

CAIRNS SHIPPING DEVELOPMENT PROJECT

Revised Draft Environmental Impact Statement

APPENDIX AQ: AEC 2016 Economic Analysis Update Report (2017)



CAIRNS SHIPPING DEVELOPMENT PROJECT 2016 ECONOMIC ANALYSIS UPDATE

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EXECUTIVE SUMMARY

This report provides an identification and economic analysis, including economic impact and value added net present value (NPV), of the economic benefits flowing from the *Cairns Shipping Development Project (CSDP)*. The CSDP seeks to invest in channel modifications that will allow vista and grand class cruise ships to access Trinity Wharf as opposed to anchoring at Yorkey's Knob.

Projected changes to cruise shipping from the CSDP are contained in *Cairns Shipping Development Project 2016 Cruise Demand Update* prepared by AEC (2017a). Also assessed are potential changes to cargo shipping and Navy shipping activity.

APPROACH

Activity surrounding the identified economic benefits has been defined and costed with any assumptions clearly stated and sourced. Economic impacts are calculated using an Input-Output model of the Cairns regional economy (Cairns Regional Council local government area), or Queensland economy where relevant. Economic impacts are generally presented for 2021, 2026 and 2031. Also calculated is the NPV from the stream of value added benefits over the period 2018 to 2043. Reported below are NPV in \$2016-17 at a 7% discount rate. NPVs of 4% and 10% were also calculated.

CSDP CONSTRUCTION

The \$120 million construction cost of the CSDP will be spent over a number of years with leadup work being undertaken from 2016-17, dredging and upgrades in 2019 followed by monitoring in 2019-20. The channel is assumed to be available for cruise shipping from 2021. The NPV of the CSDP construction is estimated at \$91.5 million in \$2016-17

CHANNEL MAINTENANCE

Channel maintenance from additional annual dredging is estimated at \$150,000 per annum. The NPV of the channel maintenance is estimated at \$1.2 million in \$2016-17.

CRUISE SHIPPING

The main effects of the channel modifications are to allow vista and grand class cruise ships access to Trinity Wharf resulting in increased expenditure from more passengers and crew in Cairns and increased expenditure on port charges, supplies and services and passenger related services by cruise lines. In addition to facilitating these larger cruise ships to berth rather than anchor at Yorkey's Knob, the availability of a larger capacity port will also attract new cruise ship calls.

Of the sixteen scenarios contained in AEC (2017a), two comparisons were chosen for economic analysis. For each comparison there is a base case and a project case, the project case being with the channel modifications. The two comparisons are:

- **Comparison A:** With Brisbane Cruise Terminal & homeporting:
 - Scenario 13: No channel modifications & no bunker (Base Case).
 - Scenario 14: With channel modifications & no bunker (Project Case).
- **Comparison B:** Business as Usual (no BCT & homeporting):
 - Scenario 5: No channel modifications & no bunker (Base Case).
 - Scenario 6: With channel modifications & no bunker (Project Case).

Comparison A results in an estimated NPV of \$728.6 million, whilst comparison B results in an estimated NPV of \$541.9 million.

HOME PORTING

Home porting delivers considerably more economic benefit than a transit call. Essentially there are twice as many passengers involved in a turnaround visit and the cruise ship is taking on sufficient provisions for the voyage. The projections in AEC (2017a) consider 20 sub-regal ship home port calls moving to 16 vista ship home port calls once the channel modifications are in place.

There is a significant risk that Cairns could lose the home porting activity as cruise lines replace the older sub-regal class ships currently used for home porting with larger vista or grand ships (as appears to be the trend), in which case without the channel modifications these ships do not fit in the port. Over the time period of the economic analysis home porting has a value added NPV of \$492.2 million. Should Cairns lose the current homeporting activity, there will be an economic loss equivalent to this value.

CAIRNS VISITATION

Additional benefits are delivered by home porting. These are passengers staying in the region pre and post cruise. The current home porting pre and post visitation NPV benefit is estimated at \$10.1 million.

Just over 61% of surveyed passengers to Cairns responded that they were likely to return to Cairns and of these, 21.8% are likely to return within 1 year, 24.2% are likely to return within 1-2 years and 46.1% sometime after 2 years. It is impossible to determine if these passengers will return and is unknown how they will return (they could be future cruise passengers in which case they are already counted in future economic impacts). The economic impact from returning passengers is therefore calculated.

CARGO

The increased depth of the channel means that bulk cargo carriers can carry a larger load meaning that the number of cargo ship visits can be reduced but deliver the same volume of cargo. This improvement in economic efficiency is passed on to producers (sugar exports) or consumers (petroleum imports). The economic benefits of reduced cargo transport costs have a NPV of \$5.5 million.

NAVY

Deeper channel access to HMAS Cairns creates the potential for the Royal Australian Navy's (RAN) largest ships (HMAS Canberra, HMAS Adelaide) to berth in Cairns. There is also the opportunity for large foreign navy ships (e.g. USS Boxer) to berth for rest and relaxation after joint naval exercises. Assuming one additional large RAN ship each year for three days and one additional foreign navy ship every six years for three days an additional NPV of \$11.7 million could be delivered.

Furthermore, the CSDP relocates the Main Swing Basin positioned adjacent to HMAS Cairns, which would enable a potential future expansion of HMAS Cairns into the inner harbour. If the expansion was to occur it would see a significant construction program as well as a tripling of personnel and operations in Cairns.

WIDER REGIONAL & STATE BENEFITS

Having a second significant home port with international air access provides additional cruising opportunities for Queensland. Based on Comparison A above, growth caused by the CSDP in the number of additional north bound Queensland loop cruises have been identified. Additional economic benefits have been estimated for Brisbane, Whitsundays and Port Douglas. Over the analysis timeframes this additional activity is estimated to deliver a NPV of \$144.6 million.

SUMMARY

As can be seen from the above the benefits of the CSDP are extensive for cruise shipping and tourism in Cairns but also extend to the rest of Queensland, the economic efficiency of cargo shipping and not only our own RAN but foreign navies as well.

The total value added to the Cairns economy by the CSDP discounted to \$2016-17 yields a NPV at a 7% real discount rate of \$848.5 million. This assumes the development of the Brisbane Cruise Terminal and the continuation of home porting. If the Brisbane Cruise Terminal does not proceed, the NPV in terms of total value added to the Cairns economy will be in the order of \$661.8 million, discounted to \$2016-17 at a 7% real discount Rate.

In addition, the CSDP will value add \$144.6 million to the wider region / State. The CSDP will also increase the resilience of home porting in Cairns by accommodating the larger Vista and Grand class ships which are the likely replacements to the current older, smaller sub-regal class ships and thereby secure \$492.2 million of value added by this key cruise shipping activity.

2014 CHANNEL CRUISE SHIPPING COMPARISON

The previous *Cairns Shipping Development Project Draft Environmental Impact Statement* (Ports North, 2014) allowed for all mega size ships to access Trinity Wharf. To model cruise ship demand under this situation two further scenarios (17 Business as Usual & 18 Brisbane Cruise Terminal) were added to the demand projections in AEC (2017a). The effect of the larger channel is to move the projected voyager class ships from Yorkey's Knob to Trinity Wharf as well as generate additional voyager ship visits by removing the assumed logistics and constraints reduction on voyager class ship visits to Yorkey's Knob.

The additional cruise shipping activity in Cairns from these two scenarios results in a marginal increase in a \$2016-17 NPV at a 7% real discount rate over the proposed 2017 channel of \$338.9 million for Comparison A and \$219.2 million for Comparison B respectively.

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1. INTRODUCTION

1.1 BACKGROUND

In June 2012, Ports North completed a *Cruise Shipping Development Strategy*, which included a *Demand Study* (BMT WBM, 2011) and a *Business Case* for improved cruise infrastructure in Cairns. The business case included a preliminary project scoping and design, preliminary environmental assessment, cost benefit analysis and financial model.

The business case concluded that there was sufficient benefits and flow on effects for the regional economy to justify Ports North proceeding with the preparation of an Environmental Impact Statement (EIS) for the 'Cairns Shipping Development Project' (CSDP). The project scope was based on accommodating the forecast demand for transit mega class cruise vessels in the sun, vista, grand and voyager class (see AEC (2017a) for definitions).

The CSDP involved upgrading of the following infrastructure:

- Expansion of the existing shipping channel and the shipping channel swing basin.
- Expansion of the existing marine dredge material placement area.
- 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.

The EIS required an assessment of the economic benefits of the project for the Cairns Region based on the increased cruise ship visitations that would result from the proposed infrastructure improvements, especially the channel upgrade. To enable this assessment, it was decided that the 2011 *Demand Study* (BMT WBM, 2011) should be updated to reflect the latest growth trends. Consequently, BMT WBM were recommissioned to undertake the *2014 Demand Study Update* (BMT WBM, 2014) as input to the EIS economic assessments. Cummings Economics were commissioned to undertake the *Cairns Shipping Development EIS Economic Analysis* (Cummings, 2014).

Subsequent to the commencement of the EIS, the Federal Government's regulation on sea disposal and the State Government's *Sustainable Ports Development Act 2015* have impacted the project. The banning of capital dredging sea disposal significantly impacted on the project viability, which required the project scope to be recalibrated by reducing dredging volumes and placing the dredge material on land.

The original scope was based on target ship classes including sun, grand, vista and voyager class. Ports North is now considering vista and grand class vessels as the alternative for defining project scope, particularly when the original demand study showed that the largest number of additional cruise ships forecast for Cairns were vista class vessels. It is noted that port access for sun class vessels using the existing channel has been granted following successful simulation.

Ports North has completed an assessment of channel designs and completed comprehensive simulations using the Smartship simulator facility in Brisbane on the preferred alignment for both vista and grand class vessels. As a result of the simulation the Regional Harbour Master (RHM) has approved the preferred channel alignment for vista and grand class vessels. The channel upgrade will also include channel deepening for improved access. The feasibility of the revised project will therefore be more critically dependant on demand for transit visits by vessel sizes in the vista and grand classes and on home porting opportunities for vista class vessels.

1.2 2016 DEMAND STUDY UPDATE

AEC (2017a) was engaged to prepare a *2016 Demand Study Update* to forecast the increased number of cruise ship visits to Cairns resulting from the proposed channel upgrade and the emerging changes in the cruise industry. AEC will use these forecasts in this report.

1.3 THIS DOCUMENT

This document contains an economic analysis of the benefits arising from the CSDP based on selected demand projections of future cruise ships visits to Cairns from AEC (2017a) and from other increased Port activities and efficiencies. It comprises the following sections:

- *Section 2 Approach* identifies the economic benefits associated with the CSDP, details the methodology used for the economic impacts and the net present value calculation.
- *Section 3 CSDP Construction* analyses the construction activity undertaken for the CSDP.
- *Section 4 Channel Maintenance* analyses the additional operational expenditure to maintain the modified channel.
- *Section 5 Cruise Shipping* analyses the changes to cruise shipping activity in Cairns.
- *Section 6 Home Porting* analyses the home porting of cruise ships in Cairns.
- *Section 7 Cairns Visitation* analyses additional Cairns visitation by cruise passengers, including pre and post cruise and revisitation.
- *Section 8 Cargo* analyses changes to cargo shipping activity.
- *Section 9 Navy* analyses potential changes to Navy shipping activity and HMAS Cairns expansion.
- *Section 10 Wider Regional & State Benefits* analyses the wider regional and state benefits of additional cruising generated by the CSDP.
- *Section 11 Summary* summarises the outcomes of the economic analysis.
- *Section 12 2014 Channel Cruise shipping* presents two additional cruise shipping activity impacts based on the previous 2014 channel configuration.

2. APPROACH

Three types of economic analysis are presented in this report (where they are relevant). They are:

- *Economic benefits & costs* – the identification of economic benefits and costs arising from the project.
- *Economic impacts* – the increased expenditure caused by the project at various points in time including direct and indirect impacts. These are expressed in terms of output (expenditure), income, employment and value added.
- *Net present value* – the present value (in \$2016-17) of the value added economic activity over the entire project assessment period (2018 to 2043).

Each of these are described further below.

2.1 ECONOMIC BENEFITS & COSTS

The first step is to identify the economic benefits and costs and quantify them. The following economic benefits have been identified for the CSDP:

- 1 Construction activity undertaken for the CSDP.
- 2 Additional operational expenditure to maintain the modified channel.
- 3 Changes to cruise shipping activity.
- 4 Home porting of cruise ships.
- 5 Additional Cairns visitation.
- 6 Changes to cargo shipping activity.
- 7 Changes to Navy shipping activity and potential HMAS Cairns expansion.
- 8 Wider regional and state benefits.

The following economic costs have been identified for the CSDP.

- 1 Environmental impacts from additional dredging.
- 2 Dredging and disposal of dredge material.

Each of the economic benefits are quantified where possible. All sources of data and assumptions are clearly stated. The quantification of economic benefits are used to determine the economic impacts and net present values (NPV).

The economic costs have only been considered in relation to the economic benefits generated by the construction and increased operational activity. The economic costs will be fully considered in the cost benefit analysis for the Project Business Case, to be undertaken by others.

2.2 ECONOMIC IMPACTS

To assess the economic impacts of increased expenditure Input-Output modelling is used to examine the direct and flow-on activity expected to be supported within the Cairns economy (defined by the Cairns Regional Council local government area) by economic activity facilitated by the CSDP.

Input-Output analysis demonstrates inter-industry relationships in an economy, depicting how the output of one industry is purchased by other industries, households, the government and external parties (i.e. exports), as well as expenditure on other factors of production such as labour, capital and imports. Input-Output analysis shows the direct and indirect (flow-on) effects of one sector on other sectors and the general economy. As such, Input-Output modelling can be used to demonstrate the economic contribution of a sector on the overall economy and how much the economy relies on this sector or to examine a change in final demand of any one sector and the resultant change in activity of its supporting sectors.

The economic contribution can be traced through the economic system via:

- **Direct impacts**, which are the first round of effects from direct operational expenditure on goods and services.
- **Indirect impacts**, which comprise the second and subsequent round effects of increased purchases by suppliers in response to increased sales. Flow-on impacts can be disaggregated to:
 - **Industry Support Effects (Type I)**, which represent the production induced support activity as a result of additional expenditure by the industry experiencing the stimulus on goods and services in the intermediate usage quadrant, and subsequent round effects of increased purchases by suppliers in response to increased sales.
 - **Household Consumption Effects (Type II)**, which represent the consumption induced activity from additional household expenditure on goods and services resulting from additional wages and salaries being paid within the economic system.

These effects can be identified through the examination of four types of impacts:

- **Output:** Refers to the gross value of goods and services transacted, including the costs of goods and services used in the development and provision of the final product. Output typically overstates the economic impacts as it counts all goods and services used in one stage of production as an input to later stages of production, hence counting their contribution more than once.
- **Value added:** Refers to the value of output after deducting the cost of goods and services inputs in the production process. Value added defines the true net contribution and is subsequently the preferred measure for assessing economic impacts.
- **Income:** Measures the level of wages and salaries paid to employees of the industry under consideration and to other industries benefiting from the project.
- **Employment:** Refers to the part-time and full-time employment positions generated by the economic shock, both directly and indirectly through flow-on activity, and is expressed in terms of full time equivalent (FTE) positions.

Input-Output multipliers can be derived from open (Type I) Input-Output models or closed (Type II) models. Open models show the direct effects of spending in a particular industry as well as the indirect or flow-on (industrial support) effects of additional activities undertaken by industries increasing their activity in response to the direct spending.

Closed models re-circulate the labour income earned as a result of the initial spending through other industry and commodity groups to estimate consumption induced effects (or impacts from increased household consumption).

2.2.1 Model Development

Multipliers used in this assessment are derived from sub-regional transaction tables developed specifically for this project. The process of developing a sub-regional transaction table involves developing regional estimates of gross production and purchasing patterns based on a parent table, in this case, the 2013-14 Australian transaction table (ABS, 2016a).

Estimates of gross production (by industry) in the study areas were developed based on the percent contribution to employment (by place of work) of the study areas to the Australian economy (ABS, 2012), and applied to Australian gross output identified in the 2013-14 Australian table.

Industry purchasing patterns within the study area were estimated using a process of cross industry location quotients and demand-supply pool production functions as described in West (1993).

Where appropriate, values were rebased from 2013-14 (as used in the Australian national IO transaction tables) to 2016-17 values using the Consumer Price Index (ABS, 2016b). The multipliers used are provided in **Appendix A**.

2.2.2 Modelling Assumptions

The key assumptions and limitations of Input-Output analysis include:

- **Lack of supply-side constraints:** The most significant limitation of economic impact analysis using Input-Output multipliers is the implicit assumption that the economy has no supply-side constraints so the supply of each good is perfectly elastic. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.
- **Fixed prices:** Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using Input-Output multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. The system is in equilibrium at given prices, and prices are assumed to be unaffected by policy and any crowding out effects are not captured. This is not the case in an economic system subject to external influences.
- **Fixed ratios for intermediate inputs and production (linear production function):** Economic impact analysis using Input-Output multipliers implicitly assumes that there is a fixed input structure in each industry and fixed ratios for production. That is, the input function is generally assumed linear and homogenous of degree one (which implies constant returns to scale and no substitution between inputs). As such, impact analysis using Input-Output multipliers can be seen to describe average effects, not marginal effects. For example, increased demand for a product is assumed to imply an equal increase in production for that product. In reality, however, it may be more efficient to increase imports or divert some exports to local consumption rather than increasing local production by the full amount. Further, it is assumed each commodity (or group of commodities) is supplied by a single industry or sector of production. This implies there is only one method used to produce each commodity and that each sector has only one primary output.
- **No allowance for economies of scope:** The total effect of carrying on several types of production is the sum of the separate effects. This rules out external economies and diseconomies and is known simply as the “additivity assumption”. This generally does not reflect real world operations.
- **No allowance for purchasers’ marginal responses to change:** Economic impact analysis using multipliers assumes that households consume goods and services in exact proportions to their initial budget shares. For example, the household budget share of some goods might increase as household income increases. This equally applies to industrial consumption of intermediate inputs and factors of production.
- **Absence of budget constraints:** Assessments of economic impacts using multipliers that consider consumption induced effects (type two multipliers) implicitly assume that household and government consumption is not subject to budget constraints.

Despite these limitations, Input-Output techniques provide a solid approach for taking account of the inter-relationships between the various sectors of the economy in the short-term and provide useful insight into the quantum of final demand for goods and services, both directly and indirectly, likely to be generated by a project.

In addition to the general limitations of Input-Output Analysis, there are two other factors that need to be considered when assessing the outputs of sub-regional transaction table developed using this approach, namely:

- It is assumed the sub-region has similar technology and demand/ consumption patterns as the parent (Australia) table (e.g. the ratio of employee compensation to employees for each industry is held constant).
- Intra-regional cross-industry purchasing patterns for a given sector vary from the national tables depending on the prominence of the sector in the regional economy compared to its input sectors. Typically, sectors that are more prominent in the region (compared to the national economy) will be assessed as purchasing a higher proportion of imports from input sectors than at the national level, and vice versa.

2.3 NET PRESENT VALUE

Net present value (NPV) is a technique used to reduce a stream of monetary values in the future to today's values. This reduction is called discounting and is calculated using a discount rate. As per Building Queensland (2016) real discount rates of 4%, 7% and 10% are used. Cash flows are assumed to occur at the end of the period.

$$NPV = \sum_{i=1}^n \frac{values_i}{(1 + rate)^i}$$

The period used for analysis is generally from 2017 to 2043 but is stated where NPV calculation are calculated in the relevant section.

