



CARNARVON FASCINE ENTRYWAY ECONOMIC EVALUATION

Prepared for the Gascoyne Development
Commission
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EXECUTIVE SUMMARY

The Gascoyne Development Commission is advancing detailed planning for a solution to reinstate navigable access to the Carnarvon Fascine. The 'Fascine Entryway Project' (the project) will rebuild a navigation channel from the Fascine to Teggs channel and allow safe access by local and visiting boats and yachts.

On 7 August 2020 the Minister for Regional Development Hon Alannah MacTiernan announced \$7 million in funding for short-term stop gap measures and a long-term Fascine access solution. Following this, the Department of Transport became the lead agency on the project.

This study estimated the expected economic, social and environmental impacts of two of the project options identified by a coastal engineering study completed in early 2020.

- Option Three – New Eastern Channel; and
- Option Four – Access through Fishing Boat Harbour.

Based on stakeholder engagement, analysis of recreation and tourism trends and case study and literature reviews, this study identified a range of impacts for each option.

The key benefits include:

- Increased visitor expenditure;

- Increased recreational opportunities; and
- Potential property value uplift for waterfront property

There are a number of challenges and risks, including:

- Construction and maintenance cost estimates are preliminary and are subject to change;
- Community may have a preference for a particular option; and
- Covid-19 national travel restrictions are significantly affecting travel to regional WA.

A cost benefit analysis was undertaken to capture the expected benefits and costs (excluding benefits and costs unable to be robustly monetised). The results reveal that both options are expected to generate significant net economic returns for the region.

To complement the cost benefit assessment, a qualitative options assessment was undertaken and found that Option 3 likely offers a stronger return on investment and should be pursued.

Key Impacts	Option 3	Option 4
Direct & Indirect Construction Jobs (FTE)	18	49
Net Benefits (Net Present Value)	\$13.4m	\$6.4m
Benefit to Cost Ratio	3.8	1.5

EXECUTIVE SUMMARY (CONT.)

OPTION	STATUS QUO (BASE CASE)	OPTION THREE (NEW EASTERN CHANNEL)	OPTION FOUR (ACCESS THROUGH FISHING BOAT HARBOUR)
Description	This option involves continuing dredging operations to temporarily clear the channel every several years.	This option involves dredging a new channel parallel to the existing channel.	This option involves dredging a new channel that opens through the boat harbour. This option also requires sheet piling and building a bridge over the new channel to allow access to the boat harbour at Pickles Point.
Pros	<ul style="list-style-type: none"> No initial capital expenditure. 	<ul style="list-style-type: none"> Substantially lower capital expenditure than other permanent solution option. Offers a permanent solution to issue, which has stakeholder support. 	<ul style="list-style-type: none"> Permanent solution that leverages existing investment in boat harbour.
Cons	<ul style="list-style-type: none"> Not a permanent solution. Over time, the frequent dredging costs will become significant. Goes against community preference for a permanent solution. 	<ul style="list-style-type: none"> Lower maintenance cost relative to status quo. Potentially features more environmental risks. 	<ul style="list-style-type: none"> May require additional operational costs to keep bridge in operation. Higher capital expenditure than other options by a significant margin. Potential issues around boat congestion bringing recreational vessels through commercial harbour.
Estimated Construction Cost	Capital expenditure: \$0 10 year maintenance expenditure: \$4.25m	Capital expenditure: \$6m 10 year maintenance expenditure: \$0.85m	Capital expenditure: \$16.1 10 year maintenance expenditure: \$0.85m
Benefit Cost Ratio (at 7%)	-	3.8	1.5

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INTRODUCTION



STUDY BACKGROUND AND PURPOSE

Study Background

The Fascine tidal waterway borders the town of Carnarvon. In April 2017, a portion of Pelican Point sand spit at the mouth of the waterway was overtopped by ocean swells which resulted in the entrance channel becoming completely blocked to all but the shallowest draught vessels.

The closure of the waterway has had implications for local recreation and tourism; and has resulted in the low usage of recent investments in the area such as the recreational boat ramp facility and revitalised Fascine and town centre.

To support the community's efforts to reinstate navigable access to the Fascine, the 'Fascine Entryway Project' (the project) was identified.

A coastal engineering study looking at the options for long term solutions was completed in early 2020 and a wave and current measurement program is underway to inform detailed planning for the engineering solution.