3. CSDP CONSTRUCTION

3.1 ACTIVITY

As mentioned in the introduction, Ports North has developed a channel design suitable for access to Trinity Wharf for vista and grand class ships. The design requires dredging of soft and stiff clay, placement of the dredged material on land to be acquired by Ports North, wharfs and services upgrades and associated professional services and fees.

The estimated capital costs are given in Table 3.1 in the years in which they are incurred. The project is estimated to have a capital cost of \$120 million. The project spans a number of years with leadup work being undertaken from 2016-17, dredging and upgrades in 2019 followed by monitoring in 2019-20. This includes a \$10.2 million contingency which has been allocated proportionately across expenditure items in 2019 with the exception of Monitoring & Offset.

3.2 ECONOMIC BENEFIT

Also included in Table 3.1 are the industries in which the activity occurs for the purposes of economic impact assessment. It will be noted that site acquisition and statutory fees are not allocated to an industry as these are transfer payments and have no economic impact. Even though dredging activity is included in construction services a separate exercise was undertaken for the draft EIS to determine the number of jobs that it would generate. This exercise estimated 1.5 FTEs per \$1 million of output. This is much lower than the 3.5 FTEs in the construction services sector therefore an additional industry was established for dredging.

Table 3.1 CSDP Capital Costs (\$M 2016-17)

Cost	2016	2017	2018	2019	Contingency	2020	Total	Industry
Dredging (12-16 weeks)								
<i>Soft clay</i>								
Establishment / demobilisation				\$5.1	\$0.6		\$5.7	Dredging
Dredging & pumping soft clay				\$35.6	\$3.9		\$39.5	Dredging
<i>Stiff clay</i>								
Establishment / demobilisation				\$2.1	\$0.2		\$2.3	Dredging
Dredging & barges				\$3.1	\$0.3		\$3.4	Dredging
<i>Total</i>	\$0.0	\$0.0	\$0.0	\$45.9	\$5.0	\$0.0	\$50.9	
Land Placement								
<i>Soft clay</i>								
Site acquisition				\$9.7	\$1.1		\$10.8	N/a
Prepare site and construct pipeline				\$6.6	\$0.7		\$7.3	Heavy and Civil Engineering Construction
<i>Stiff clay</i>								
Site acquisition					\$0.0		\$0.0	N/a
Prepare site, transport and place material				\$3.8	\$0.4		\$4.2	Road Transport
<i>Total</i>	\$0.0	\$0.0	\$0.0	\$20.1	\$2.2	\$0.0	\$22.3	
Wharfs & services upgrades				\$22.0	\$2.4		\$24.4	Heavy and Civil Engineering Construction
Professional services & fees								
EIS	\$2.3	\$2.3						Construction Services
Statutory fees		\$0.6						N/a
Engineering services			\$5.2	\$5.2	\$0.6		\$10.9	Construction Services
Monitoring & offset				\$3.2		\$3.2	\$6.3	Professional, Scientific and Technical Services
<i>Total</i>	\$2.3	\$2.9	\$5.2	\$8.3	\$0.6	\$3.2	\$22.4	
Total	\$2.3	\$2.9	\$5.2	\$96.3	\$10.2	\$3.2	\$120.0	

Source: Ports North (unpublished), AEC

3.3 ECONOMIC IMPACT

Applying the channel modification expenditure to the Cairns economy sees the following increase in economic impacts over the length of the project.

Table 3.2 CSDP Construction Economic Impacts (\$M 2016-17)

Impact	2016	2017	2018	2019	2020
Output (\$M)					
Direct	\$2.3	\$2.3	\$5.2	\$95.7	\$3.2
Indirect	\$3.4	\$3.4	\$7.5	\$145.0	\$4.7
Total	\$5.7	\$5.7	\$12.7	\$240.8	\$7.8
Wages Income (\$M)					
Direct	\$0.4	\$0.4	\$0.9	\$18.3	\$1.1
Indirect	\$0.8	\$0.8	\$1.8	\$36.1	\$1.3
Total	\$1.2	\$1.2	\$2.8	\$54.5	\$2.3
Employment (FTEs)					
Direct	8	8	18	148	13
Indirect	12	12	28	537	18
Total	20	20	46	685	31
Value Added (\$M)					
Direct	\$0.7	\$0.7	\$1.7	\$33.2	\$1.6
Indirect	\$1.6	\$1.6	\$3.6	\$71.4	\$2.6
Total	\$2.4	\$2.4	\$5.3	\$104.7	\$4.2

Source: AEC

3.4 NET PRESENT VALUE

Discounting the total value added impacts of the CSDP construction over the period 2016 to 2020 to \$2016-17 yields a NPV at a 7% real discount rate of \$91.5 million.

Table 3.3 NPV CSDP Construction Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$102.1
7%	\$91.5
10%	\$82.2

Source: AEC

4. CHANNEL MAINTENANCE

4.1 ACTIVITY

Once the channel is modified it will require annual dredging to maintain. This additional dredging will be in addition to the current annual dredging program. The additional amount of material required to be dredged has been calculated at 30,000 cubic meters at a cost of \$5/cm resulting in an additional maintenance cost of \$150,000.

Table 4.1 Channel Maintenance Costs (\$M 2016-17)

Activity	Volume (cm)	Rate/cm	Cost
Current maintenance dredging	320,000	\$5.00	\$1,600,000
Increased maintenance dredging	350,000	\$5.00	\$1,750,000
<i>Additional dredging</i>	<i>30,000</i>	<i>\$5.00</i>	<i>\$150,000</i>

Source: Ports North (unpublished)

Maintenance costs associated with other components of the CSDP such as wharfs and services upgrades are included in business as usual and therefore do not require additional expenditure.

4.2 ECONOMIC BENEFIT

The economic benefit to Cairns from the maintenance dredging is the additional expenditure on dredging of \$150,000 per annum. This is applied to the dredging industry created for the CSDP construction impact assessment.

4.3 ECONOMIC IMPACT

Applying the channel maintenance expenditure to the Cairns economy sees the following increase in economic impacts each year commencing in 2021.

Table 4.2 Annual Channel Maintenance Economic Impacts (\$M 2016-17)

Impact	2021 on
Output (\$M)	
Direct	\$0.15
Indirect	\$0.22
Total	\$0.37
Wages Income (\$M)	
Direct	\$0.0
Indirect	\$0.1
Total	\$0.1
Employment (FTEs)	
Direct	0.22
Indirect	0.81
Total	1.03
Value Added (\$M)	
Direct	0.05
Indirect	0.11
Total	0.15

Source: AEC

4.4 NET PRESENT VALUE

Discounting the total value added impacts of the channel maintenance over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$1.2 million.

Table 4.3 NPV Channel Construction Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$1.9
7%	\$1.2
10%	\$0.9

Source: AEC

5. CRUISE SHIPPING

5.1 ACTIVITY

With the channel modifications in place vista and grand class cruise ships will be able to access Trinity Wharf. This access is predicted to change cruise shipping activity to Cairns. Whilst dredging and wharf upgrades are currently programmed for 2019 the channel could be available from 2020. However, the assumption is to commence any new cruise activity in 2021 to allow new cruise line schedules to be fully established. Because the starting point for cruise shipping activity prior to the channel modifications being in place is subject to change cruise shipping activity post channel modifications is also subject to change. Changes to cruise shipping activity are therefore compared based on two different starting scenarios (or base cases) sourced from AEC (2017a). These starting and project scenarios are:

- **Comparison A:** With Brisbane Cruise Terminal (BCT) & homeporting:
 - Starting scenario: Scenario 13: No channel modifications & no bunker.
 - Project scenario: Scenario 14: With channel modifications & no bunker.
- **Comparison B:** Business as Usual (no BCT & homeporting):
 - Starting scenario: Scenario 5: No channel modifications & no bunker.
 - Project scenario: Scenario 6: With channel modifications & no bunker.

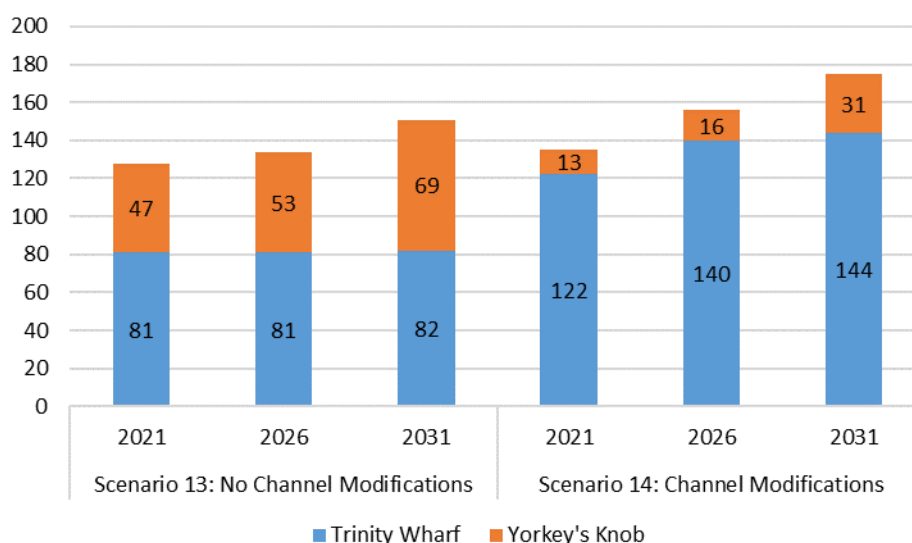
These are further described below.

5.1.1 Comparison A

The major difference between scenarios 13 and 14 is the number and size of visiting ships that can access Trinity Wharf as opposed to Yorkey's Knob anchorage with channel modifications in place (see Figure 5.1). There is also a small increase in the number of cruise ships visiting Cairns. The increased number of ships berthing at Trinity Wharf will have the following impacts:

- Increased numbers of passengers and crew going ashore and therefore their expenditure.
- Increased cruise line expenditure on port charges, services and supplies and passenger related expenses.

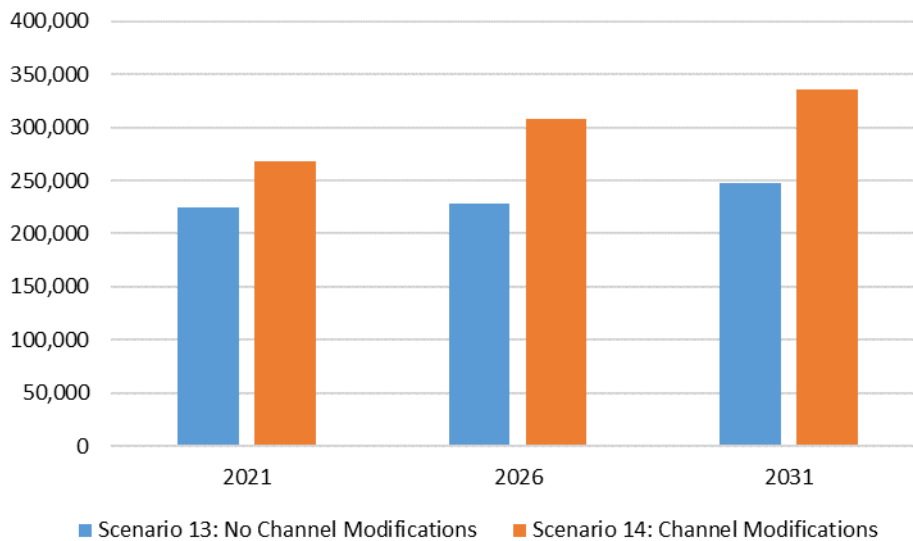
Figure 5.1 Comparison A: Projected Ship Visits to Trinity Wharf & Yorkey's Knob (Scenario 13 v 14, Medium Projection)



Source: AEC (2017a)

The number of passenger days in port is a critical driver of aggregate passenger expenditure. As can be seen in Figure 5.2 there is an increase in passengers in scenario 14 with a modified channel.

Figure 5.2 Comparison A: Projected Passenger Days in Port (Scenario 13 v 14, Medium Projection)



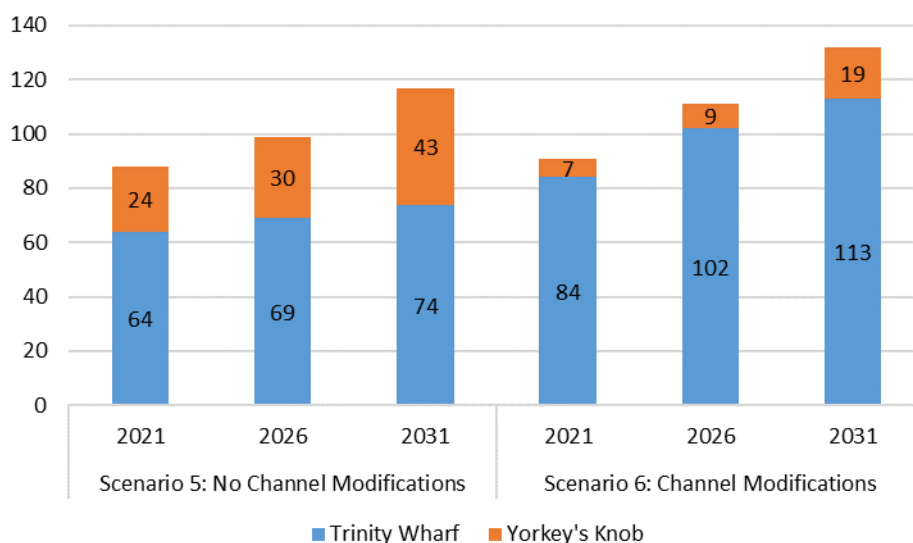
Source: AEC

5.1.2 Comparison B

Similar to comparison A, the major difference between scenarios 5 and 6 is the number and size of visiting ships that can access Trinity Wharf as opposed to Yorkey’s Knob anchorage with channel modifications in place (see Figure 5.3). There is also a small increase in the number of ships visiting Cairns. The increased number of ships berthing at Trinity Wharf will have the following impacts:

- Increased numbers of passengers and crew going ashore and therefore their expenditure.
- Increased cruise line expenditure on port charges, services and supplies and passenger related expenses.

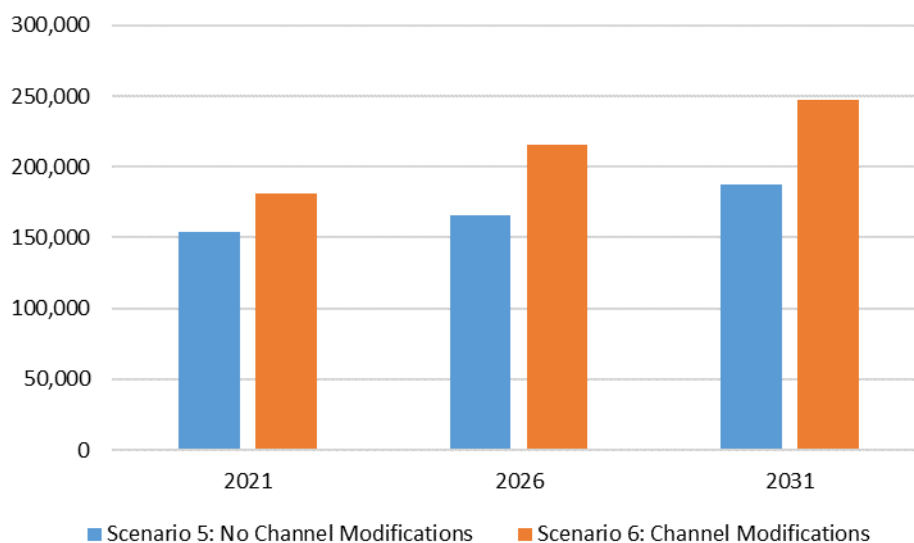
Figure 5.3 Comparison B: Projected Ship Visits to Trinity Wharf & Yorkey’s Knob (Scenario 5 v 6, Medium Projection)



Source: AEC (2017a)

The number of passenger days in port is a critical driver of aggregate passenger expenditure. As can be seen in Figure 5.4 there is an increase in passengers for scenario 6 when the channel has been modified.

Figure 5.4 Comparison B: Projected Passenger Days in Port (Scenario 5 v 6, Medium Projection)



Source: AEC

5.2 ECONOMIC BENEFIT

The approach taken to quantify the expenditure generated by cruise ship visits is similar to that used by the Australian Cruise Association (ACA, 2016). Expenditure generated by cruise shipping activity is broken down into the following categories:

- Passenger and crew expenditure in port.
- Port charges.
- Supplies and services supplied to the cruise ship.
- Passenger related charges.
- Cruise line corporate expenditure.

5.2.1 Passenger & Crew Expenditure

Expenditure by passengers and crew at ports of call is a major component of cruise generated expenditure. Data on this expenditure was collected through passenger and crew intercept surveys at Trinity Wharf and Yorkey's Knob, by AEC (2017b) for the purposes of informing this study.

The expenditure levels from these various surveys are subject to sample bias and should therefore be interpreted with caution and considered indicative only. Furthermore, there is degradation of survey accuracy once segmentation is undertaken (e.g. arriving, departing, transit, domestic, international, crew, passenger). However, at the same time, the surveys provide the most accurate, targeted and up-to-date information on passenger and crew expenditure levels. Various techniques are used to smooth variations across years as much as possible.

Assumptions regarding the proportion of passengers and crew disembarking transiting ships for Trinity Wharf or Yorkey's Knob are taken from ACA (2016). Figures used are:

- 90% of passengers for Trinity Wharf.
- 70% of passengers for Yorkey's Knob.
- 50% of crew for Trinity Wharf.

- 10% of crew for Yorkey's Knob.

If a ship is undertaking a turnaround (Trinity Wharf only) then the proportion of passengers in Cairns is 200% (i.e. 100% disembarking, 100% embarking) and remains at 50% for crew.

Surveys show that there are different expenditure patterns between international and domestic passengers and international and domestic crew. As the international v domestic mix of passengers and crew are not known average expenditure figures have been used.

There are also significant differences between transiting and turnaround passengers. Since there is no survey data for turnaround ships in Cairns, Brisbane data is used. Passenger and crew expenditure used is contained in the table below. AEC (2017b) obtained insufficient crew surveys at Yorkey's Knob (mainly because so few crew go ashore) therefore the percentage difference in passenger expenditure between Trinity Wharf and Yorkey's Knob was applied to Trinity Wharf crew expenditure to give crew expenditure at Yorkeys Knob.

Table 5.1 Surveyed International and Domestic Passenger Expenditure

Expenditure	2014-15 Survey		2017 Survey					
	Pax	Crew	Pax	Crew	Pax	Crew	Pax	Pax
	Cairns Turnaround (Same as Brisbane)		Trinity Wharf		Yorkey's Knob		Trinity Wharf 1 Day 2 Day	
Shopping	\$86.98	\$17.97	\$105.27	\$173.20	\$114.94	\$147.74	\$85.01	\$127.21
Food and Drinks	\$105.00	\$210.73	\$74.28	\$163.28	\$17.35	\$139.28	\$102.91	\$89.80
Organised Tours	\$566.11	\$119.41	\$207.07	\$0.00	\$226.95	\$0.00	\$148.55	\$170.92
Entertainment/Gambling	\$2.92	\$0.00	\$31.19	\$53.62	\$2.21	\$45.73	\$30.85	\$42.87
Transport	\$38.05	\$34.93	\$7.67	\$0.74	\$0.17	\$0.64	\$5.44	\$6.93
Other	\$3.22	\$0.00	\$0.00	\$2.13	\$1.33	\$1.81	\$0.00	\$0.97
Total	\$802.28	\$383.04	\$425.49	\$392.97	\$362.94	\$335.20	\$372.77	\$438.71

Source: AEC (2015), AEC (2017b)

An inflation rate of 2.5% is used to inflate the 2014-15 prices to 2016-17 prices.

5.2.2 Port Charges

Port operators and service providers levy a range of charges on visiting cruise ships for seaside activities. These charges generally include:

- **Navigation service charge** – a charge to cover the cost of maintaining channels and navigation aids throughout the port and harbour area. The charge is generally levied based on the gross registered tonnage (GRT) of the vessel (this charge sometimes includes pilotage). Cairns does not levy navigation charges on cruise ships.
- **Berthing/ wharfage charge** – a charge for the use of a port berth, which is generally levied according to ship length and time at wharf. Berthing charges for ships berthing at Trinity Wharf have been calculated from PN (2017) based on length of the ship and an assumed average duration of 22 hours¹.
- **Line rates** – a charge for securing a ship to a wharf often provided by a third party service provider. Line rates for ships mooring at Trinity Wharf have been calculated from PN (2017).
- **Pilotage** – a charge for the piloting of the vessel to a berth from the entrance of the harbour or start of the harbour channel, which is generally levied according to a vessel's length. Pilotage for ships entering and departing the Port of Cairns have been calculated from MSQ (2017) and for pilot boat hire from PN (2017).
- **Towage** – a charge for the use of tug boats to position the vessel at a berth or to assist a vessel departing a berth. Towage is generally provided by a third party service provider independent of the port and is generally

¹ In 2016 there were 18 2 days visits and 24 1 day visits. Assuming 12 hours for a 1 day visit and 36 hours for a 2 days visit gives an average of 22 hours.

levied according to a vessel's GRT. Towage for ships entering the Port of Cairns have been calculated from Svitzer Australia provided by PN. It has been assumed that only one tug is required on average.

- **Mooring** – a mooring charge of \$5,000 is applied for a cruise ship to moor at Yorkey's Knob in 2016-17.

It has been assumed that there are no increases to Port of Cairns charges due to the channel investment.

Where charges are for years prior to 2016-17 an inflation rate of 2.5% per annum is used to inflate to 2016-17 prices.

5.2.3 Supplies & Services

Port operators and service providers offer a range of landside services for cruise lines, including:

- **Supplies:**
 - *Fuel* – fuel bunkering services. Fuel has not been included in the assessment. Although it is noted that it is currently supplied to homeporting ships
 - *Stores/provisions* – food and beverage provisioning. ACA (2016) assumes an amount of \$12.70 per passenger for 2015-16 for transiting passengers. For a seven day turnaround cruise an amount of \$388.44 per head (passenger + crew) has been assumed. Further details are provided in **Appendix B**.
 - *Water* – supply of potable water. PN (2017) has a charge of \$2.41 per kilolitre and ACA (2016) assumes 0.3 kilolitre per passenger.
- **Vessel services:**
 - *Wastewater collection* - PN (2017) does not contain a fee for wastewater so the ACA (2016) amount of \$1.81 per passenger for 2015-16 is used.
 - *Garbage collection* - PN (2017) assumes a service fee of \$174.32 and a fee of \$2.32/kg for amounts less than 100kg. This fee is reduced for larger volumes.
- *Tendering* – Cummings (2014) calculated an amount of \$17 per passenger.

Where charges are for years prior to 2016-17 an inflation rate of 2.5% per annum is used to inflate to 2016-17 prices.

5.2.4 Passenger Related Expenditure

Port operators and service providers frequently provide passenger related services to cruise lines, including:

- **Passenger levy** – Ports North (2017) imposes a passenger levy on cruise ships as follows:

Table 5.2 Cairns Seaport Passenger Levy, from 1 January 2017

Passenger Levy	Unit	GST Ex
Vessels based in Cairns (a)		
Charge per passenger	\$/pax	\$3.00
Charge per passenger using CCLT	\$/pax	\$7.00
Vessels Not Based in Cairns		
Passenger charge (transit)	\$/pax	\$8.00
Passenger charge (embark/disembark)	\$/pax	\$6.51

Note: (a) vessels based in Cairns refers to those who are headquartered in Cairns and operate on a predetermined regular schedule from the Port of Cairns.

Source: PN (2017)

- **Security** – PN (2017) imposes security charges for cruise ships which are \$4,268.44 per visit per day (excludes security guards the cost of which are not included in the assessment).
- **Baggage handling/screening** – passenger screening including luggage. PN (2017) imposes the following fees per visit:

- Turnaround screening (>500 pax) \$6,221.25.
- Turnaround screening (<500 pax) \$2,625.00.
- Transit screening (all vessels) \$1,312.50.

5.2.5 Cruise Line Corporate Expenditure

Corporate expenditure is expenditure by cruise operators excluding port activity outlined above. Expenditure includes corporate head office administration and professional expenses and travel agents commission. Corporate expenditure has been based on estimates presented by BREa (2014) in *The Contribution of Cruise Tourism to the Australian Economy in 2013* study. The amount of this expenditure was \$220.8 million in 2013 and has been grossed up by the increase in ship visits. Most expenditure has been assumed to be located within Sydney with assumptions made regarding the distribution of expenditure throughout ports in Australia based on turnaround passenger share. This means that in 2015-16 Cairns was allocated \$7,500.

It may be argued that cruise lines would not actually spend this amount in Cairns. Since the amount is included in the base case and the ‘with facility’ cases, the figure nets to zero when considering the expenditure increases of the ‘with facility’ cases against the base case and therefore has no material impact on the analysis and has been excluded.

5.2.6 Total Expenditure

5.2.6.1 Comparison A

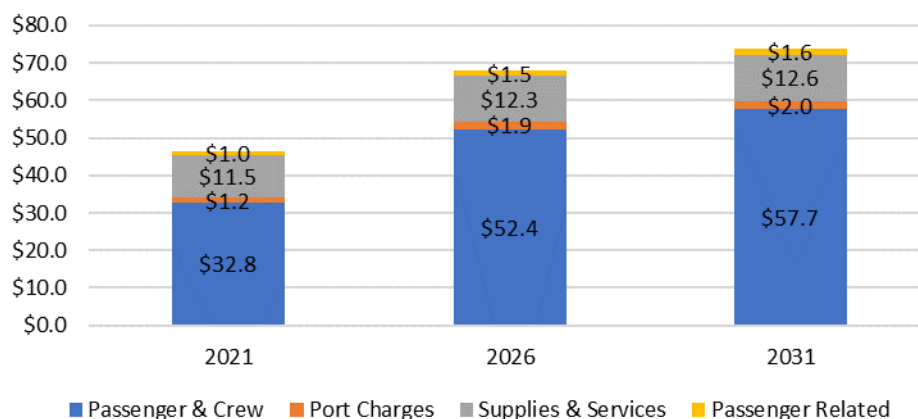
Applying the various expenditures associated with cruise shipping activity for comparison A results in an increase in expenditure in the project case totalling \$46.5 million in 2021, increasing to \$73.8 million in 2031. The largest increase comes from passenger and crew expenditure.

Table 5.3 Comparison A Cruise Related Expenditure (Medium Projection, \$M 2016-17)

Category	Scenario 13 (Base Case)			Scenario 14 (Project Case)			Increase		
	2021	2025	2031	2021	2025	2031	2021	2025	2031
Passenger & Crew	\$127.7	\$127.7	\$134.2	\$160.5	\$180.0	\$191.9	\$32.8	\$52.4	\$57.7
Port Charges	\$3.7	\$3.8	\$4.0	\$4.9	\$5.7	\$6.1	\$1.2	\$1.9	\$2.0
Supplies & Services	\$13.9	\$13.9	\$14.2	\$25.4	\$26.2	\$26.7	\$11.5	\$12.3	\$12.6
Passenger Related	\$1.6	\$1.6	\$1.5	\$2.6	\$3.0	\$3.1	\$1.0	\$1.5	\$1.6
Total	\$146.9	\$146.9	\$153.9	\$193.4	\$215.0	\$227.8	\$46.5	\$68.1	\$73.8

Source: AEC

Figure 5.5 Comparison A Increase in Cruise Related Expenditure of Project Case less Base Case (Medium Projection, \$M 2016-17)



Source: AEC

5.2.6.2 Comparison B

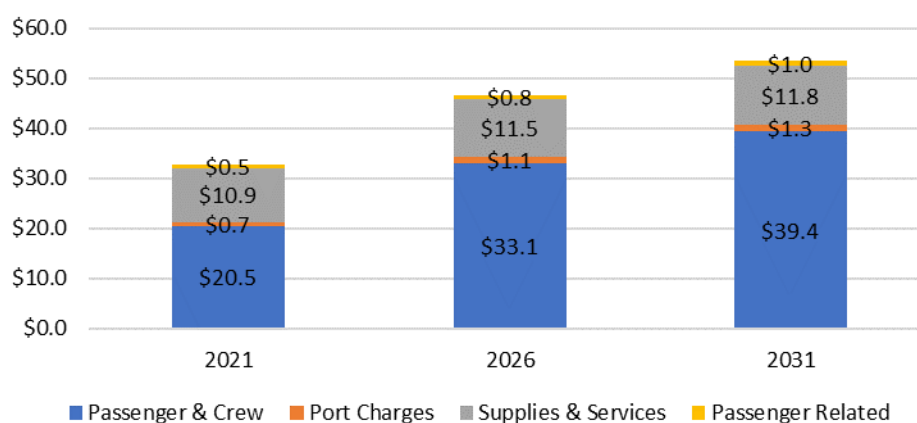
Applying the various expenditures associated with cruise shipping activity as for comparison A, results in an increase in expenditure in the project case totalling \$32.7 million in 2021, increasing to \$53.5 million in 2031. The largest increase comes from passenger and crew expenditure.

Table 5.4 Comparison B Cruise Related Expenditure (Medium Projection, \$M 2016-17)

Category	Scenario 13 (Base Case)			Scenario 14 (Project Case)			Increase		
	2021	2025	2031	2021	2025	2031	2021	2025	2031
Passenger & Crew	\$96.0	\$100.7	\$109.1	\$116.5	\$133.8	\$148.5	\$20.5	\$33.1	\$39.4
Port Charges	\$2.6	\$2.9	\$3.3	\$3.3	\$4.0	\$4.6	\$0.7	\$1.1	\$1.3
Supplies & Services	\$12.5	\$12.7	\$13.1	\$23.5	\$24.2	\$24.8	\$10.9	\$11.5	\$11.8
Passenger Related	\$1.3	\$1.3	\$1.3	\$1.8	\$2.2	\$2.3	\$0.5	\$0.8	\$1.0
Total	\$112.4	\$117.6	\$126.8	\$145.1	\$164.2	\$180.2	\$32.7	\$46.6	\$53.5

Source: AEC

Figure 5.6 Comparison B Increase in Cruise Related Expenditure of Project Case less Base Case (Medium Projection, \$M 2016-17)



Source: AEC

The economic impact of a single cruise ship switching from Yorkey's Knob to Trinity Wharf is explored further in **Appendix C**.

5.3 ECONOMIC IMPACT

Applying the cruise activity expenditure to the Cairns economy sees the following economic impacts in 2021, 2025 and 2031.

Table 5.5 Comparison A Cruise Related Economic Impacts (Medium Projection, \$M 2016-17)

Impact	Scenario 13 (Base Case)			Scenario 14 (Project Case)			Increase		
	2021	2025	2031	2021	2025	2031	2021	2025	2031
Output (\$M)									
Direct	\$146.9	\$146.9	\$153.9	\$193.4	\$215.0	\$227.8	\$46.5	\$68.1	\$73.8
Indirect	\$181.7	\$181.5	\$189.5	\$241.0	\$266.9	\$281.9	\$59.2	\$85.4	\$92.4
Total	\$328.7	\$328.5	\$343.5	\$434.4	\$481.9	\$509.7	\$105.7	\$153.4	\$166.2
Wages Income (\$M)									
Direct	\$39.7	\$39.6	\$41.3	\$53.0	\$58.7	\$61.9	\$13.2	\$19.0	\$20.6
Indirect	\$47.9	\$47.8	\$50.0	\$63.3	\$70.2	\$74.2	\$15.5	\$22.4	\$24.2
Total	\$87.6	\$87.5	\$91.3	\$116.3	\$128.9	\$136.1	\$28.7	\$41.4	\$44.8
Employment (FTEs)									

Impact	Scenario 13 (Base Case)			Scenario 14 (Project Case)			Increase		
	2021	2025	2031	2021	2025	2031	2021	2025	2031
Direct	902	905	961	1,161	1,311	1,407	259	406	445
Indirect	717	716	748	946	1,049	1,109	229	333	361
Total	1,619	1,621	1,710	2,107	2,360	2,515	488	739	806
Value Added (\$M)									
Direct	\$71.9	\$71.9	\$75.4	\$94.8	\$105.7	\$112.1	\$23.0	\$33.8	\$36.7
Indirect	\$98.9	\$98.8	\$103.2	\$131.2	\$145.3	\$153.5	\$32.3	\$46.5	\$50.4
Total	\$170.8	\$170.7	\$178.6	\$226.0	\$251.0	\$265.6	\$55.2	\$80.3	\$87.1

Source: AEC

Table 5.6 Comparison B Cruise Related Economic Impacts (Medium Projection, \$M 2016-17)

Impact	Scenario 13 (Base Case)			Scenario 14 (Project Case)			Increase		
	2021	2025	2031	2021	2025	2031	2021	2025	2031
Output (\$M)									
Direct	\$112.4	\$117.6	\$126.8	\$145.1	\$164.2	\$180.2	\$32.7	\$46.6	\$53.5
Indirect	\$140.7	\$146.8	\$157.4	\$182.8	\$205.8	\$224.9	\$42.1	\$59.0	\$67.4
Total	\$253.2	\$264.3	\$284.2	\$327.9	\$370.0	\$405.1	\$74.7	\$105.6	\$120.9
Wages Income (\$M)									
Direct	\$30.8	\$32.1	\$34.4	\$40.2	\$45.2	\$49.4	\$9.4	\$13.1	\$15.0
Indirect	\$37.0	\$38.6	\$41.5	\$48.0	\$54.0	\$59.1	\$10.9	\$15.4	\$17.6
Total	\$67.8	\$70.7	\$75.8	\$88.2	\$99.3	\$108.5	\$20.3	\$28.6	\$32.7
Employment (FTEs)									
Direct	652	690	760	823	956	1,072	171	266	311
Indirect	554	578	621	716	807	883	162	229	262
Total	1,206	1,268	1,381	1,539	1,763	1,954	333	494	573
Value Added (\$M)									
Direct	\$54.5	\$57.1	\$61.7	\$70.6	\$80.1	\$88.2	\$16.1	\$23.1	\$26.5
Indirect	\$76.6	\$79.8	\$85.7	\$99.5	\$112.0	\$122.4	\$22.9	\$32.2	\$36.7
Total	\$131.0	\$136.9	\$147.4	\$170.0	\$192.1	\$210.6	\$39.0	\$55.2	\$63.3

Source: AEC

5.4 NET PRESENT VALUE

Discounting the total value added impacts of the increase in cruise related activity over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$728.6 million for Comparison A and \$541.9 million for Comparison B.

Table 5.7 NPV Cruise Related Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)	
	Comparison A	Comparison B
4%	\$1,116.8	\$839.9
7%	\$728.6	\$541.9
10%	\$496.2	\$365.5

Source: AEC

6. HOME PORTING

The comparisons contained in the previous chapter either did not include home porting or contained it in both the base case and project case. This section looks at the economic impact of home porting in isolation.

6.1 ACTIVITY

In 2016 Cairns enjoyed 9 turnaround visits from P&O's Pacific Eden and 3 by other vessels. The Pacific Eden has a reported passenger and crew capacity of approximately 1,250 and 600 respectively.

The assumption in the Demand Study (AEC, 2016) for scenarios that include home porting is that by 2021 home porting will grow to 20 sub-regal ship home port visits per annum. With the availability of the modified channel these are replaced by 16 vista ships when the channel modification are available.

Cairns could lose its cruise ship home porting activity due to a number of factors:

- The current older sub-regal ships used for home porting could be retired, estimated to be in 2024.
- Regional cruising demand could fall resulting in reallocation of the current home porting ships to other regions.
- Cruise lines may replace current sub-regal class ships used for home porting with larger vista or grand ships (as appears to be the trend). In which case without the channel modifications these ships do not fit in the port.

Should Cairns lose the current homeporting activity then the economic loss is the benefit described below.

6.2 ECONOMIC BENEFIT

The approach taken to quantify the expenditure generated by home porting cruise ship visits in Cairns is similar to that used by the Australian Cruise Association (ACA, 2016). Expenditure generated by cruise shipping activity is broken down into the following categories:

- Passenger and crew expenditure in port.
- Port charges.
- Supplies and services supplied to the cruise ship.
- Passenger related charges.

The detail behind these expenditures for Cairns was contained in section 5.2.

Replacing 20 sub-regal ships with 16 vista ships in any one year would see expenditure in Cairns increase by \$13.9 million. If the channel modifications were not made then Cairns could potentially loose \$60.3 million in expenditure from 2025 on.

Table 6.1 Expenditure Generated from Home Porting in a Year (\$M 2016-17)

Category	20 Sub-Regal	16 Vista	Difference
Passenger & Crew	\$44.6	\$55.6	\$11.0
Port Charges	\$0.7	\$0.7	\$0.0
Supplies & Services	\$14.5	\$17.4	\$2.9
Passenger Related	\$0.5	\$0.6	\$0.0
Total	\$60.3	\$74.2	\$13.9

Source: AEC

6.3 ECONOMIC IMPACT

Applying the cruise home porting activity expenditure to the Cairns economy sees the following economic impacts in any one year.

Table 6.2 Economic Impacts from Home Porting in a Year (\$M 2016-17)

Impact	20 Sub-Regal	16 Vista	Difference
Output (\$M)			
Direct	\$60.3	\$74.2	\$13.9
Indirect	\$78.6	\$96.7	\$18.1
Total	\$138.8	\$170.9	\$32.1
Wages Income (\$M)			
Direct	\$17.3	\$21.3	\$4.0
Indirect	\$20.5	\$25.2	\$4.7
Total	\$37.8	\$46.5	\$8.7
Employment (FTEs)			
Direct	281	348	67
Indirect	305	376	71
Total	587	724	137
Value Added (\$M)			
Direct	\$28.4	\$35.0	\$6.6
Indirect	\$42.7	\$52.5	\$9.8
Total	\$71.1	\$87.5	\$16.4

Source: AEC

6.4 NET PRESENT VALUE

Discounting the total value added impacts of 16 vista home porting ships continuing over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$492.2 million.