Measures to be implemented in the short term to improve access and provide relief to boat users include:

- Regular monitoring and relocation of the channels waters to aid navigation;
- Construction of new pens at the Small Boat Harbour to accommodate approximately 15 stranded boats;
- Provision of overland relocation to the newly built pens at the Small Boat Harbour; and
- Fees for the relocated boats will continue to be paid to the Carnarvon Yacht Club at the club's usual rate.

Location Context Map



STUDY BACKGROUND AND PURPOSE

Study Purpose

Urbis was engaged by the Gascoyne Development Commission to assist with funding, project development and strategic planning decisions for this project. In particular, this study sought to identify and assess the pros and cons of the following proposed project options identified by Seashore Engineering against the base case (i.e. status quo).

- Option Three – New Eastern Channel
- Option Four – Access through Fishing Boat Harbour

To support decision making, this study sought to understand:

- The social, environmental and economic implications of the project options;
- The implications of the status quo;
- Any opportunities to optimise the outcomes of an investment in a preferred coastal engineering solution;
- The strategic alignment of the project options;
- Stakeholder considerations;
- The public benefit of project options through cost benefit analysis and evaluation approaches aligned with government guidelines; and
- Implementation risks and opportunities.

Fascine Entryway Options Map



Source: Seashore Engineering

STUDY APPROACH

Study Approach

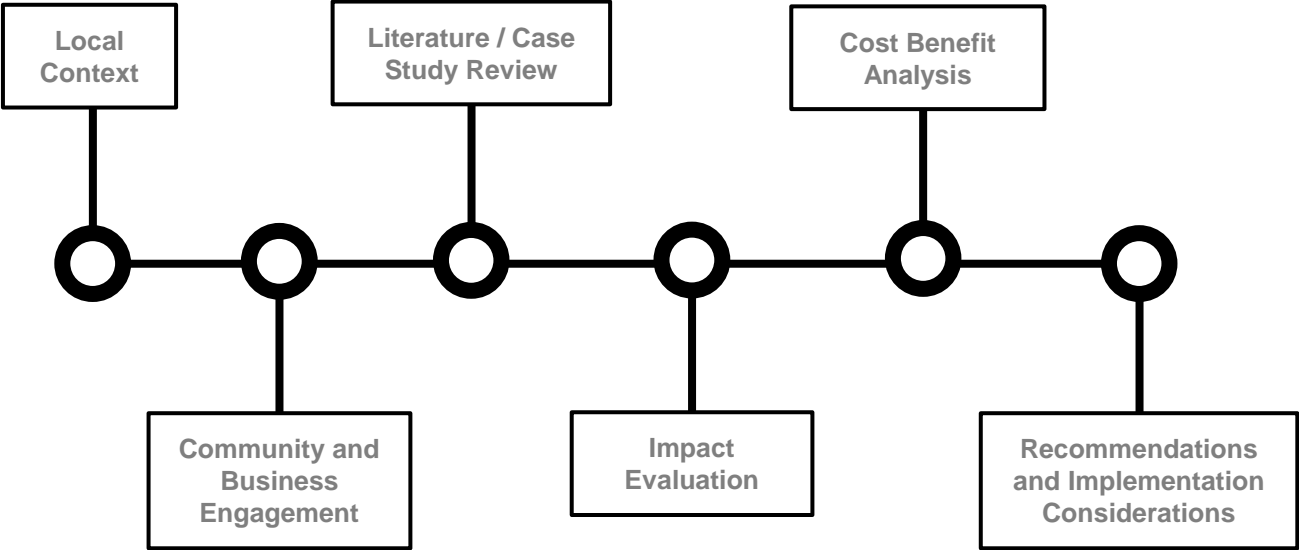
The economic analysis approach:

- Assessed historical and forecast tourism and recreation activity and the value of these activities to other industry sectors (e.g. hospitality and accommodation) in the region;
- Quantified and described the value of the Fascine to the Carnarvon region's economy and broader Western Australian economy;
- Assessed the implications of the under-utilisation of State Government funded amenities in the region;
- Assessed the impact of relevant case studies and implications for this project; and
- Quantified and monetised the expected impacts of the project options on the Carnarvon region's economy and broader Western Australian economy (both the construction and ongoing impacts).

The Fascine Entryway project Steering Committee made up of the Department of Transport, the Gascoyne Development Commission, the Shire of Carnarvon and the Carnarvon Yacht Club along with other business and community stakeholders provided important input regarding the expected impacts of the project.