Table 6.3 NPV 16 Vista Ships from 2025 Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$807.8
7%	\$492.2
10%	\$310.6

Source: AEC

7. CAIRNS VISITATION

7.1 ACTIVITY

7.1.1 Pre & Post Cruise

Passengers undertaking a turnaround cruise will undertake additional activities pre/post cruise in the turnaround port. These activities may be as simple as using the airport and traveling directly to and from the ship, staying a night pre/post cruise in short term accommodation or, staying for additional nights pre/post cruise and engaging in other leisure activities.

There are therefore economic benefits to Cairns from turnaround cruise passengers due to their expenditure in areas such as:

- Retail.
- Accommodation.
- Food & beverage.
- Transport (road, rail, air).
- Rental & hiring services.
- Heritage, creative & performing arts.
- Sports and Recreation.
- Gambling.
- Automotive repair & maintenance.
- Personal services.

It is not known with any certainty how many nights are spent pre and post cruise by departing or arriving passengers in Cairns. However, some insights can be drawn from passenger surveys undertaken in other Ports. A survey of arriving and departing passengers in Sydney (AEC, 2014) found:

Departing and arriving passengers were asked the number of nights they would be spending away from home before/after the cruise in Australia, in Sydney and/or outside Sydney but within NSW. In total, passengers were spending 5.2 nights away from home in Australia either before or after their cruise. This includes an average of 1.3 nights in Sydney and an average of 0.8 nights outside of Sydney but within NSW.

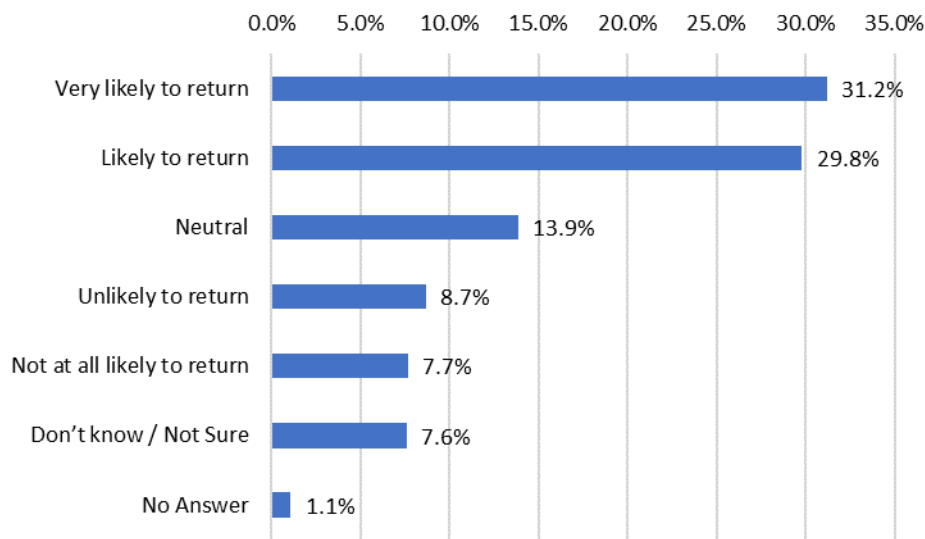
Assuming an average of 1.3 nights in Cairns per turnaround passenger (same as Sydney) and an average domestic overnight visitor night expenditure of \$218 (TNQ, 2016) every additional turnaround cruise passenger is likely to spend on average \$283 in Cairns. Therefore, the more turnaround cruises in Cairns the higher cruise passenger spend pre and post cruise.

7.1.2 Passenger Return Intention

A characteristic of a cruise is that passengers are only in a destination for a limited amount of time. If they like the destination and feel they would like to spend more time there then they may have an intention to return.

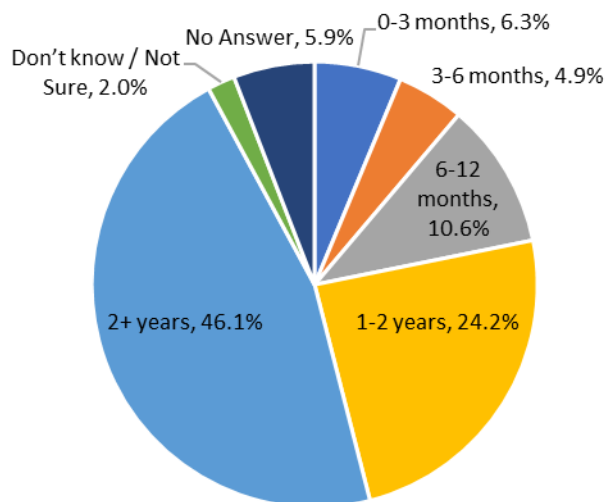
In the most recent completed survey of cruise passengers in Queensland ports (Brisbane, Whitsundays, Cairns) (AEC, 2015), 61% of surveyed passengers indicated that they were likely or very likely to return to Queensland in the future. Of those who are very likely or likely to return to Queensland, 21.8% are likely to return within 1 year and 24.2% are likely to return within 1-2 years.

Figure 7.1: Cruise Passenger Likelihood of returning to Queensland, 2014-15



Q4.2 How likely are you to return to Queensland on another trip in the future? Base: All passengers excluding current residents (n = 818)
Source: AEC (2015)

Figure 7.2: Cruise Passenger Estimated Time of Return, 2014-15



Q4.3 When are you likely to visit again? Base: All passengers who are 'very likely to return' or 'likely to return' to QLD (n = 508)
Source: AEC (2015)

Assuming similar intentions hold for cruise passengers to Cairns then a certain percentage will return in future years. However, the passenger's stated return intention is probably overly optimistic having just been in the destination. Therefore, the actual number of passengers likely to return is impossible to determine with any certainty. Furthermore, it is not clear what means of transport these passengers may use to return to Cairns. Should this be by cruise ship then there is a danger of double counting their impact as they are included in future cruise ship economic impacts.

The economic impact of passenger return intention is therefore not included further.

7.2 ECONOMIC BENEFIT

7.2.1 Pre & Post Cruise

Based on the average length of stay pre-post cruise and the average expenditure the estimated increase in expenditure of turnaround passengers from Comparison A is \$1.1 million per annum. Note since the number of turnarounds is fixed there is no difference over the years.

Table 7.1 Comparison A Pre-post Cruise Passenger Expenditure (Medium Projection, \$M 2016-17)

Category	Scenario 13 (Base Case)	Scenario 14 (Project Case)	Increase
Total	\$17.0	\$18.1	\$1.1

Source: AEC

7.2.2 Passenger Return Intention

The economic impact from passenger return intention is not calculated.

7.3 ECONOMIC IMPACT

7.3.1 Pre & Post Cruise

Applying the pre-post cruise passenger expenditure to the Cairns economy sees the following economic impacts in 2021, 2025 and 2031.

Table 7.2 Comparison A Pre-post Cruise Passenger Expenditure (Medium Projection, \$M 2016-17)

Impact	Scenario 13 (Base Case)	Scenario 14 (Project Case)	Change
Output (\$M)			
Direct	\$17.0	\$18.1	\$1.1
Indirect	\$19.1	\$20.4	\$1.3
Total	\$36.1	\$38.5	\$2.4
Wages Income (\$M)			
Direct	\$5.0	\$5.3	\$0.3
Indirect	\$5.0	\$5.3	\$0.3
Total	\$10.0	\$10.6	\$0.7
Employment (FTEs)			
Direct	99	106	7
Indirect	72	77	5
Total	171	183	11
Value Added (\$M)			
Direct	\$8.3	\$8.8	\$0.6
Indirect	\$10.5	\$11.2	\$0.7
Total	\$18.8	\$20.0	\$1.3

Source: AEC

7.3.2 Passenger Return Intention

The economic impact from passenger return intention is not calculated.

7.4 NET PRESENT VALUE

Discounting the total value added of the increase in Cairns visitation activity over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$10.1 million for pre-post cruise expenditure and \$37.9 million for returning passengers.

Table 7.3 Comparison A NPV Cairns Pre-post Cruise Passenger Expenditure Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$15.3
7%	\$10.1
10%	\$6.9

Source: AEC

8. CARGO

8.1 ACTIVITY

The Cairns Shipping Channel effectively limits cargo vessels calling at the port to an LOA of less than 200m, without special prior clearance from the Harbour Master. Furthermore, with its current declared depth of 8.3m below LAT vessels with an excess draft have to wait for suitable tidal conditions for movement in and out of the port. In addition, such traffic is also constrained by the length, berth box size, wharf strength, handling gear (or its absence) and storage capacity provided at its relevant cargo berths (7/8, 10 and 12).

Table 8.1 Port of Cairns Principal Deep Sea Cargo Berths

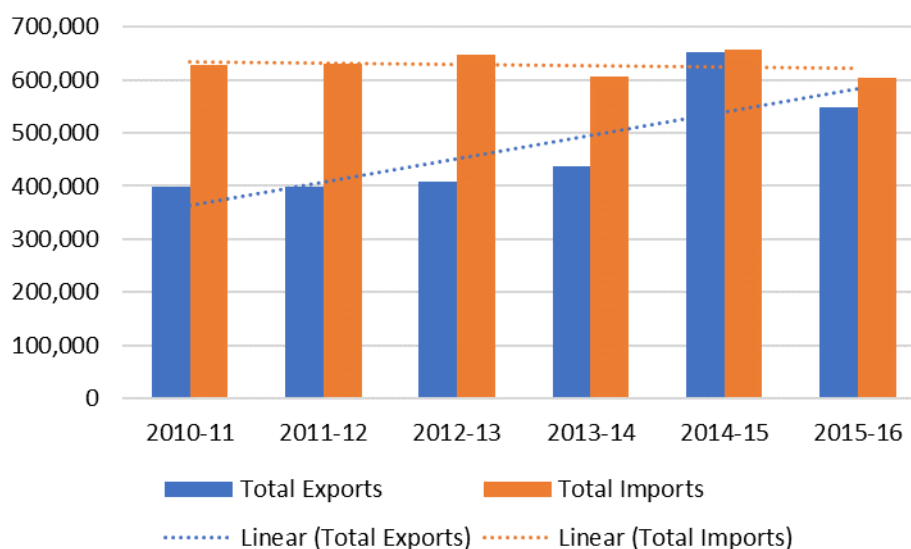
Berth	Type	Wharf Length	Depth LAT	Area & Facilities
7/8	Containers, Fertiliser, Break Bulk	250m	9.5m	27.8m wide, 3,800m ² TEU yard, 35t F/L, 100t crane deck load, 40,000 dwt wharf strength adjacent to the Incitec warehouse
10	Oil & LPG	20m (a)	9.3m	Berth Pocket 222 x 40m; maximum ship size 189m LOA
12	Sugar	183m	10.5m	Sugar Australia owned, with 17.6m wharf width, outloading conveyor with 1600 tph capacity ex 2 sheds with 234,000 tonne storage, and 18,000 tonne molasses storage

Note: (a) Facility includes 2 x berthing and 2 x mooring dolphins remote from wharf head.
Source: Thompson Clark (2016) from Ports North

8.1.1 Historical Trade

Cairns cargo exports have grown by an average annual 6.6% over the last five years from 397,346 tonnes to 547,174 tonnes in 2015-16 whilst imports have declined by 0.8% per annum from 627,941 tonnes in 2010-11 to 602,804 tonnes in 2015-16. Overall trade volumes have increased by 2.3% per annum.

Figure 8.1 Port of Cairns Cargo Movements (tonnes)



Source: Ports North (2016)

The surge in exports in 2014-15 was due to Queensland Sugar deciding to empty its warehouse to allow replacement of the sugar shed roofs. Sugar was also the cause of the higher volumes in 2015-16.

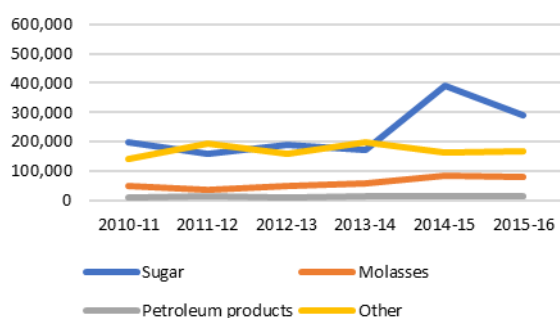
The key commodities, volumes, ships and average parcel sizes between 2010-11 and 2015-16 are shown in the table below.

Table 8.2 Port of Cairns Bulk Cargo Movements

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	CAGR
Exports (tonnes)							
Sugar	197,024	157,239	187,023	170,717	389,872	290,067	8.0%
Molasses	50,036	36,410	49,674	57,331	84,616	78,036	9.3%
Petroleum products	7,334	12,663	10,791	12,354	12,119	11,338	9.1%
Other	142,952	192,305	160,403	196,476	164,361	167,733	3.2%
<i>Total Exports</i>	<i>397,346</i>	<i>398,617</i>	<i>407,891</i>	<i>436,878</i>	<i>650,968</i>	<i>547,174</i>	<i>6.6%</i>
Imports (tonnes)							
Petroleum products	528,146	532,083	543,985	520,797	539,215	501,372	-1.0%
Fertiliser	26,173	46,838	50,362	32,746	49,483	34,682	5.8%
LPG	16,893	15,021	16,369	15,912	15,280	16,248	-0.8%
Other	56,729	37,093	37,001	36,515	53,891	50,502	-2.3%
<i>Total Imports</i>	<i>627,941</i>	<i>631,035</i>	<i>647,717</i>	<i>605,970</i>	<i>657,869</i>	<i>602,804</i>	<i>-0.8%</i>
Total Trade	1,025,287	1,029,652	1,055,608	1,042,848	1,308,837	1,149,978	2.3%
Bulk Vessel Arrivals							
Sugar	10	6	8	7	14	12	3.7%
Molasses	5	5	6	7	11	10	14.9%
Petroleum	38	44	39	43	41	37	-0.5%
Fertiliser	7	10	10	8	9	7	0.0%
LPG	18	12	16	14	14	15	-3.6%
Average Parcel Size (tonnes)							
Sugar	19,702	26,207	23,378	24,388	27,848	24,172	4.2%
Molasses	10,007	7,282	8,279	8,190	7,692	7,804	-4.9%
Petroleum	14,092	12,381	14,225	12,399	13,447	13,857	-0.3%
Fertiliser	3,739	4,684	5,036	4,093	5,498	4,955	5.8%
LPG	939	1,252	1,023	1,137	1,091	1,083	2.9%

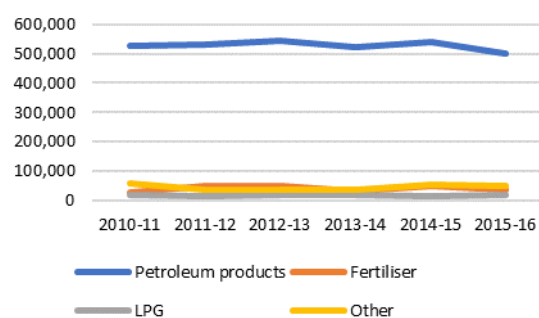
Source: Ports North (2016)

Figure 8.2 Bulk Cargo Exports



Source: Ports North (2016)

Figure 8.3 Bulk Cargo Imports



Analysis of the typical ships transporting bulk commodities to/from Cairns indicates that those for sugar, petroleum and fertiliser have a fully laden draft greater than the declared depth for the Cairns Shipping Channel and are therefore restricted by tides and cannot carry full loads into or out of the Port of Cairns.

Table 8.3 Typical Ships Trading Bulk Commodities in/out Port of Cairns

Cargo	Typical Ship	LOA (m)	Beam (m)	GRT (t)	DWT (t)	Max Draft (m)
Sugar	Shunwa	169.4	27.0	17,018	28,400	9.8
	Eco Destiny	175.6	28.0	21,059	35,300	10.6
Molasses	Theresa Micronesia	120.0	18.0	5,489	9,100	7.9
Petroleum	Alexander Spirit	176.0	31.0	25,382	40,100	11.0
	Hugli Spirit	183.2	32.2	29,242	46,900	12.2
Gas	Gas Defiance	99.9	18.0	4,309	5,000	6.2
Fertiliser	Nordic Dalian	180.0	30.0	24,212	37,500	9.6

Source Ports North

Increasing the depth of the channel means that:

- Ships waste less time waiting for the tides to enter Cairns Port.
- Ships can carry more cargo into and out of the port meaning fewer ship calls and less sharing of loads with other ports, mostly Townsville.

8.1.2 Future Trade

Cummings (2014) suggested a growth scenario of 2% pa for petroleum imports based on the longer-term population growth rate of the region and 1% pa for sugar exports based on cane land expansion on the Tablelands. More recently Thompson Clarke (2016) in its early freight shipping investigations, concluded that there are no clear indications that there will be any significant growth in tonnages of sugar, petroleum products and fertiliser through the Port of Cairns. Reasons for this are that the Port of Townsville has better capacity. Similarly, there is also little prospect of Cairns being able to attract container or car carrier traffic against the cargo and ship capacity offered by Townsville.

8.2 ECONOMIC BENEFIT

The economic benefits of the channel modifications should result in a reduction in bulk cargo transport costs as the same aggregate volume of cargo will be carried in fewer ships and the remaining ships may reduce sharing of loads with other ports. This means that commodities incur a lower transport margin and that landed imports will be cheaper and exports will have a higher margin.

8.2.1 Increased Loads, Fewer Ships

The bulk carriers that can take on larger loads are those with a maximum draft greater than the current 8.3m LAT channel restriction and are for sugar, petroleum products and fertiliser. Using data from the typical ship's recent port calls, including their loaded percentage and actual loaded drafts, the additional load with the extra 0.5m LAT channel modifications can be calculated.

Table 8.4 Additional Loads for Ships Trading Bulk Commodities in/out Port of Cairns, 8.8m LAT

Commodity	Ship	Max Draft (m)	Load Draft (m)	Load	Additional Load (a)
Sugar	Eco Destiny	10.6	9.0	80%	6.3%
Petroleum	Alexander Spirit	11.0	9.0	50%	12.5%
Fertiliser	Nordic Dalian	9.6	6.7	15%	N/A

Note: (a) additional load = $0.5 / (\text{max draft} - \text{load draft}) * (1 - \text{load})$. Fertiliser is typically restricted by parcel size rather than from draft restriction.
Source Ports North, AEC

Based on the additional load and the average number of ships over the last six years calling with that commodity each year the number of reduced ship calls can be determined.

Table 8.5 Reduction in Ships Trading Bulk Commodities in/out Port of Cairns, 8.8m LAT

Commodity	Average Ships	Additional Load	Ship Reduction
Sugar	10	6.3%	1
Petroleum	41	12.5%	5

Note: (a) ship reduction = average ships * additional load, rounded to nearest integer
Source Ports North, AEC

The cost saving of the reduced number of ships is determined by the origin/destination of the ship, steaming days and operating costs.

Sugar exports are north to either Indonesia, Japan, Korea or Malaysia. It is assumed that 10 days for a round trip at a cost of \$15,000 per day plus 2 lots of port charges of \$35,000 would be saved. The savings from the one sugar ship reduction therefore amounts to \$220,000.

The mix of petroleum imports are considered to be 3/8 from overseas (north) and 5/8 from south. Therefore 2 trips from the north not stopping at Cairns will save 1 day and 1 port call each, and 3 ships from the south not going past Townsville will save 2 days and 1 port call each. Costs for these ships are estimated at \$20,000 per day and \$50,000 per port call (Cummings, 2014). The savings from these reductions are therefore \$410,000.