Drawing on the above tasks, this study developed a recommendation and project advice to facilitate the subsequent steps to delivering this project.

Study Tasks



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LOCAL CONTEXT



POPULATION TRENDS

Population Trend Findings

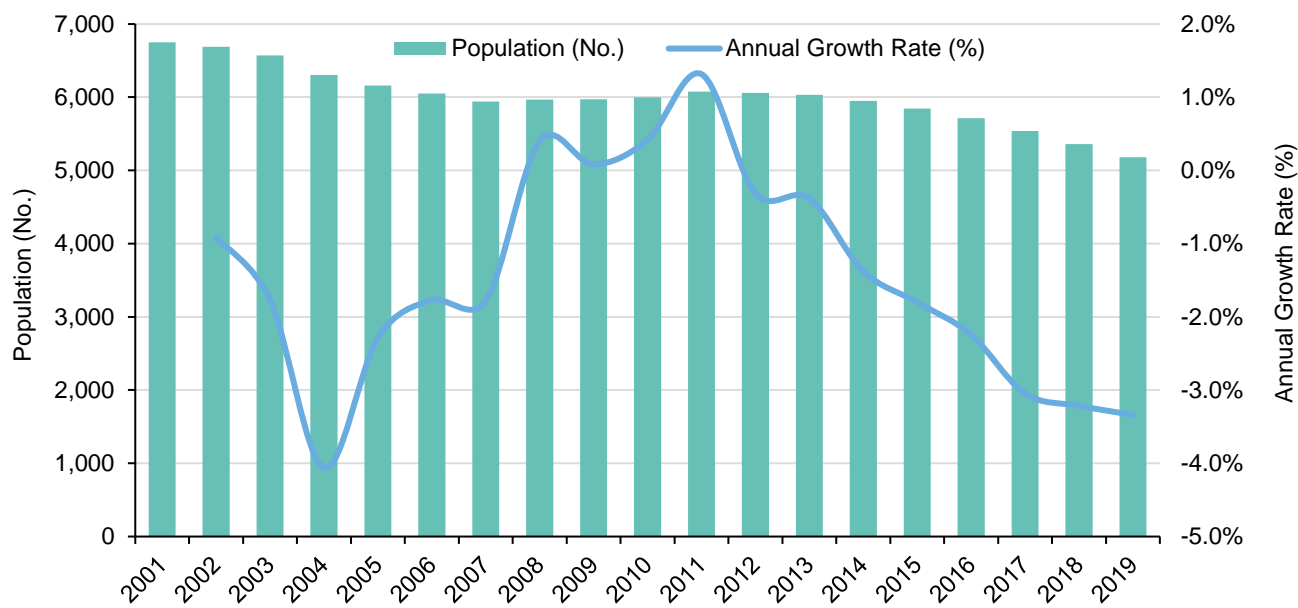
The population within the Shire of Carnarvon steadily declined by 1.5% per annum over the past two decades. The Shire has consistently recorded annual population decline except for a period of stable population levels between 2008 and 2013.

As of June 2019, the Shire's estimated resident population was 5,182. The vast majority of the Shire's population resides in the Carnarvon townsite.

Since 2013, the Shire's population has declined at an increasing rate; with the population declining by 179 residents or 3.3% over the 2018/19 period. According the Australian Bureau of Statistics, the declining population was driven by residents moving elsewhere across Australia.

The State Government's projections for the Shire of Carnarvon suggest that the population will remain broadly stable over the coming decade. The WA Tomorrow (Band C) publication estimates the population will be approximately 5,545 by 2031.

Historical Population Growth, Shire of Carnarvon



Source: ABS

BUSINESS ACTIVITY

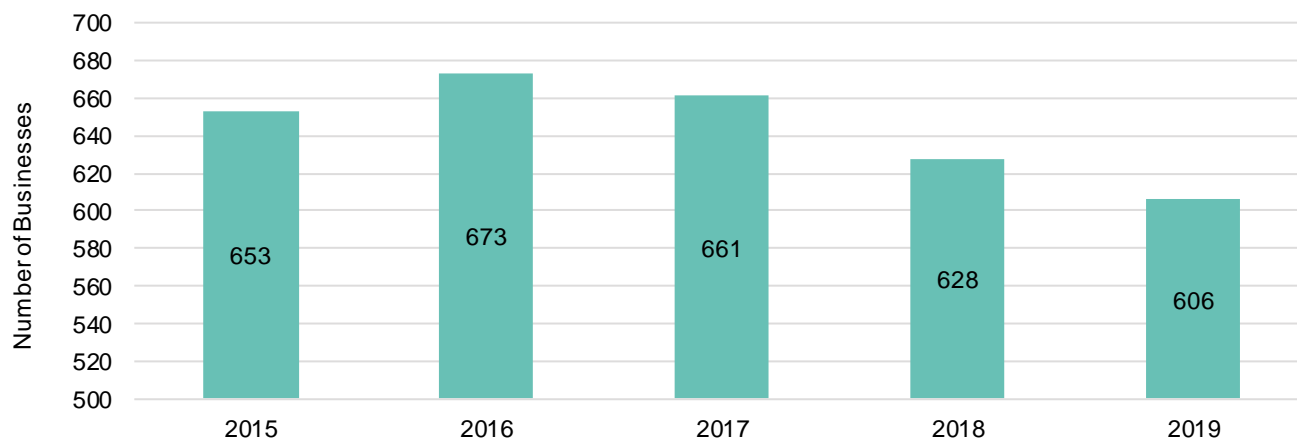
Business Activity Findings

The Shire of Carnarvon's economy has experienced considerable challenges over the past three years. Since 2017 – the same year as the closure of the waterway – business levels have declined and unemployment has increased considerably.

Business registrations in the Shire of Carnarvon declined by 55 between 2017 and 2019. The most significant declines were in the “agriculture, forestry and fishing”, “accommodation and food services”, “retail trade” and “construction” industries.

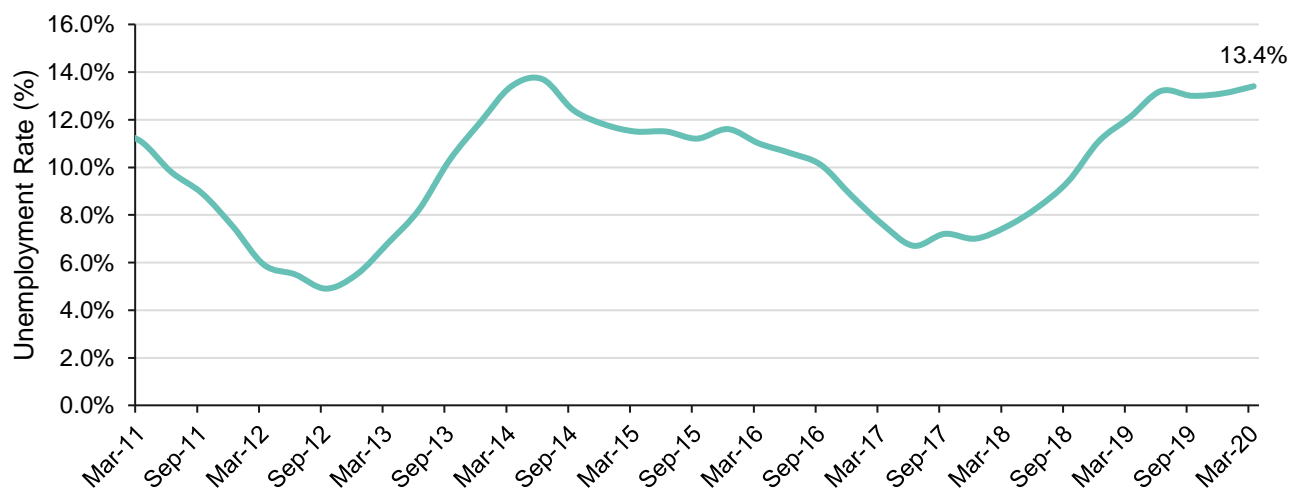
While the unemployment rate improved through to 2017 from 2014 highs, it has seen steady quarter on quarter increases. As of March 2020, the unemployment rate was estimated at a peak of 13.4%. This represents the unemployment rate prior the impact of Covid-19 health restrictions.