Table 8.6 Saving from Reduction in Ships Trading Bulk Commodities in/out Port of Cairns, 8.8m LAT

Commodity	Direction	Ships	Days	Ports	Day Cost	Port Cost	Saving
Sugar	To North	1	10	2	\$15,000	\$35,000	\$220,000
Petroleum	From North	2	1	1	\$20,000	\$50,000	\$140,000
	From South	3	2	1	\$20,000	\$50,000	\$270,000
Total							\$630,000

Source Cummings (2014), Ports North, AEC

8.2.2 Increased Loads, Less Sharing with Other Ports

In addition to the above savings from reduction in ships, there may also be less sharing of loads between ports. Cummings (2014) in discussions with shipping agents determined that the percentage of bulk commodity ships sharing loads with Townsville was 13.3% for sugar and 100% for petroleum. Given the reduction in the number of sugar ships calling at Cairns there will also be a saving from the remaining ships not sharing loads with Townsville. Petroleum will continue to share with Townsville regardless.

Table 8.7 Saving from Reduction in Ships Trading Bulk Commodities Sharing with Townsville, 8.8m LAT

Commodity	Direction	Average ships	% Sharing	Number Sharing	Cost
Sugar	To North	9	13.3%	1	\$50,000
Total					\$50,000

Source Cummings (2014), Ports North, AEC

Overall savings from reduced ships and no port sharing amounts to \$0.68 million in the first year of increased channel depth modification assuming no growth in commodity volumes to 2021.

8.2.3 Loss of Port Revenue

Whilst the reduction in cargo ships results in a reduction in transport costs for the same volume of commodities it also results in a loss of port revenue to both Cairns and Townsville. The loss of revenue for Cairns is likely made up in longer berthing times.

8.3 ECONOMIC IMPACT

The economic impact from cost saving is not calculated as it is expected that any cost savings from imported commodities would be reflected in reduced transport margins which would be passed on to end consumers and in the case of exports improved profits for suppliers.

8.4 NET PRESENT VALUE

Assuming no growth in commodity volumes, the net present value of the savings over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$5.5 million.

Table 8.8 NPV 16 Reduced Cargo Ships and Sharing of Ports from 2021 Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$8.3
7%	\$5.5
10%	\$3.8

Source: AEC

9. NAVY

9.1 ACTIVITY

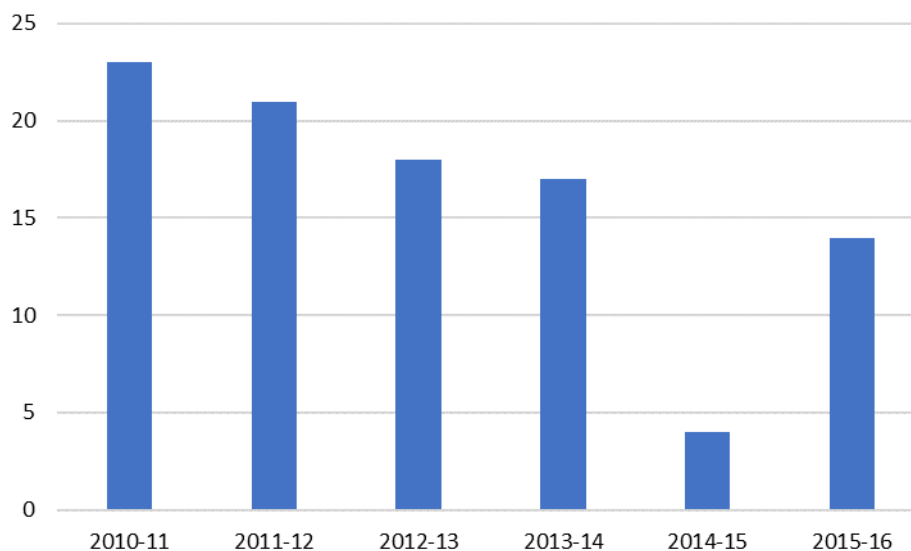
9.1.1 HMAS Cairns & Historical Activity

HMAS Cairns is located on the northern shore of Trinity Inlet. The base has a responsibility extending from Rockhampton to Thursday Island, is home to Royal Australian Navy (RAN) and civilian personnel and is the homeport for 14 Naval Vessels. Its primary responsibility is to provide maintenance, logistic and administrative support for Cairns based units listed below. HMAS Cairns also provides refit and training support for neighbouring Pacific Island nations (Pacific Class Patrol Boats). HMAS Cairns includes the following units:

- Base Command Element.
- Fleet Logistic Support Element – Cairns.
- Fleet Support Unit (formerly FIMA) – Cairns.
- Laser Airborne Depth Sounding Flight.
- Defence Communication Station – Cairns.
- Patrol Boat Systems Program Office.
- Amphibious and Afloat Support Systems Program Office.
- Hydrographic Systems Program Office.
- Sea Training Group (Minor War Vessels).

Over the six years from 2010-11 to 2015-16 Cairns received 97 Navy ship visits (average of 16 visits per annum). The majority were RAN (60%) with 40 foreign ships. Only a small number had a draft greater than 7m. The largest foreign warship that can enter the port of Cairns is the USS Boxer.

Figure 9.1 Number of Navy Ships Entering Port of Cairns



Source: Ports North (2016)

9.1.2 Future RAN Activity

Future RAN ship visits over and above the ships homeported at HMAS Cairns are likely to be Amphibious Assault Ship (Landing Helicopter Dock (LHD) ships and Landing Ship Dock (LSD) ships). The LSD ships can

currently fit into Cairns Port but have not yet entered. Ship simulations were undertaken with the RAN at the Brisbane Smartship facility in September 2016. A vessel equivalent to the LHD (agreed by the RAN & PN) was simulated in the upgraded channel with the outcome being that the vessel could safely navigate the upgraded channel under all simulated conditions.

Whilst, there has been no indication that an LHD will be based in Cairns, the RAN has indicated that Cairns is a port where the LHD may call. Also, the LHD is the RAN's emergency response vessel so providing it access to Cairns is important in times of emergency (e.g. response to cyclones).

Determining what economic benefits accrue from an LHD visit is difficult as duration, troop numbers, shore leave permissions and whether business related or rest and relaxation, and provisioning are all unknown. As a minimum it is assumed that one visit per annum from an LHD for three days with a full troop complement and 50% of crew and troops have shore leave permission each day and minimal provisioning.

Table 9.1 Largest RAN and Visiting Ships

Characteristic	LHD	LSD	Foreign
In service	HMAS Canberra HMAS Adelaide	HMAS Choules	USS Boxer
Tonnage	27,500GRT	16,160GRT	40,000GRT
Length	231m	177m	257m
Beam	32m	26.4m	32m
Draft	7.08m	5.8m	8.5m
Crew	358	158	1,110
Troops	1,045 standard 1,600 overload	356 standard 700 overload	1,900

Source: RAN, Wikipedia

9.1.3 Future Foreign Navy Activity

Channel modifications will provide safer access to foreign navy ships that are currently at the limit of the channel depth. This may encourage more and more regular visits.

Determining what economic benefits accrue from foreign navy ship visits is also difficult but as has occurred in other ports could be significant. Predicting frequency and the activity for a foreign navy ship all require assumptions.

Joint Australian / US Navy exercises (Talisman Sabre) are held biennially. Therefore, it would be reasonable to assume that a US Navy ship visits Cairns for every third exercise i.e. a 3 day visit every 6 years and 50% of crew and troops have shore leave permission each day and minimal provisioning.

9.1.4 Future Expansion of HMAS Cairns

HMAS Cairns completed a major redevelopment in 2008-09. In March 2016, The Cairns Post (Michael, 2016) announced that confidential documents revealed plans to triple the size of HMAS Cairns to form northern Australia's key strategic naval base. These plans include inlet dredging and expanding the base to accommodate 3,000 personnel.

Of possible benefit to the future expansion of HMAS Cairns, the CSDP relocates the Main Swing Basin positioned adjacent to HMAS Cairns to a new location adjacent to the Smith's Creek entrance. This will enable the naval facilities to expand into the inner harbour.

9.2 ECONOMIC BENEFIT

9.2.1 Navy Ship Visits

To calculate the economic impact of an LHD visit it is treated as a similarly sized cruise ship transiting for three days with 50% of the crew onshore each day along with the same surveyed crew expenditure for a cruise ship. To calculate the economic impact of a foreign navy ship visit (e.g. USS Boxer) it is treated as a cruise ship

transiting for three days with 50% of the crew onshore each day. The resulting estimated expenditures are shown below.

Table 9.2 Navy Ship Expenditure (\$M 2016-17)

Category	RAN LHD	USS Boxer
Crew & Troops	\$0.90	\$1.92
Port Charges	\$0.06	\$0.07
Supplies & Services	\$0.04	\$0.05
Person Related	\$0.01	\$0.01
Total	\$1.00	\$2.05

Source AEC

9.2.2 HMAS Cairns Expansion

The capital cost of expanding HMAS Cairns is unpublished but reported by Michael (2016) as \$420 million as allocated in the "latest Defence White Paper". A search of the *2016 Defence White Paper* and associated *2016 Integrated Investment Program* did not reveal any committed investment in HMAS Cairns.

SGS Economics and Planning (2010) determined that the Cairns Defence Precinct (HMAS Cairns and Porton Barracks) adds \$112.9 million in value added to the Cairns Region economy annually and also supports 1,667 FTEs. Including the contribution to the wider Queensland economy increases the value add to \$138 million and employment to 1,893 FTEs.

9.3 ECONOMIC IMPACT

9.3.1 Navy Ship Visits

Applying the navy ship visit activity expenditure to the Cairns economy sees the following economic impacts in the year the visit occurs.

Table 9.3 Economic Impacts from Navy Ship Visits in a Year (\$M 2016-17)

Impact	RAN LHD	USS Boxer
Output (\$M)		
Direct	\$1.00	\$2.05
Indirect	\$1.21	\$2.46
Total	\$2.21	\$4.52
Wages Income (\$M)		
Direct	\$0.26	\$0.53
Indirect	\$0.32	\$0.65
Total	\$0.58	\$1.19
Employment (FTEs)		
Direct	7	15
Indirect	5	10
Total	12	25
Value Added (\$M)		
Direct	\$0.51	\$1.04
Indirect	\$0.66	\$1.34
Total	\$1.16	\$2.38

Source: AEC

9.3.2 HMAS Cairns Expansion

A capital investment in HMAS Cairns of \$420 million would have a considerable economic impact through the non-residential construction sector.

From an operational perspective if HMAS Cairns was expanded to 3,000 personnel from its current 900 then the economic impacts could conceivably be between 2 and three times the current economic impact.

The additional construction and operational economic impacts are not calculated as they are not a direct result of the CSDP. Having said that having the CSDP in place is certainly likely to reduce some cost to the Australian Government and favour decision making.

9.4 NET PRESENT VALUE

Discounting the total value added impacts of one LHD RAN ship visit per year and one foreign navy ship every six years from 2021 over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$11.7 million.

Table 9.4 NPV RAN and Foreign Navy Ship Visits from 2021 Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$17.5
7%	\$11.7
10%	\$8.2

Source: AEC

10. WIDER REGIONAL & STATE BENEFITS

10.1 ACTIVITY

So far, the economic analysis has focussed on Cairns. Having a second home port (and the only regular non-capital city home port) with international air access in Queensland provides a number of benefits to the Queensland and Australian cruise industry. For example:

- An increase in northbound Queensland loop cruises out of Brisbane staying in Cairns for two nights.
- An increase in southbound cruises out of Cairns from ships home porting in Cairns.
- An increase in southern repositioning cruises from ships home porting in Cairns.

Each of these cruises could call at Queensland ports/anchorages such as Port Douglas, Townsville, Whitsundays, Gladstone, Fraser Is, Mooloolaba, Moreton Is or Brisbane.

10.1.1 Northbound Queensland Loop

The northbound Queensland loop generally has an itinerary of Brisbane-Whitsundays-Cairns-Port Douglas-Willis Is-Brisbane in some configuration. An analysis of *2016 Cairns Cruise Shipping Schedule* shows that approximately 40% of transit visits to Cairns/Yorkey's Knob are on this circuit and that half will call at either Whitsundays or Port Douglas and half at both. Ships that access Trinity Wharf often stay for two days and forego either Port Douglas or Whitsundays.

Therefore, with the growth in cruise ships calling at Cairns due to the channel upgrade it can be assumed that 40% of these are on the northbound Queensland loop and thus there will be additional calls to Brisbane (twice as originating home port), and at either Whitsundays or Port Douglas.

Based on comparison A (see Figure 5.1) the number of additional port calls for 2021, 2026 and 2031 is as follows.

Table 10.1 Comparison A Additional Queensland Port Calls

Additional Visits	2021	2026	2031
Cairns (Scenario 14 – Scenario 13)	7	22	24
On Northbound Queensland Loop	3	9	10
Calling at Brisbane	6	18	20
Calling at Whitsundays	2	5	5
Calling at Port Douglas	1	4	5

Source: AEC

10.1.2 Southbound Cruises

For those ships homeported in Cairns almost all itineraries in 2016 were north bound to PNG or Pacific countries but there are a couple that extend to Brisbane and/or Sydney and turnaround coming back to Cairns. Both of these called at Whitsundays. Given the forecast of 20 sub-regal homeported cruises, changing to 16 vista homeported cruises and the current trend of using these cruises to attend sporting and other events it is assumed that at least two more of these cruises will call at Whitsundays each year with one turning around in Brisbane rather than heading north to non-Australian ports. Since these cruises are already occurring and not expected to increase they are not considered further.

10.1.3 Southbound Repositioning

Currently the ships homeported in Cairns are those based for the full year in Australia. There may be times in the future where a ship homeports in Cairns for part of the year and then relocates south to another port in Australia calling at one or more Queensland ports/anchorages on the way. Since these cruises are already occurring and not expected to increase they are not considered further.

10.2 ECONOMIC BENEFIT

The approach taken to quantify the expenditure generated by the additional port visits in other Queensland ports generated from the channel modifications is similar to that used by the Australian Cruise Association (ACA, 2016). Expenditure generated by cruise shipping activity is broken down into the following categories:

- Passenger and crew expenditure in port.
- Port charges.
- Supplies and services supplied to the cruise ship.
- Passenger related charges.

Reference is given to ACA (2016) for the details on individual port expenditures.

The additional expenditure from the additional port calls from the northbound Queensland loop is given below.

Table 10.2 Comparison A Regional/State Cruise Related Expenditure (Medium Projection, \$M 2016-17)

Category	Queensland		
	2021	2025	2031
Passenger & Crew	\$6.4	\$19.1	\$21.2
Port Charges	\$0.3	\$0.9	\$1.0
Supplies & Services	\$0.7	\$2.2	\$2.5
Passenger Related	\$0.1	\$0.3	\$0.3
Total	\$7.5	\$22.5	\$25.0

Source: AEC

10.3 ECONOMIC IMPACT

Applying the cruise activity expenditure to the Queensland economy sees the following additional economic impacts in 2021, 2025 and 2031.

Table 10.3 Comparison A Regional/State Cruise Related Economic Impacts (Medium Projection, \$M 2016-17)

Impact	Brisbane		
	2021	2025	2031
Output (\$M)			
Direct	\$7.5	\$22.5	\$25.0
Indirect	\$5.0	\$15.0	\$16.7
Total	\$12.5	\$37.5	\$41.6
Wages Income (\$M)			
Direct	\$1.8	\$5.4	\$6.0
Indirect	\$1.2	\$3.5	\$3.9
Total	\$3.0	\$8.9	\$9.9
Employment (FTEs)			
Direct	33	100	111
Indirect	16	49	55
Total	50	149	166
Value Added (\$M)			
Direct	\$3.4	\$10.3	\$11.5
Indirect	\$2.2	\$6.7	\$7.5
Total	\$5.7	\$17.1	\$18.9

Source: AEC

10.4 NET PRESENT VALUE

Discounting the total value added impacts of the increase in regional/state cruise related activity over the period 2017 to 2043 to \$2016-17 yields a NPV at a 7% real discount rate of \$144.6 million (comparison A).

Table 10.4 Comparison A NPV Regional/State Cruise Related Total Value Added (\$M 2016-17)

Discount Rate	NPV (\$M)
4%	\$226.4
7%	\$144.6
10%	\$96.1

Source: AEC

11. SUMMARY

The table below summarises the potential value added impacts of the channel modification NPV of all the various value added economic benefits from increased expenditure directly associated with the CSDP from 2017 to 2043.

Table 11.1 Summarised NPV, (\$M 2016-17)

Economic Activity	NPV at 7% Discount Rate
Channel	
CSDP Construction	\$91.5
Channel Maintenance	\$1.2
Cruise Shipping	
Cruise Shipping Activity	A: Change from Demand Scenario 13 to Scenario 14 \$728.6 B: Change from Demand Scenario 5 to Scenario 6 \$541.9
Home Porting	\$492.2 (lost if home porting to cease)
Cairns Visitation	
Pre & Post Cruise Passenger Activity	\$10.1 (Comparison A)
Passenger Return Intention	N/A
Cargo	
Increased Ship Capacity	\$5.5
Navy	
Navy Ship Visits	\$11.7
Navy Base Expansion	N/A
Wider Regional & State Benefits	
Cruise Shipping Activity	\$144.6 (Comparison A)

Source: AEC

The total value added to the Cairns economy by the CSDP discounted to \$2016-17 yields a NPV at a 7% real discount rate of \$849.5 million. This assumes the development of the Brisbane Cruise Terminal and the continuation of home porting. If the Brisbane Cruise Terminal does not proceed, the NPV in terms of total value added to the Cairns economy will be in the order of \$661.8 million, discounted to \$2016-17 at a 7% real discount rate.

In addition, the CSDP will value add \$144.6 million to the wider region / State.

The CSDP will also increase the resilience of home porting in Cairns by accommodating the larger Vista and Grand class ships which are the likely replacements to the current older, smaller sub-regal class ships and thereby secure \$492.2 million of value added by this key cruise shipping activity.

The above economic analysis shows that the benefits of the CSDP are extensive for cruise shipping and tourism in Cairns and also extend to the rest of Queensland, the economic efficiency of cargo shipping and to our own navy and foreign navies as well.

12. 2014 CHANNEL CRUISE SHIPPING

Section 9 of AEC (2017a) examined two additional scenarios based on the previous *Cairns Shipping Development Project Draft Environmental Impact Statement* (Ports North, 2014) which allowed for “a channel upgrade capable of allowing access for all mega class ships to berth at Trinity wharf and involved 4,400,00m³ of dredging”. This includes access by voyager class ships to Trinity Wharf. The scenarios were:

- Scenario 17: Business as usual (no Brisbane Cruise Terminal), homeporting and 2014 channel modifications.
- Scenario 18: Brisbane Cruise Terminal, homeporting and 2014 channel modifications.

To compare the additional benefits of voyager class ship projections berthing at Trinity Wharf these two scenarios were considered as additional projects under Comparison A and Comparison B described in section 5 and subject to an NPV analysis. The corresponding starting and project scenarios are:

- **Comparison A:** With Brisbane Cruise Terminal (BCT) & homeporting:
 - Starting scenario: Scenario 13: No channel modifications & no bunker.
 - Project 1 scenario: Scenario 14: With channel modifications & no bunker.
 - Project 2 scenario: Scenario 17: With 2014 channel modifications & no bunker.
- **Comparison B:** Business as Usual (no BCT & homeporting):
 - Starting scenario: Scenario 5: No channel modifications & no bunker.
 - Project 1 scenario: Scenario 6: With channel modifications & no bunker.
 - Project 2 scenario: Scenario 18: With 2014 channel modifications & no bunker.

12.1 EXPENDITURE ASSUMPTIONS

The move of voyager class ships from Yorkey’s Knob to Trinity Wharf along with the additional projected voyager class ship visits from lifting of the phased in anchorage constraint applied to the unconstrained projections will increase passenger and crew visitation and expenditure, port charges, supplies and services and passenger related expenditure in Cairns.

To keep this expenditure conservative, it is assumed that all voyager class ship visits are transitory in nature and only berth for one day, i.e. no turnarounds or multiple day visits.

The same expenditure parameters as in section 5 along with economic impact methodology and net present value methodology have been applied.

The approach does not consider any economic loss to Yorkey’s Knob from the loss of cruise ship visits,

12.2 NET PRESENT VALUE

Presented below are the outcomes from the cruise shipping expenditure impacts presented as \$2016-17 NPV of the total value added impacts at only the 7% discount rate.

Table 12.1 NPV Cruise Related Total Value Added (\$M 2016-17)

Scenario	NPV at 7% Discount Rate
Comparison A: Brisbane Cruise Terminal	
Project 1: Revised Channel	\$728.6
Project 2: 2014 Channel	\$1,067.5
<i>Increase due to Project 2</i>	\$338.9
Comparison B: Business as Usual	
Project 1: Revised Channel	\$541.9
Project 2: 2014 Channel	\$761.1
<i>Increase due to Project 2</i>	\$219.2

Source: AEC

For Comparison A the table shows that the revised channel is estimated to deliver an additional \$728.6 million to the Cairns economy over the period 2017 to 2043 at a 7% discount rate with the project. Should the 2014 channel be constructed then an additional \$338.9 million over the same period and discount rate would be delivered.

For Comparison B the table shows that the revised channel is estimated to deliver an additional \$541.9 million to the Cairns economy over the period 2017 to 2043 at a 7% discount rate with the project. Should the 2014 channel be constructed then an additional \$219.2 million over the same period and discount rate would be delivered.

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APPENDIX A I-O MULTIPLIERS

Table A.1: 2013-14 Cairns Local Government Area Output Multipliers

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
1	Sheep, Grains, Beef and Dairy Cattle	1.000	0.412	1.668	2.055	0.257	0.668	0.387
2	Poultry and Other Livestock	1.000	0.344	1.546	1.932	0.202	0.546	0.386
3	Other Agriculture	1.000	0.221	1.365	1.710	0.145	0.365	0.345
4	Aquaculture	1.000	0.198	1.308	1.768	0.110	0.308	0.460
5	Forestry and Logging	1.000	0.257	1.437	1.944	0.180	0.437	0.507
6	Fishing, hunting and trapping	1.000	0.175	1.285	1.654	0.110	0.285	0.369
7	Agriculture, Forestry and Fishing Support Services	1.000	0.570	1.858	2.418	0.288	0.858	0.560
8	Coal mining	1.000	0.000	1.000	1.000	0.000	0.000	0.000
9	Oil and gas extraction	1.000	0.270	1.410	1.780	0.140	0.410	0.370
10	Iron Ore Mining	1.000	0.000	1.000	1.000	0.000	0.000	0.000
11	Non Ferrous Metal Ore Mining	1.000	0.559	1.884	2.573	0.324	0.884	0.689
12	Non Metallic Mineral Mining	1.000	0.285	1.455	2.110	0.171	0.455	0.655
13	Exploration and Mining Support Services	1.000	0.351	1.536	2.425	0.186	0.536	0.889
14	Meat and Meat Product Manufacturing	1.000	0.430	1.684	2.196	0.254	0.684	0.512
15	Processed Seafood Manufacturing	1.000	0.512	1.722	2.282	0.211	0.722	0.559
16	Dairy Product Manufacturing	1.000	0.413	1.666	2.123	0.254	0.666	0.457
17	Fruit and Vegetable Product Manufacturing	1.000	0.609	1.929	2.632	0.321	0.929	0.703
18	Oils and Fats Manufacturing	1.000	0.000	1.000	1.000	0.000	0.000	0.000
19	Grain Mill and Cereal Product Manufacturing	1.000	0.423	1.678	2.199	0.255	0.678	0.521
20	Bakery Product Manufacturing	1.000	0.237	1.378	2.115	0.141	0.378	0.737
21	Sugar and Confectionery Manufacturing	1.000	0.428	1.662	2.192	0.233	0.662	0.531
22	Other Food Product Manufacturing	1.000	0.577	1.904	2.555	0.327	0.904	0.651
23	Soft Drinks, Cordials and Syrup Manufacturing	1.000	0.513	1.788	2.382	0.275	0.788	0.594
24	Beer Manufacturing	1.000	0.325	1.491	1.867	0.167	0.491	0.376
25	Wine, Spirits and Tobacco	1.000	0.450	1.676	2.274	0.226	0.676	0.598
26	Textile Manufacturing	1.000	0.276	1.442	1.912	0.165	0.442	0.471
27	Tanned Leather, Dressed Fur and Leather Product Manufacturing	1.000	0.214	1.319	1.679	0.105	0.319	0.359
28	Textile Product Manufacturing	1.000	0.297	1.457	2.106	0.160	0.457	0.649

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
29	Knitted Product Manufacturing	1.000	0.000	1.000	1.000	0.000	0.000	0.000
30	Clothing Manufacturing	1.000	0.372	1.571	2.561	0.198	0.571	0.990
31	Footwear Manufacturing	1.000	0.000	1.000	1.000	0.000	0.000	0.000
32	Sawmill Product Manufacturing	1.000	0.614	1.935	2.752	0.321	0.935	0.816
33	Other Wood Product Manufacturing	1.000	0.414	1.657	2.412	0.243	0.657	0.754
34	Pulp, Paper and Paperboard Manufacturing	1.000	0.000	1.000	1.000	0.000	0.000	0.000
35	Paper Stationery and Other Converted Paper Product Manufacturing	1.000	0.505	1.787	2.501	0.282	0.787	0.714
36	Printing (including the reproduction of recorded media)	1.000	0.353	1.541	2.315	0.188	0.541	0.774
37	Petroleum and Coal Product Manufacturing	1.000	0.565	1.805	2.081	0.240	0.805	0.276
38	Human Pharmaceutical and Medicinal Product Manufacturing	1.000	0.499	1.788	2.436	0.289	0.788	0.649
39	Veterinary Pharmaceutical and Medicinal Product Manufacturing	1.000	0.000	1.000	1.000	0.000	0.000	0.000
40	Basic Chemical Manufacturing	1.000	0.471	1.733	2.330	0.262	0.733	0.597
41	Cleaning Compounds and Toiletry Preparation Manufacturing	1.000	0.298	1.464	2.002	0.166	0.464	0.538
42	Polymer Product Manufacturing	1.000	0.359	1.576	2.251	0.217	0.576	0.675
43	Natural Rubber Product Manufacturing	1.000	0.234	1.366	2.098	0.132	0.366	0.732
44	Glass and Glass Product Manufacturing	1.000	0.421	1.645	2.345	0.225	0.645	0.700
45	Ceramic Product Manufacturing	1.000	0.372	1.582	2.457	0.210	0.582	0.875
46	Cement, Lime and Ready-Mixed Concrete Manufacturing	1.000	0.544	1.894	2.544	0.349	0.894	0.650
47	Plaster and Concrete Product Manufacturing	1.000	0.456	1.721	2.486	0.265	0.721	0.765
48	Other Non-Metallic Mineral Product Manufacturing	1.000	0.475	1.748	2.537	0.273	0.748	0.789
49	Iron and Steel Manufacturing	1.000	0.172	1.273	1.704	0.101	0.273	0.431
50	Basic Non-Ferrous Metal Manufacturing	1.000	0.588	2.104	2.622	0.516	1.104	0.519
51	Forged Iron and Steel Product Manufacturing	1.000	0.000	1.000	1.000	0.000	0.000	0.000
52	Structural Metal Product Manufacturing	1.000	0.387	1.589	2.299	0.202	0.589	0.710
53	Metal Containers and Other Sheet Metal Product manufacturing	1.000	0.234	1.383	2.020	0.149	0.383	0.637
54	Other Fabricated Metal Product manufacturing	1.000	0.329	1.529	2.348	0.200	0.529	0.818
55	Motor Vehicles and Parts; Other Transport Equipment manufacturing	1.000	0.470	1.733	2.459	0.264	0.733	0.726
56	Ships and Boat Manufacturing	1.000	0.228	1.359	2.059	0.131	0.359	0.700
57	Railway Rolling Stock Manufacturing	1.000	0.394	1.608	2.142	0.214	0.608	0.534
58	Aircraft Manufacturing	1.000	0.159	1.245	2.067	0.087	0.245	0.822
59	Professional, Scientific, Computer and Electronic Equipment Manufacturing	1.000	0.216	1.343	2.060	0.127	0.343	0.717
60	Electrical Equipment Manufacturing	1.000	0.330	1.548	2.209	0.218	0.548	0.661

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
61	Domestic Appliance Manufacturing	1.000	0.424	1.678	2.418	0.253	0.678	0.740
62	Specialised and other Machinery and Equipment Manufacturing	1.000	0.407	1.631	2.395	0.224	0.631	0.764
63	Furniture Manufacturing	1.000	0.382	1.612	2.254	0.230	0.612	0.642
64	Other Manufactured Products	1.000	0.334	1.531	2.146	0.196	0.531	0.616
65	Electricity Generation	1.000	0.334	1.569	1.916	0.235	0.569	0.346
66	Electricity Transmission, Distribution, On Selling and Electricity Market Operation	1.000	0.546	2.042	2.567	0.495	1.042	0.525
67	Gas Supply	1.000	0.482	1.798	2.166	0.316	0.798	0.369
68	Water Supply, Sewerage and Drainage Services	1.000	0.286	1.439	1.908	0.153	0.439	0.470
69	Waste Collection, Treatment and Disposal Services	1.000	0.128	1.187	2.240	0.059	0.187	1.053
70	Residential Building Construction	1.000	0.663	2.117	2.743	0.454	1.117	0.626
71	Non-Residential Building Construction	1.000	0.527	1.895	2.505	0.368	0.895	0.610
72	Heavy and Civil Engineering Construction	1.000	0.546	1.901	2.650	0.355	0.901	0.749
73	Construction Services	1.000	0.477	1.797	2.457	0.320	0.797	0.660
74	Wholesale Trade	1.000	0.380	1.580	2.398	0.200	0.580	0.819
75	Retail Trade	1.000	0.259	1.397	2.272	0.137	0.397	0.876
76	Accommodation	1.000	0.202	1.314	1.946	0.112	0.314	0.632
77	Food and Beverage Services	1.000	0.261	1.402	2.157	0.141	0.402	0.755
78	Road Transport	1.000	0.379	1.560	2.305	0.181	0.560	0.745
79	Rail Transport	1.000	0.443	1.716	2.510	0.273	0.716	0.794
80	Water, Pipeline and Other Transport	1.000	0.267	1.383	1.901	0.116	0.383	0.518
81	Air and Space Transport	1.000	0.318	1.455	2.048	0.137	0.455	0.593
82	Postal and Courier Pick-up and Delivery Service	1.000	0.396	1.590	2.400	0.194	0.590	0.810
83	Transport Support services and storage	1.000	0.329	1.501	2.106	0.171	0.501	0.606
84	Publishing (except Internet and Music Publishing)	1.000	0.166	1.248	1.877	0.082	0.248	0.630
85	Motion Picture and Sound Recording	1.000	0.462	1.727	2.487	0.265	0.727	0.760
86	Broadcasting (except Internet)	1.000	0.446	1.719	2.383	0.273	0.719	0.664
87	Internet Service Providers, Internet Publishing and Broadcasting, Websearch Portals and Data Processing	1.000	0.312	1.482	1.987	0.170	0.482	0.505
88	Telecommunication Services	1.000	0.435	1.686	2.208	0.251	0.686	0.522
89	Library and Other Information Services	1.000	0.160	1.236	1.918	0.076	0.236	0.682
90	Finance	1.000	0.159	1.220	1.671	0.061	0.220	0.451
91	Insurance and Superannuation Funds	1.000	0.486	1.687	2.442	0.201	0.687	0.755

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
92	Auxiliary Finance and Insurance Services	1.000	0.376	1.570	2.667	0.194	0.570	1.097
93	Rental and Hiring Services (except Real Estate)	1.000	0.366	1.555	2.195	0.189	0.555	0.640
94	Ownership of Dwellings	1.000	0.141	1.205	1.287	0.064	0.205	0.082
95	Non-Residential Property Operators and Real Estate Services	1.000	0.313	1.475	2.009	0.162	0.475	0.533
96	Professional, Scientific and Technical Services	1.000	0.373	1.564	2.483	0.191	0.564	0.919
97	Computer Systems Design and Related Services	1.000	0.368	1.552	2.586	0.184	0.552	1.034
98	Employment, Travel Agency and Other Administrative Services	1.000	0.308	1.459	2.576	0.150	0.459	1.117
99	Building Cleaning, Pest Control and Other Support Services	1.000	0.376	1.562	2.433	0.186	0.562	0.871
100	Public Administration and Regulatory Services	1.000	0.294	1.463	2.541	0.169	0.463	1.078
101	Defence	1.000	0.160	1.251	2.228	0.091	0.251	0.977
102	Public Order and Safety	1.000	0.227	1.341	2.421	0.114	0.341	1.080
103	Primary and Secondary Education Services (incl Pre-Schools and Special Schools)	1.000	0.140	1.208	2.556	0.069	0.208	1.347
104	Technical, Vocational and Tertiary Education Services (incl undergraduate and postgraduate)	1.000	0.175	1.260	2.617	0.085	0.260	1.358
105	Arts, Sports, Adult and Other Education Services (incl community education)	1.000	0.251	1.372	2.283	0.121	0.372	0.912
106	Health Care Services	1.000	0.155	1.232	2.410	0.078	0.232	1.178
107	Residential Care and Social Assistance Services	1.000	0.110	1.165	2.601	0.056	0.165	1.436
108	Heritage, Creative and Performing Arts	1.000	0.343	1.517	2.176	0.174	0.517	0.659
109	Sports and Recreation	1.000	0.408	1.624	2.375	0.216	0.624	0.752
110	Gambling	1.000	0.381	1.582	2.246	0.201	0.582	0.665
111	Automotive Repair and Maintenance	1.000	0.196	1.310	1.961	0.114	0.310	0.651
112	Other Repair and Maintenance	1.000	0.281	1.433	2.192	0.153	0.433	0.759
113	Personal Services	1.000	0.378	1.566	2.343	0.188	0.566	0.777
114	Other Services	1.000	0.082	1.124	2.445	0.042	0.124	1.321

Source: AEC

Table A.2: 2013-14 Cairns Local Government Area Value Added Multipliers

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
1	Sheep, Grains, Beef and Dairy Cattle	0.472	0.169	0.764	0.989	0.122	0.292	0.225
2	Poultry and Other Livestock	0.475	0.154	0.723	0.947	0.094	0.248	0.224
3	Other Agriculture	0.583	0.082	0.733	0.934	0.069	0.151	0.201
4	Aquaculture	0.549	0.082	0.684	0.952	0.053	0.135	0.268
5	Forestry and Logging	0.537	0.079	0.700	0.995	0.085	0.164	0.295
6	Fishing, hunting and trapping	0.542	0.060	0.655	0.869	0.053	0.112	0.215
7	Agriculture, Forestry and Fishing Support Services	0.166	0.272	0.570	0.896	0.133	0.404	0.326
8	Coal mining	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	Oil and gas extraction	0.669	0.129	0.866	1.081	0.068	0.197	0.215
10	Iron Ore Mining	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	Non Ferrous Metal Ore Mining	0.291	0.255	0.698	1.099	0.153	0.408	0.401
12	Non Metallic Mineral Mining	0.541	0.132	0.752	1.133	0.080	0.211	0.381
13	Exploration and Mining Support Services	0.587	0.173	0.852	1.370	0.093	0.266	0.517
14	Meat and Meat Product Manufacturing	0.235	0.197	0.550	0.848	0.117	0.314	0.298
15	Processed Seafood Manufacturing	0.273	0.258	0.627	0.953	0.096	0.354	0.325
16	Dairy Product Manufacturing	0.211	0.162	0.487	0.753	0.114	0.276	0.266
17	Fruit and Vegetable Product Manufacturing	0.300	0.296	0.745	1.153	0.149	0.444	0.409
18	Oils and Fats Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	Grain Mill and Cereal Product Manufacturing	0.280	0.194	0.592	0.895	0.118	0.312	0.303
20	Bakery Product Manufacturing	0.469	0.092	0.627	1.055	0.065	0.157	0.429
21	Sugar and Confectionery Manufacturing	0.235	0.185	0.524	0.833	0.105	0.289	0.309
22	Other Food Product Manufacturing	0.258	0.245	0.654	1.033	0.151	0.396	0.379
23	Soft Drinks, Cordials and Syrup Manufacturing	0.302	0.232	0.664	1.010	0.130	0.362	0.346
24	Beer Manufacturing	0.421	0.160	0.661	0.879	0.080	0.239	0.219
25	Wine, Spirits and Tobacco	0.438	0.227	0.771	1.119	0.107	0.333	0.348
26	Textile Manufacturing	0.464	0.116	0.657	0.930	0.076	0.192	0.274
27	Tanned Leather, Dressed Fur and Leather Product Manufacturing	0.528	0.091	0.667	0.876	0.048	0.139	0.209
28	Textile Product Manufacturing	0.369	0.137	0.582	0.960	0.076	0.213	0.378
29	Knitted Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	Clothing Manufacturing	0.407	0.185	0.689	1.266	0.097	0.282	0.576