Historical Business Counts, Shire of Carnarvon



Source: ABS Business Counts, Cat. No. 8165.0

Unemployment Rate, Shire of Carnarvon



Source: Department of Education, Skills and Employment

INVESTMENT ACTIVITY

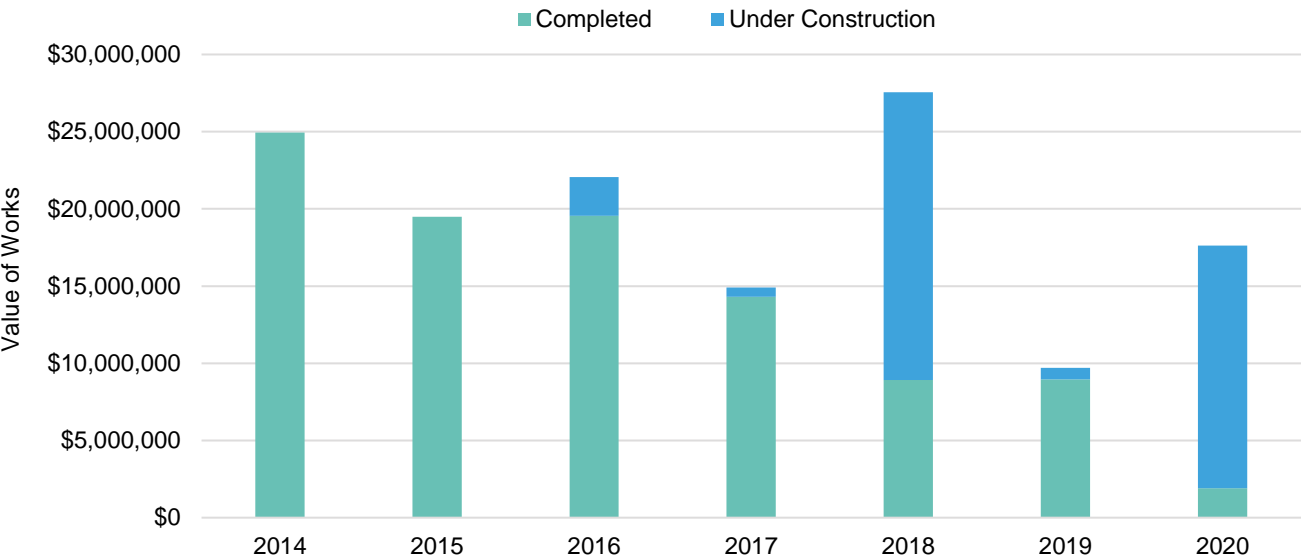
Project Findings

Carnarvon experienced investment in a number of notable projects over the past few years which has supported economic activity. Key examples included:

- Upgrades to the Carnarvon Community College and Carnarvon Health Campus; and
- Construction of a Satellite Earth Station (SES) facility.

Whilst there are numerous projects in early planning, the outlook for investment is relatively subdued. This suggests that unemployment levels are likely to remain high without additional investment activity.

Major Projects by Commencement Year, Carnarvon



Source: Cordell Connect
* Includes only major projects completed or commenced

VISITATION TRENDS

Visitation Findings

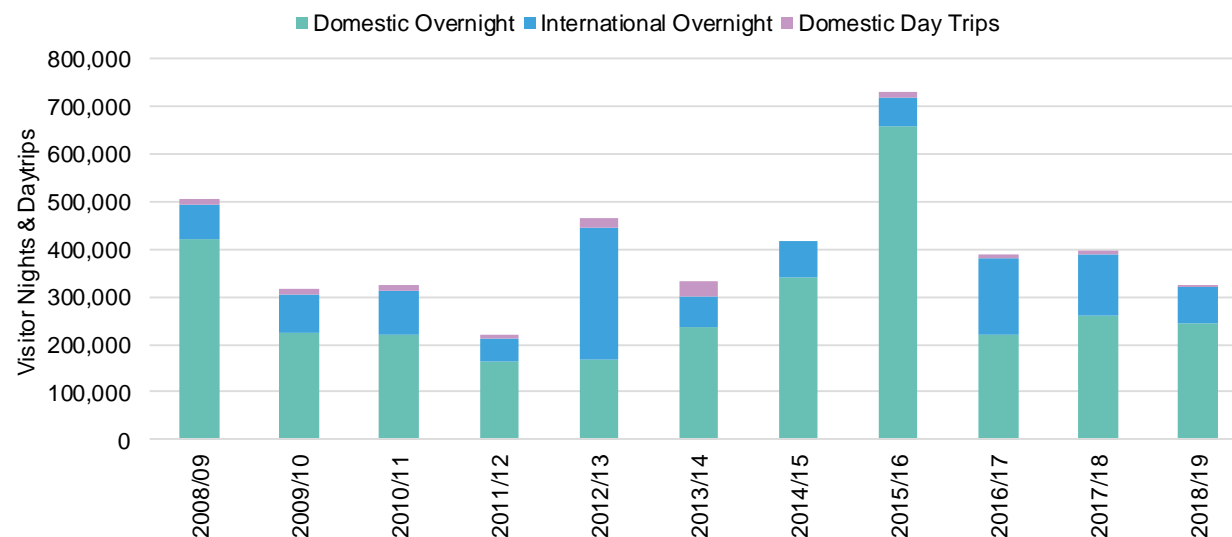
Carnarvon is a popular visitor destination that is estimated to have an average of 1,070 overnight visitors per day. Primarily, Carnarvon is a popular destination for intrastate travellers though it also attracts a notable number of international and interstate travellers which support the local economy.