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
31	Footwear Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	Sawmill Product Manufacturing	0.353	0.296	0.788	1.263	0.139	0.435	0.475
33	Other Wood Product Manufacturing	0.373	0.187	0.671	1.110	0.111	0.297	0.439
34	Pulp, Paper and Paperboard Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	Paper Stationery and Other Converted Paper Product Manufacturing	0.290	0.232	0.658	1.073	0.136	0.368	0.415
36	Printing (including the reproduction of recorded media)	0.442	0.166	0.699	1.150	0.092	0.258	0.451
37	Petroleum and Coal Product Manufacturing	0.168	0.364	0.647	0.808	0.115	0.479	0.161
38	Human Pharmaceutical and Medicinal Product Manufacturing	0.304	0.221	0.665	1.043	0.140	0.361	0.377
39	Veterinary Pharmaceutical and Medicinal Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	Basic Chemical Manufacturing	0.245	0.221	0.591	0.938	0.125	0.346	0.347
41	Cleaning Compounds and Toiletry Preparation Manufacturing	0.487	0.141	0.707	1.019	0.079	0.220	0.313
42	Polymer Product Manufacturing	0.375	0.144	0.621	1.014	0.102	0.246	0.393
43	Natural Rubber Product Manufacturing	0.445	0.116	0.622	1.048	0.062	0.178	0.426
44	Glass and Glass Product Manufacturing	0.391	0.207	0.703	1.110	0.106	0.313	0.407
45	Ceramic Product Manufacturing	0.543	0.182	0.824	1.334	0.100	0.282	0.509
46	Cement, Lime and Ready-Mixed Concrete Manufacturing	0.313	0.235	0.710	1.088	0.163	0.398	0.378
47	Plaster and Concrete Product Manufacturing	0.404	0.201	0.726	1.171	0.121	0.322	0.445
48	Other Non-Metallic Mineral Product Manufacturing	0.419	0.214	0.758	1.217	0.125	0.339	0.459
49	Iron and Steel Manufacturing	0.186	0.066	0.297	0.548	0.046	0.111	0.251
50	Basic Non-Ferrous Metal Manufacturing	0.063	0.169	0.460	0.762	0.229	0.397	0.302
51	Forged Iron and Steel Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	Structural Metal Product Manufacturing	0.394	0.147	0.631	1.044	0.090	0.238	0.413
53	Metal Containers and Other Sheet Metal Product manufacturing	0.528	0.077	0.667	1.037	0.062	0.139	0.370
54	Other Fabricated Metal Product manufacturing	0.425	0.117	0.627	1.103	0.086	0.203	0.476
55	Motor Vehicles and Parts; Other Transport Equipment manufacturing	0.230	0.193	0.545	0.968	0.122	0.316	0.422
56	Ships and Boat Manufacturing	0.354	0.096	0.511	0.918	0.060	0.157	0.407
57	Railway Rolling Stock Manufacturing	0.390	0.173	0.661	0.972	0.098	0.271	0.311
58	Aircraft Manufacturing	0.534	0.069	0.641	1.119	0.038	0.107	0.478
59	Professional, Scientific, Computer and Electronic Equipment Manufacturing	0.575	0.092	0.726	1.143	0.059	0.151	0.417
60	Electrical Equipment Manufacturing	0.359	0.122	0.576	0.961	0.094	0.217	0.385
61	Domestic Appliance Manufacturing	0.426	0.159	0.696	1.127	0.111	0.270	0.431
62	Specialised and other Machinery and Equipment Manufacturing	0.383	0.164	0.648	1.093	0.101	0.265	0.444

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
63	Furniture Manufacturing	0.334	0.159	0.598	0.971	0.105	0.264	0.374
64	Other Manufactured Products	0.421	0.142	0.650	1.008	0.087	0.229	0.358
65	Electricity Generation	0.514	0.160	0.778	0.980	0.104	0.264	0.202
66	Electricity Transmission, Distribution, On Selling and Electricity Market Operation	0.368	0.220	0.796	1.102	0.208	0.428	0.306
67	Gas Supply	0.402	0.223	0.776	0.990	0.150	0.373	0.214
68	Water Supply, Sewerage and Drainage Services	0.615	0.149	0.837	1.110	0.072	0.222	0.273
69	Waste Collection, Treatment and Disposal Services	0.778	0.071	0.879	1.491	0.030	0.101	0.612
70	Residential Building Construction	0.192	0.253	0.640	1.004	0.195	0.448	0.364
71	Non-Residential Building Construction	0.283	0.200	0.642	0.997	0.158	0.358	0.355
72	Heavy and Civil Engineering Construction	0.359	0.223	0.739	1.175	0.158	0.381	0.436
73	Construction Services	0.324	0.184	0.646	1.030	0.138	0.322	0.384
74	Wholesale Trade	0.485	0.187	0.769	1.245	0.097	0.284	0.476
75	Retail Trade	0.589	0.129	0.785	1.295	0.067	0.196	0.509
76	Accommodation	0.518	0.095	0.666	1.034	0.053	0.149	0.368
77	Food and Beverage Services	0.480	0.123	0.670	1.109	0.068	0.191	0.439
78	Road Transport	0.444	0.183	0.716	1.149	0.089	0.272	0.433
79	Rail Transport	0.445	0.189	0.758	1.220	0.124	0.313	0.462
80	Water, Pipeline and Other Transport	0.426	0.125	0.608	0.909	0.056	0.181	0.301
81	Air and Space Transport	0.300	0.159	0.526	0.871	0.068	0.226	0.345
82	Postal and Courier Pick-up and Delivery Service	0.426	0.190	0.711	1.182	0.095	0.285	0.471
83	Transport Support services and storage	0.500	0.166	0.750	1.102	0.084	0.250	0.352
84	Publishing (except Internet and Music Publishing)	0.622	0.084	0.747	1.113	0.041	0.125	0.366
85	Motion Picture and Sound Recording	0.327	0.211	0.667	1.109	0.129	0.339	0.442
86	Broadcasting (except Internet)	0.489	0.190	0.809	1.196	0.131	0.321	0.386
87	Internet Service Providers, Internet Publishing and Broadcasting, Websearch Portals and Data Processing	0.489	0.148	0.719	1.013	0.083	0.231	0.294
88	Telecommunication Services	0.412	0.205	0.739	1.043	0.122	0.328	0.304
89	Library and Other Information Services	0.813	0.084	0.935	1.332	0.038	0.122	0.397
90	Finance	0.760	0.100	0.892	1.155	0.032	0.132	0.263
91	Insurance and Superannuation Funds	0.365	0.299	0.770	1.209	0.106	0.405	0.439
92	Auxiliary Finance and Insurance Services	0.524	0.198	0.820	1.458	0.099	0.297	0.638
93	Rental and Hiring Services (except Real Estate)	0.349	0.190	0.633	1.006	0.094	0.284	0.372

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
94	Ownership of Dwellings	0.759	0.081	0.871	0.918	0.031	0.112	0.048
95	Non-Residential Property Operators and Real Estate Services	0.547	0.164	0.792	1.102	0.081	0.245	0.310
96	Professional, Scientific and Technical Services	0.514	0.193	0.803	1.337	0.096	0.289	0.535
97	Computer Systems Design and Related Services	0.548	0.193	0.834	1.435	0.093	0.286	0.601
98	Employment, Travel Agency and Other Administrative Services	0.566	0.160	0.801	1.451	0.076	0.235	0.650
99	Building Cleaning, Pest Control and Other Support Services	0.450	0.190	0.732	1.239	0.093	0.283	0.507
100	Public Administration and Regulatory Services	0.556	0.141	0.778	1.405	0.080	0.222	0.627
101	Defence	0.686	0.070	0.798	1.366	0.042	0.112	0.569
102	Public Order and Safety	0.606	0.114	0.777	1.405	0.057	0.171	0.628
103	Primary and Secondary Education Services (incl Pre-Schools and Special Schools)	0.768	0.072	0.874	1.658	0.034	0.106	0.784
104	Technical, Vocational and Tertiary Education Services (incl undergraduate and postgraduate)	0.752	0.091	0.884	1.674	0.042	0.133	0.790
105	Arts, Sports, Adult and Other Education Services (incl community education)	0.631	0.130	0.821	1.352	0.060	0.191	0.530
106	Health Care Services	0.734	0.080	0.852	1.538	0.038	0.118	0.685
107	Residential Care and Social Assistance Services	0.827	0.054	0.909	1.744	0.027	0.082	0.835
108	Heritage, Creative and Performing Arts	0.528	0.173	0.788	1.171	0.087	0.259	0.383
109	Sports and Recreation	0.359	0.197	0.662	1.100	0.107	0.304	0.437
110	Gambling	0.316	0.184	0.600	0.986	0.099	0.283	0.387
111	Automotive Repair and Maintenance	0.467	0.086	0.607	0.986	0.054	0.140	0.379
112	Other Repair and Maintenance	0.446	0.124	0.644	1.086	0.074	0.198	0.442
113	Personal Services	0.373	0.189	0.655	1.107	0.093	0.282	0.452
114	Other Services	0.868	0.040	0.929	1.697	0.021	0.061	0.768

Source: AEC

Table A.1: 2013-14 Cairns Local Government Area Income Multipliers

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
1	Sheep, Grains, Beef and Dairy Cattle	0.070	0.083	0.215	0.314	0.062	0.145	0.099
2	Poultry and Other Livestock	0.099	0.066	0.214	0.313	0.048	0.115	0.099
3	Other Agriculture	0.114	0.043	0.192	0.280	0.034	0.077	0.088
4	Aquaculture	0.180	0.048	0.256	0.373	0.028	0.075	0.118
5	Forestry and Logging	0.202	0.042	0.282	0.411	0.038	0.080	0.130
6	Fishing, hunting and trapping	0.140	0.039	0.205	0.299	0.026	0.065	0.094
7	Agriculture, Forestry and Fishing Support Services	0.129	0.112	0.311	0.454	0.070	0.182	0.143
8	Coal mining	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	Oil and gas extraction	0.101	0.067	0.205	0.300	0.037	0.104	0.094
10	Iron Ore Mining	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	Non Ferrous Metal Ore Mining	0.148	0.150	0.383	0.559	0.085	0.235	0.176
12	Non Metallic Mineral Mining	0.249	0.072	0.364	0.531	0.043	0.115	0.167
13	Exploration and Mining Support Services	0.331	0.108	0.494	0.721	0.054	0.163	0.227
14	Meat and Meat Product Manufacturing	0.155	0.071	0.285	0.416	0.059	0.130	0.131
15	Processed Seafood Manufacturing	0.152	0.106	0.311	0.454	0.053	0.159	0.143
16	Dairy Product Manufacturing	0.121	0.075	0.254	0.371	0.059	0.133	0.117
17	Fruit and Vegetable Product Manufacturing	0.181	0.132	0.390	0.570	0.078	0.210	0.180
18	Oils and Fats Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	Grain Mill and Cereal Product Manufacturing	0.145	0.082	0.289	0.423	0.062	0.144	0.133
20	Bakery Product Manufacturing	0.323	0.054	0.410	0.598	0.033	0.087	0.188
21	Sugar and Confectionery Manufacturing	0.161	0.081	0.295	0.430	0.053	0.134	0.136
22	Other Food Product Manufacturing	0.167	0.118	0.362	0.528	0.077	0.195	0.166
23	Soft Drinks, Cordials and Syrup Manufacturing	0.123	0.137	0.330	0.482	0.071	0.207	0.152
24	Beer Manufacturing	0.093	0.074	0.209	0.305	0.043	0.116	0.096
25	Wine, Spirits and Tobacco	0.175	0.101	0.332	0.485	0.057	0.158	0.153
26	Textile Manufacturing	0.175	0.050	0.262	0.382	0.037	0.086	0.120
27	Tanned Leather, Dressed Fur and Leather Product Manufacturing	0.139	0.038	0.200	0.292	0.023	0.061	0.092
28	Textile Product Manufacturing	0.240	0.080	0.361	0.526	0.041	0.121	0.166
29	Knitted Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	Clothing Manufacturing	0.382	0.117	0.550	0.803	0.051	0.168	0.253

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
31	Footwear Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	Sawmill Product Manufacturing	0.239	0.140	0.453	0.662	0.074	0.215	0.209
33	Other Wood Product Manufacturing	0.253	0.106	0.419	0.612	0.060	0.166	0.193
34	Pulp, Paper and Paperboard Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	Paper Stationery and Other Converted Paper Product Manufacturing	0.193	0.128	0.396	0.579	0.075	0.203	0.182
36	Printing (including the reproduction of recorded media)	0.277	0.101	0.430	0.628	0.053	0.154	0.198
37	Petroleum and Coal Product Manufacturing	0.030	0.063	0.153	0.224	0.060	0.123	0.071
38	Human Pharmaceutical and Medicinal Product Manufacturing	0.156	0.128	0.360	0.526	0.076	0.205	0.166
39	Veterinary Pharmaceutical and Medicinal Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	Basic Chemical Manufacturing	0.157	0.109	0.332	0.484	0.066	0.174	0.153
41	Cleaning Compounds and Toiletry Preparation Manufacturing	0.180	0.077	0.299	0.436	0.042	0.119	0.137
42	Polymer Product Manufacturing	0.240	0.082	0.375	0.547	0.054	0.135	0.172
43	Natural Rubber Product Manufacturing	0.311	0.063	0.407	0.594	0.033	0.096	0.187
44	Glass and Glass Product Manufacturing	0.227	0.104	0.389	0.568	0.057	0.161	0.179
45	Ceramic Product Manufacturing	0.348	0.085	0.486	0.710	0.053	0.138	0.224
46	Cement, Lime and Ready-Mixed Concrete Manufacturing	0.141	0.129	0.361	0.527	0.091	0.220	0.166
47	Plaster and Concrete Product Manufacturing	0.244	0.112	0.425	0.620	0.068	0.180	0.195
48	Other Non-Metallic Mineral Product Manufacturing	0.254	0.114	0.438	0.640	0.070	0.184	0.202
49	Iron and Steel Manufacturing	0.177	0.038	0.239	0.350	0.025	0.062	0.110
50	Basic Non-Ferrous Metal Manufacturing	0.079	0.082	0.288	0.421	0.127	0.209	0.133
51	Forged Iron and Steel Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	Structural Metal Product Manufacturing	0.250	0.095	0.395	0.576	0.050	0.145	0.181
53	Metal Containers and Other Sheet Metal Product manufacturing	0.271	0.049	0.354	0.516	0.034	0.083	0.163
54	Other Fabricated Metal Product manufacturing	0.332	0.076	0.455	0.664	0.047	0.123	0.209
55	Motor Vehicles and Parts; Other Transport Equipment manufacturing	0.208	0.125	0.403	0.589	0.070	0.195	0.186
56	Ships and Boat Manufacturing	0.293	0.061	0.389	0.568	0.034	0.095	0.179
57	Railway Rolling Stock Manufacturing	0.136	0.105	0.297	0.433	0.056	0.161	0.136
58	Aircraft Manufacturing	0.392	0.043	0.457	0.666	0.021	0.065	0.210
59	Professional, Scientific, Computer and Electronic Equipment Manufacturing	0.307	0.058	0.398	0.582	0.033	0.091	0.183
60	Electrical Equipment Manufacturing	0.235	0.080	0.367	0.536	0.053	0.133	0.169
61	Domestic Appliance Manufacturing	0.243	0.105	0.411	0.600	0.062	0.168	0.189
62	Specialised and other Machinery and Equipment Manufacturing	0.262	0.106	0.424	0.620	0.057	0.163	0.195

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
63	Furniture Manufacturing	0.198	0.101	0.357	0.521	0.057	0.158	0.164
64	Other Manufactured Products	0.219	0.076	0.342	0.499	0.047	0.123	0.157
65	Electricity Generation	0.076	0.066	0.192	0.281	0.050	0.116	0.089
66	Electricity Transmission, Distribution, On Selling and Electricity Market Operation	0.112	0.087	0.292	0.426	0.093	0.180	0.134
67	Gas Supply	0.066	0.074	0.205	0.299	0.065	0.138	0.094
68	Water Supply, Sewerage and Drainage Services	0.156	0.066	0.261	0.381	0.038	0.105	0.120
69	Waste Collection, Treatment and Disposal Services	0.522	0.046	0.585	0.854	0.017	0.063	0.269
70	Residential Building Construction	0.089	0.147	0.348	0.508	0.112	0.259	0.160
71	Non-Residential Building Construction	0.136	0.113	0.339	0.495	0.090	0.203	0.156
72	Heavy and Civil Engineering Construction	0.190	0.135	0.416	0.607	0.091	0.226	0.191
73	Construction Services	0.180	0.108	0.366	0.535	0.079	0.187	0.169
74	Wholesale Trade	0.309	0.092	0.455	0.664	0.054	0.146	0.209
75	Retail Trade	0.383	0.067	0.487	0.710	0.037	0.104	0.224
76	Accommodation	0.268	0.053	0.351	0.512	0.029	0.083	0.161
77	Food and Beverage Services	0.322	0.062	0.419	0.612	0.035	0.097	0.193
78	Road Transport	0.257	0.107	0.414	0.604	0.050	0.157	0.190
79	Rail Transport	0.276	0.095	0.441	0.644	0.070	0.165	0.203
80	Water, Pipeline and Other Transport	0.195	0.062	0.288	0.420	0.031	0.093	0.132
81	Air and Space Transport	0.190	0.102	0.330	0.481	0.038	0.139	0.152
82	Postal and Courier Pick-up and Delivery Service	0.291	0.106	0.450	0.657	0.053	0.159	0.207
83	Transport Support services and storage	0.188	0.100	0.336	0.491	0.048	0.148	0.155
84	Publishing (except Internet and Music Publishing)	0.278	0.048	0.350	0.511	0.023	0.072	0.161
85	Motion Picture and Sound Recording	0.226	0.122	0.422	0.616	0.074	0.196	0.194
86	Broadcasting (except Internet)	0.174	0.121	0.369	0.539	0.074	0.195	0.170
87	Internet Service Providers, Internet Publishing and Broadcasting, Websearch Portals and Data Processing	0.167	0.069	0.280	0.409	0.044	0.113	0.129
88	Telecommunication Services	0.127	0.097	0.290	0.423	0.066	0.163	0.133
89	Library and Other Information Services	0.298	0.060	0.379	0.554	0.022	0.082	0.174
90	Finance	0.188	0.044	0.251	0.366	0.018	0.062	0.115
91	Insurance and Superannuation Funds	0.193	0.165	0.419	0.612	0.062	0.227	0.193
92	Auxiliary Finance and Insurance Services	0.427	0.124	0.609	0.890	0.058	0.182	0.280
93	Rental and Hiring Services (except Real Estate)	0.211	0.094	0.356	0.519	0.051	0.144	0.164



#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
94	Ownership of Dwellings	0.000	0.029	0.046	0.067	0.017	0.046	0.021
95	Non-Residential Property Operators and Real Estate Services	0.169	0.082	0.296	0.433	0.045	0.128	0.136
96	Professional, Scientific and Technical Services	0.335	0.120	0.511	0.745	0.056	0.176	0.235
97	Computer Systems Design and Related Services	0.391	0.128	0.574	0.838	0.056	0.183	0.264
98	Employment, Travel Agency and Other Administrative Services	0.480	0.097	0.621	0.906	0.044	0.140	0.285
99	Building Cleaning, Pest Control and Other Support Services	0.318	0.114	0.484	0.707	0.053	0.166	0.223
100	Public Administration and Regulatory Services	0.468	0.086	0.599	0.874	0.045	0.131	0.275
101	Defence	0.477	0.042	0.543	0.793	0.024	0.066	0.250
102	Public Order and Safety	0.495	0.073	0.600	0.876	0.032	0.105	0.276
103	Primary and Secondary Education Services (incl Pre-Schools and Special Schools)	0.685	0.044	0.749	1.093	0.019	0.063	0.344
104	Technical, Vocational and Tertiary Education Services (incl undergraduate and postgraduate)	0.676	0.054	0.754	1.101	0.024	0.078	0.347
105	Arts, Sports, Adult and Other Education Services (incl community education)	0.399	0.074	0.507	0.739	0.034	0.108	0.233
106	Health Care Services	0.582	0.051	0.655	0.955	0.021	0.073	0.301
107	Residential Care and Social Assistance Services	0.748	0.034	0.798	1.165	0.015	0.049	0.367
108	Heritage, Creative and Performing Arts	0.212	0.104	0.366	0.534	0.050	0.154	0.168
109	Sports and Recreation	0.233	0.123	0.418	0.610	0.061	0.184	0.192
110	Gambling	0.202	0.111	0.369	0.539	0.056	0.167	0.170
111	Automotive Repair and Maintenance	0.277	0.055	0.362	0.528	0.030	0.085	0.166
112	Other Repair and Maintenance	0.303	0.079	0.422	0.616	0.040	0.119	0.194
113	Personal Services	0.266	0.114	0.432	0.630	0.052	0.166	0.198
114	Other Services	0.698	0.024	0.734	1.071	0.012	0.035	0.337

Source: AEC

Table A.1: 2013-14 Cairns Local Government Area Employment Multipliers per \$M Production

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
1	Sheep, Grains, Beef and Dairy Cattle	3.802	1.198	5.845	7.375	0.845	2.043	1.531
2	Poultry and Other Livestock	3.428	1.078	5.178	6.704	0.672	1.750	1.526
3	Other Agriculture	3.835	0.633	4.953	6.318	0.485	1.118	1.365
4	Aquaculture	2.380	0.607	3.348	5.169	0.361	0.968	1.821
5	Forestry and Logging	2.580	0.627	3.772	5.779	0.565	1.192	2.007
6	Fishing, hunting and trapping	2.939	0.502	3.805	5.264	0.364	0.866	1.459
7	Agriculture, Forestry and Fishing Support Services	2.245	2.022	5.212	7.429	0.945	2.967	2.217
8	Coal mining	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	Oil and gas extraction	0.569	0.794	1.821	3.284	0.459	1.253	1.463
10	Iron Ore Mining	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	Non Ferrous Metal Ore Mining	1.307	1.944	4.307	7.035	1.056	3.000	2.728
12	Non Metallic Mineral Mining	3.761	0.863	5.156	7.747	0.532	1.395	2.591
13	Exploration and Mining Support Services	3.926	1.331	5.912	9.430	0.655	1.986	3.518
14	Meat and Meat Product Manufacturing	2.823	1.502	5.162	7.189	0.837	2.339	2.027
15	Processed Seafood Manufacturing	1.750	1.668	4.108	6.322	0.690	2.358	2.213
16	Dairy Product Manufacturing	1.862	1.214	3.887	5.695	0.811	2.025	1.808
17	Fruit and Vegetable Product Manufacturing	1.277	2.029	4.369	7.150	1.064	3.093	2.781
18	Oils and Fats Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	Grain Mill and Cereal Product Manufacturing	1.202	1.463	3.511	5.573	0.846	2.309	2.062
20	Bakery Product Manufacturing	7.585	0.736	8.787	11.705	0.466	1.202	2.917
21	Sugar and Confectionery Manufacturing	1.791	1.299	3.808	5.908	0.719	2.018	2.099
22	Other Food Product Manufacturing	1.610	1.775	4.454	7.031	1.069	2.844	2.577
23	Soft Drinks, Cordials and Syrup Manufacturing	1.380	1.816	4.091	6.442	0.895	2.711	2.351
24	Beer Manufacturing	1.039	1.103	2.693	4.179	0.551	1.654	1.487
25	Wine, Spirits and Tobacco	3.170	1.724	5.633	8.001	0.740	2.463	2.368
26	Textile Manufacturing	3.407	0.908	4.857	6.720	0.543	1.451	1.863
27	Tanned Leather, Dressed Fur and Leather Product Manufacturing	1.525	0.588	2.469	3.891	0.355	0.944	1.422
28	Textile Product Manufacturing	3.581	1.095	5.209	7.777	0.533	1.628	2.568
29	Knitted Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	Clothing Manufacturing	12.118	1.473	14.229	18.147	0.637	2.111	3.918

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
31	Footwear Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
32	Sawmill Product Manufacturing	3.650	1.990	6.712	9.942	1.073	3.063	3.230
33	Other Wood Product Manufacturing	4.075	1.460	6.350	9.334	0.815	2.275	2.984
34	Pulp, Paper and Paperboard Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
35	Paper Stationery and Other Converted Paper Product Manufacturing	1.514	1.696	4.125	6.949	0.915	2.611	2.824
36	Printing (including the reproduction of recorded media)	5.831	1.520	8.024	11.089	0.674	2.194	3.065
37	Petroleum and Coal Product Manufacturing	0.823	0.433	1.979	3.072	0.723	1.156	1.093
38	Human Pharmaceutical and Medicinal Product Manufacturing	1.725	1.505	4.163	6.730	0.933	2.438	2.567
39	Veterinary Pharmaceutical and Medicinal Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	Basic Chemical Manufacturing	0.557	1.290	2.673	5.036	0.826	2.116	2.362
41	Cleaning Compounds and Toiletry Preparation Manufacturing	2.504	0.962	3.976	6.103	0.511	1.472	2.127
42	Polymer Product Manufacturing	3.266	0.885	4.803	7.474	0.652	1.537	2.670
43	Natural Rubber Product Manufacturing	1.346	0.820	2.561	5.458	0.395	1.216	2.896
44	Glass and Glass Product Manufacturing	1.798	1.380	3.896	6.666	0.718	2.098	2.770
45	Ceramic Product Manufacturing	5.696	1.403	7.758	11.221	0.659	2.062	3.463
46	Cement, Lime and Ready-Mixed Concrete Manufacturing	1.051	1.590	3.790	6.362	1.149	2.738	2.572
47	Plaster and Concrete Product Manufacturing	1.819	1.220	3.887	6.914	0.848	2.068	3.026
48	Other Non-Metallic Mineral Product Manufacturing	9.335	1.388	11.620	14.743	0.897	2.286	3.123
49	Iron and Steel Manufacturing	2.902	0.459	3.674	5.379	0.312	0.771	1.705
50	Basic Non-Ferrous Metal Manufacturing	1.189	0.821	3.600	5.653	1.590	2.411	2.053
51	Forged Iron and Steel Product Manufacturing	0.000	0.000	0.000	0.000	0.000	0.000	0.000
52	Structural Metal Product Manufacturing	1.320	1.164	3.103	5.913	0.619	1.783	2.811
53	Metal Containers and Other Sheet Metal Product manufacturing	1.808	0.598	2.814	5.333	0.407	1.006	2.519
54	Other Fabricated Metal Product manufacturing	3.153	0.930	4.653	7.892	0.570	1.500	3.239
55	Motor Vehicles and Parts; Other Transport Equipment manufacturing	3.039	1.570	5.469	8.342	0.859	2.429	2.874
56	Ships and Boat Manufacturing	2.979	0.766	4.165	6.934	0.419	1.185	2.770
57	Railway Rolling Stock Manufacturing	1.377	1.102	3.169	5.282	0.691	1.792	2.113
58	Aircraft Manufacturing	3.978	0.517	4.753	8.005	0.258	0.775	3.252
59	Professional, Scientific, Computer and Electronic Equipment Manufacturing	5.218	0.724	6.341	9.179	0.399	1.123	2.838
60	Electrical Equipment Manufacturing	3.191	0.951	4.781	7.398	0.638	1.589	2.617
61	Domestic Appliance Manufacturing	2.379	1.301	4.441	7.370	0.761	2.062	2.929
62	Specialised and other Machinery and Equipment Manufacturing	3.766	1.257	5.719	8.742	0.696	1.953	3.024

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
63	Furniture Manufacturing	8.754	1.359	10.858	13.399	0.745	2.104	2.541
64	Other Manufactured Products	4.918	1.081	6.599	9.036	0.600	1.681	2.437
65	Electricity Generation	1.408	0.623	2.592	3.963	0.561	1.184	1.371
66	Electricity Transmission, Distribution, On Selling and Electricity Market Operation	0.912	0.825	2.741	4.819	1.003	1.828	2.079
67	Gas Supply	2.671	1.297	4.907	6.366	0.940	2.236	1.459
68	Water Supply, Sewerage and Drainage Services	1.824	0.775	3.068	4.927	0.470	1.244	1.859
69	Waste Collection, Treatment and Disposal Services	4.668	0.443	5.314	9.480	0.203	0.646	4.165
70	Residential Building Construction	2.264	2.231	6.044	8.522	1.549	3.780	2.478
71	Non-Residential Building Construction	1.617	1.733	4.606	7.021	1.256	2.989	2.415
72	Heavy and Civil Engineering Construction	0.666	1.873	3.760	6.722	1.220	3.094	2.963
73	Construction Services	3.501	1.668	6.260	8.871	1.091	2.759	2.610
74	Wholesale Trade	3.023	1.190	4.889	8.129	0.676	1.866	3.239
75	Retail Trade	7.832	0.909	9.207	12.673	0.466	1.375	3.466
76	Accommodation	5.157	0.776	6.311	8.811	0.378	1.154	2.500
77	Food and Beverage Services	8.210	0.775	9.451	12.437	0.465	1.241	2.986
78	Road Transport	4.261	1.701	6.597	9.545	0.636	2.336	2.948
79	Rail Transport	2.954	1.195	5.052	8.195	0.902	2.098	3.143
80	Water, Pipeline and Other Transport	1.808	0.667	2.835	4.884	0.361	1.028	2.049
81	Air and Space Transport	2.166	1.032	3.651	5.999	0.454	1.486	2.348
82	Postal and Courier Pick-up and Delivery Service	5.991	1.613	8.278	11.483	0.674	2.287	3.205
83	Transport Support services and storage	2.139	1.115	3.848	6.244	0.594	1.709	2.396
84	Publishing (except Internet and Music Publishing)	2.990	0.713	4.009	6.501	0.306	1.019	2.492
85	Motion Picture and Sound Recording	2.964	2.079	6.073	9.080	1.030	3.109	3.007
86	Broadcasting (except Internet)	2.391	1.488	4.928	7.556	1.048	2.536	2.629
87	Internet Service Providers, Internet Publishing and Broadcasting, Websearch Portals and Data Processing	1.189	0.776	2.505	4.502	0.541	1.316	1.997
88	Telecommunication Services	1.744	1.293	3.856	5.921	0.820	2.112	2.065
89	Library and Other Information Services	6.918	0.513	7.702	10.403	0.272	0.784	2.701
90	Finance	1.642	0.429	2.272	4.058	0.202	0.630	1.786
91	Insurance and Superannuation Funds	1.938	1.454	4.093	7.081	0.701	2.155	2.988
92	Auxiliary Finance and Insurance Services	2.578	1.385	4.661	9.001	0.698	2.083	4.340
93	Rental and Hiring Services (except Real Estate)	1.829	1.131	3.589	6.122	0.630	1.761	2.532

#	Industry	Initial	First	Simple	Total	Industry	Production	Consumption
94	Ownership of Dwellings	0.000	0.376	0.591	0.916	0.215	0.591	0.325
95	Non-Residential Property Operators and Real Estate Services	2.277	1.135	3.983	6.093	0.571	1.706	2.110
96	Professional, Scientific and Technical Services	4.248	1.430	6.360	9.997	0.682	2.112	3.637
97	Computer Systems Design and Related Services	3.769	1.317	5.740	9.830	0.654	1.972	4.090
98	Employment, Travel Agency and Other Administrative Services	2.569	1.107	4.206	8.628	0.530	1.637	4.421
99	Building Cleaning, Pest Control and Other Support Services	9.807	1.618	12.087	15.535	0.662	2.280	3.448
100	Public Administration and Regulatory Services	4.781	1.046	6.382	10.648	0.555	1.602	4.265
101	Defence	4.524	0.556	5.394	9.261	0.313	0.869	3.867
102	Public Order and Safety	7.671	0.944	9.014	13.287	0.399	1.343	4.273
103	Primary and Secondary Education Services (incl Pre-Schools and Special Schools)	8.728	0.571	9.539	14.871	0.240	0.811	5.332
104	Technical, Vocational and Tertiary Education Services (incl undergraduate and postgraduate)	5.611	0.687	6.596	11.969	0.298	0.985	5.373
105	Arts, Sports, Adult and Other Education Services (incl community education)	12.744	0.957	14.128	17.735	0.427	1.384	3.608
106	Health Care Services	8.437	0.671	9.375	14.036	0.267	0.938	4.662
107	Residential Care and Social Assistance Services	8.873	0.483	9.547	15.229	0.191	0.675	5.682
108	Heritage, Creative and Performing Arts	8.424	1.696	10.786	13.393	0.666	2.362	2.607
109	Sports and Recreation	5.237	1.878	7.913	10.887	0.798	2.676	2.974
110	Gambling	2.642	1.623	4.984	7.613	0.719	2.342	2.630
111	Automotive Repair and Maintenance	7.179	0.641	8.197	10.773	0.377	1.018	2.576
112	Other Repair and Maintenance	7.335	0.903	8.738	11.742	0.500	1.402	3.005
113	Personal Services	9.349	1.557	11.560	14.634	0.654	2.211	3.074
114	Other Services	5.280	0.408	5.838	11.064	0.150	0.558	5.226

Source: AEC

APPENDIX B TURNAROUND PROVISIONS

The following list of provisions has been adapted from a list publicly available for the *Celebrity Constellation* (Pax 1,950 crew 999) for a seven day cruise to *Pacific Eden* (1,250 Pax, 600 crew). Pricing has been obtained from North Queensland wholesalers. Since there can be a wide range of prices depending on quality and brand, median prices have been assumed.

Table B.1: Example Provisioning for a 1,850 Head Ship for a Seven Day Cruise (\$ 2016-17)

Item	Unit	Qty	Unit Cost	Total
Beef	Kg	6,901	\$29.95	\$206,674
Lamb	Kg	1,443	\$20.95	\$30,228
Pork	Kg	2,070	\$13.95	\$28,879
Veal	Kg	1,317	\$13.95	\$18,378
Sausage	Kg	502	\$10.95	\$5,495
Chicken	Kg	2,886	\$7.50	\$21,643
Turkey	Kg	878	\$15.00	\$13,174
Fish	Kg	3,952	\$25.00	\$98,805
Crab	Kg	100	\$22.70	\$2,278
Lobster	Kg	596	\$40.00	\$23,839
Fresh Vegetables	Kg	7,340	\$2.00	\$14,680
Potatoes	Kg	4,329	\$3.45	\$14,934
Fresh Fruit	Kg	5,709	\$2.00	\$11,417
Milk	L	7,716	\$1.56	\$12,021
Cream	L	1,192	\$4.35	\$5,190
Ice Cream	L	1,443	\$1.83	\$2,640
Eggs	Dozen	5,803	\$2.82	\$16,368
Sugar	Kg	1,631	\$1.47	\$2,398
Rice	Kg	1,066	\$2.31	\$2,459
Cereal	Kg	496	\$2.00	\$991
Jelly	Kg	125	\$1.00	\$125
Coffee	Kg	690	\$27.85	\$19,218
Cookies	Kg	565	\$16.87	\$9,525
Tea Bags	Box	1,568	\$26.00	\$40,777
Herbs & Spices	Kg	35	\$23.00	\$794
Wine	Bottle	2,133	\$20.00	\$42,659
Champagne	Bottle	125	\$13.91	\$1,745
Gin	Bottle	125	\$49.78	\$6,246
Vodka	Bottle	182	\$42.97	\$7,817
Whiskey	Bottle	220	\$48.55	\$10,660
Rum	Bottle	94	\$56.15	\$5,283
Sherry	Bottle	28	\$21.42	\$605
Liqueurs	Bottle	376	\$65.11	\$24,509
Beer	Bottles/Cans	6,336	\$2.55	\$16,167
Total				\$718,620
<i>Average per head</i>				<i>\$388.44</i>

Source: Information provided by Celebrity Cruises shipboard literature via [https://en.wikipedia.org/wiki/Provisioning_\(cruise_ship\)](https://en.wikipedia.org/wiki/Provisioning_(cruise_ship)), AEC

APPENDIX C SELECTED CHANGE ANALYSIS

TRANSIT VISIT OF VISTA CLASS SHIP FROM YORKEY'S KNOB TO TRINITY WHARVES

With the channel modifications a vista class ship will be able to berth at Trinity Wharf. Berthing will generate greater expenditure and economic impacts for Cairns compared to anchoring at Yorkey's Knob due to:

- Location of the Cairns Cruise Liner Terminal (CCLT) adjacent to the Cairns CBD.
- Higher numbers of passengers and crew disembarking.
- More time on ground and for shore excursions.
- Port charges and passenger related charges which are higher than those at Yorkey's Knob.
- Access to supplies and services.

One Day Transit Visit

Analysis indicates that a vista class ship with passenger and crew capacity of 1,950 and 925 respectively, berthing at Trinity Wharf for a one day transit visit as opposed to anchoring at Yorkey's Knob would generate an additional \$0.47 million in expenditure.

Table C.1 Expenditure from a Vista class ship transit visit at Trinity Wharf v Yorkey's Knob (\$M 2016-17)

Category	Yorkey's Knob	Trinity Wharf	Difference
Passenger & Crew	\$0.53	\$0.93	\$0.41
Port Charges	\$0.02	\$0.04	\$0.02
Supplies & Services	\$0.02	\$0.05	\$0.02
Passenger Related	\$0.00	\$0.02	\$0.02
Total	\$0.57	\$1.04	\$0.47

Source: AEC

Table C.2 Economic Impacts from a Vista class ship transit visit at Trinity Wharf v Yorkey's Knob (\$M 2016-17)

Impact	Yorkey's Knob	Trinity Wharf	Difference
Output (\$M)			
Direct	\$0.57	\$1.04	\$0.47
Indirect	\$0.66	\$1.25	\$0.59
Total	\$1.23	\$2.30	\$1.07
Wages Income (\$M)			
Direct	\$0.14	\$0.28	\$0.13
Indirect	\$0.18	\$0.33	\$0.16
Total	\$0.32	\$0.61	\$0.29
Employment (FTEs)			
Direct	4	7	3
Indirect	3	5	2
Total	7	12	5
Value Added (\$M)			
Direct	\$0.29	\$0.52	\$0.23
Indirect	\$0.36	\$0.68	\$0.32
Total	\$0.65	\$1.20	\$0.56

Source: AEC

Two Day Transit Visit

Cruise ships quite regularly berth overnight in Cairns giving passengers two full days in the location. In this case there is the opportunity for additional passenger and crew expenditure. Using the same example of that above, a two day transit visit at Trinity Wharf compared to a one day transit visit at Yorkey's Knob would generate an additional \$0.72 million in expenditure.

Table C.3 Expenditure from a Vista class ship 2 day transit visit at Trinity Wharf v 1 day transit visit at Yorkey's Knob (\$M 2016-17)

Category	Yorkey's Knob	Trinity Wharf	Difference
Passenger & Crew	\$0.53	\$1.14	\$0.62
Port Charges	\$0.02	\$0.07	\$0.06
Supplies & Services	\$0.02	\$0.05	\$0.02
Passenger Related	\$0.00	\$0.03	\$0.03
Total	\$0.57	\$1.29	\$0.72

Source: AEC

Table C.4 Economic Impacts from a Vista class ship 2 day transit visit at Trinity Wharf v 1 day transit visit at Yorkey's Knob (\$M 2016-17)

Impact	Yorkey's Knob	Trinity Wharf	Difference
Output (\$M)			
Direct	\$0.57	\$1.29	\$0.72
Indirect	\$0.66	\$1.56	\$0.89
Total	\$1.23	\$2.85	\$1.62
Wages Income (\$M)			
Direct	\$0.14	\$0.35	\$0.21
Indirect	\$0.18	\$0.41	\$0.23
Total	\$0.32	\$0.76	\$0.44
Employment (FTEs)			
Direct	4	9	4
Indirect	3	6	3
Total	7	15	8
Value Added (\$M)			
Direct	\$0.29	\$0.64	\$0.35
Indirect	\$0.36	\$0.85	\$0.49
Total	\$0.65	\$1.49	\$0.84

Source: AEC

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OUTCOME DRIVEN