Carnarvon's natural beauty is complemented by heritage and cultural attractions. It forms part of the Coral Coast and, as such, its tourism economy benefits from the popularity of surrounding attractions such as Ningaloo World Heritage Area.

The coastal location and Fascine are major assets for Carnarvon. Going to the beach remains one of the most common activities undertaken by visitors, particularly international visitors (93%). Fishing is a popular activity among domestic visitors, with 25% of day trippers and 44% of overnight visitors undertaking this activity. This highlights the attraction of outdoor nature-based activities the region's visitors.

Tourism Research Australia estimates suggest that there was a sharp drop in visitation four years ago. The engagement with business owners (noted further below) confirmed that declining visitor levels and expenditure have been observed over this period.

Visitor Nights / Days by Origin, Carnarvon Statistical Area



Source: Tourism Research Australia

Top Visitor Activities, Carnarvon Statistical Area, 2008-19

Activity	Domestic Day Trips	Domestic Overnight	International Overnight
Eat out / dine at a restaurant and/or cafe	30%	55%	87%
Go to the beach	23%	47%	93%
Sightseeing/looking around	1%	39%	85%
Fishing	25%	44%	40%
Go shopping for pleasure	1%	23%	82%
Visit national parks / state parks	0%	24%	73%
Go to markets	0%	23%	65%
Pubs, clubs, discos etc.	3%	19%	63%
Visit museums or art galleries	0%	14%	46%
Visit farms	0%	7%	53%

Source: Tourism Research Australia

VALUE OF VISITATION TO CARNARVON

Visitation Value Findings

Carnarvon's visitor economy is significant and supports considerable direct and indirect jobs. A high level assessment revealed that visitors spend an estimated \$53.5m per annum in Carnarvon. This is estimated to directly and indirectly support 285 employment opportunities.

Furthermore, Carnarvon is a regional destination which supports visitation across the Coral Coast and the rest of Western Australia.

Whilst exhaustive and accurate visitor / user estimates are not published for the Fascine, stakeholder input reveals that the Fascine supports significant tourism activity. Indicatively, if only 20% of visitors to Carnarvon interacted with the Fascine then its local economic value in terms of visitor spend is equivalent to approximately \$10.7 million per annum (i.e. 20% of \$53.5 million per annum).

Estimated Contribution of Visitor Economy, Carnarvon Statistical Area

Attribute	Estimate
Average Annual Visitor Nights (2016-19)	371,431
<i>Domestic Visitor Nights</i>	241,163
<i>Domestic Day Trips</i>	7,858
<i>International Visitor Nights</i>	122,410
Estimated Annual direct Visitor Expenditure*	\$53.5m
Indirect Annual Economic Impact (Supply-Chain Flow On Effect)*	\$30.5m
Total Annual Economic Impact	\$84.0m
Direct Employment*	218
Indirect Employment (Supply-Chain Flow On Effect)*	67
Total Ongoing Employment Impact	285

Sources: Tourism Research Australia, Tourism WA, REMPLAN, Urbis

* Based on REMPLAN Tourism Impact Model

RECREATION ANALYSIS

Recreation Opportunities and Trends

Carnarvon's waterfront location supports high boat ownership. According the Department of Transport, there were approximately 627 boats registered in Carnarvon as of 2020.

In the Carnarvon Yacht Club, there are approximately 43-50 boats mooring pens, depending on the size of the currently moored boats, with capacity to store other boats on land based storage structures. The majority of these boats have been unable to access the ocean from the Fascine entryway, with 51% unable to exit, and a further 21% unable to exit unless certain tidal conditions are met.

Boat Registrations, Shire of Carnarvon, 2020

Vessel Size	Number of Vessels
Under 5m	389
Between 5m and 10m	207
Between 10m and 20m	31
Total	627

Source: Department of Transport

Carnarvon Yacht Club Survey, July 2020

Can Boat Access the Ocean?	Number of Boats
Maybe	9
No	22
Yes	12

Source: Carnarvon Yacht Club Survey, July 2020

OTHER CONSIDERATIONS

Key Findings

There are a number of other considerations and potential issues that have arisen in the period that the Fascine entryway has been closed, with potential investment opportunities being risked, and recent significant infrastructure investments in and around the Fascine being underutilised. The table to the right lists several of the more significant considerations.

Other Considerations

Consideration	Description
Residential Development	While property sales volumes have been relatively consistent in Carnarvon over the past five years, the closure of the Fascine entryway has likely impacted residential land sales (particularly for the next stage of the Northwater Estate which is marketed as a canal front development complete with boat moorings for waterfront properties).
Aquaculture Development	Harvest Road Group has been trialling oyster farming operations in the Fascine over the past 12 months. If the Fascine is not accessible to vessels, it would likely impact decisions to extend the trial and reduce the likelihood of comparable opportunities being presented.
Inability to Use the New Boat Ramp Facilities	Currently, the boat ramp that enters the Fascine is underutilised as it is difficult for boats to traverse the Fascine and easily use the boat ramp at the Small Boat Harbour.
Leveraging of Recent Town Centre Investments	Over the past decade there have been substantial investment in the foreshore and public open space around the Fascine closer to the Carnarvon town centre. The Fascine's closure is leading to these investments being underutilised.

Source: Urbis' Discussions with stakeholders

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A group of four people (three women and one man) are gathered around a table in a bright, modern office setting. They are looking at a laptop screen, with one woman pointing at it. There are glasses of water and papers on the table. The background is slightly blurred, showing office shelves and plants.

COMMUNITY & BUSINESS ENGAGEMENT

LOCAL BUSINESS ENGAGEMENT

Engagement Findings

As part of this project, community and business engagement with relevant stakeholders was undertaken.

These discussions were largely led by open ended questions that queried the perceived impact of the Fascine entryway closure on their businesses, the community and / or the environment. More direct questions were asked about business turnover impacts and if there were any other decisions (such as investment) that had been influenced by the Fascine entryway closure.

Declines in turnover were consistent across all business owners liaised with. The declines ranged from 10% to 30% of revenue. This was primarily attributed to declining tourism levels due to the Fascine entryway closure.

Business Engagement Summary

Business	Description
Casey's Boat Hire	This charter boat operator stated that it has experienced major setbacks and is no longer operating a charter boat in the Fascine (whereas it would previously be operating several times a week during the dry season). It also stated that the Indian Chief charter boat was no longer in operation.
Carnarvon Retreat	This organisation stated that its revenue had dropped by more than 30% since 2017 and that it would have typically turned over \$400,000 annually. The business is up for sale.
Ray White	This business representative stated that while the Fascine closure hadn't had a major impact on property transactions generally, it had likely slowed down the sales of the North Water Estate lots, particularly the waterfront ones. Additionally, it was stated that the boat harbour boat ramp was highly congested and did not have a high enough capacity on weekends.
Carnarvon Tackle & Marine	This organisation experienced a decline in turnover equivalent to at least a 10% since 2018. It also stated that it was closing the shop for the summer period completely.
Pickles Point Seafood	Pickles Point Seafood experienced a 30% drop in revenue since the Fascine closure in 2017, particularly with a lower volume of boat slippage.
Telomac Tackle Shop	This organisation stated that it had seen a 20% decline in revenue since the Fascine's closure in 2017, with people who would typically be regulars not using this shop as their boats are in the Fascine.

Source: Urbis' discussions with stakeholders

OTHER ENGAGEMENT

Engagement Findings

In addition to engagement with business owners, this study engaged with community leaders and potential business operators (such as the Harvest Road Group which has been trialling oyster farming in the Fascine over the past 12 months and Bobby Dorey who is a local Aboriginal leader who advises on heritage projects).

Other Engagement Summary

Individual	Description
Harvest Road Group	This business stated that while they have been trialling oysters in the Fascine after its closure, but it would have a positive effect on water quality and vessel movement if it was opened and this may influence their decision to make it a permanent oyster farm.
Bobby Dorey – Local Aboriginal Community Leader	This community member stated that in his discussions with elders in his community there was a consensus that there should be a new Fascine entryway closer to the mangroves near Pickles Point, rather than where the previous entryway was. It was also stated that while he was unaware of any indigenous cultural sites in the future Fascine canal location, there should be engagement with the community prior to commencing construction.

Source: Urbis' discussions with stakeholders

COMMUNITY SURVEY RESPONSE

Survey Approach

A community survey was undertaken to inform the analysis of this project. The aim of the survey was to understand usage of the Fascine and any impacts from the entryway closure.

The survey received 116 completed responses, with the majority of respondents living in Carnarvon and being boat owners.

The following pages detail the key findings of this survey.

Survey Response Summary

Key Statistic	Metric
Number of completed responses	116
Proportion of responses from people who permanently live in Carnarvon	81%
Proportion of responses from business owners or operators	31%
Proportion of responses from people who own a boat	79%
Period survey was operational	28 September to 12 October 2020

Source: Urbis Community Survey

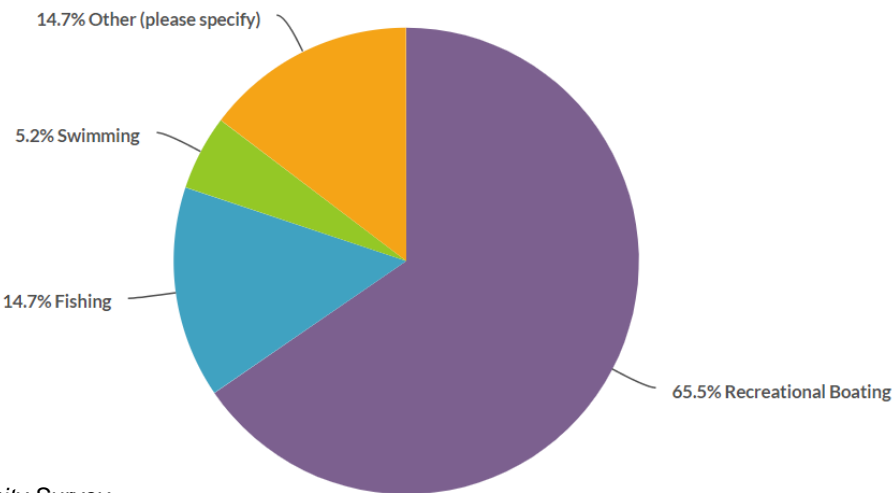
COMMUNITY SURVEY RESPONSE

Survey Findings

Fascine users typically used the Fascine for recreational boating and fishing.

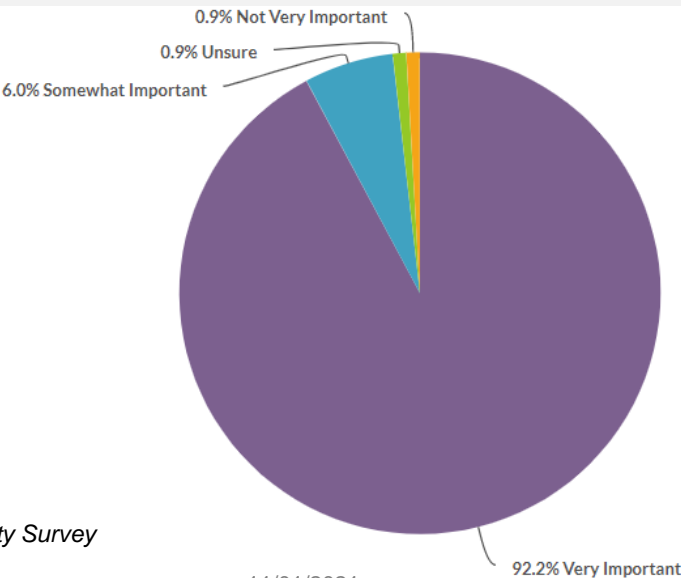
The Fascine being accessible to boats was considered to be very important to almost all respondents, though it should be noted that this survey featured a high proportion of boat owners, and it may be less important to the broader community in Carnarvon.

Breakdown of Fascine Usage, Selected Categories



Source: Urbis Community Survey

Importance of the Fascine Being Accessible to Boats



Source: Urbis Community Survey

COMMUNITY SURVEY RESPONSE

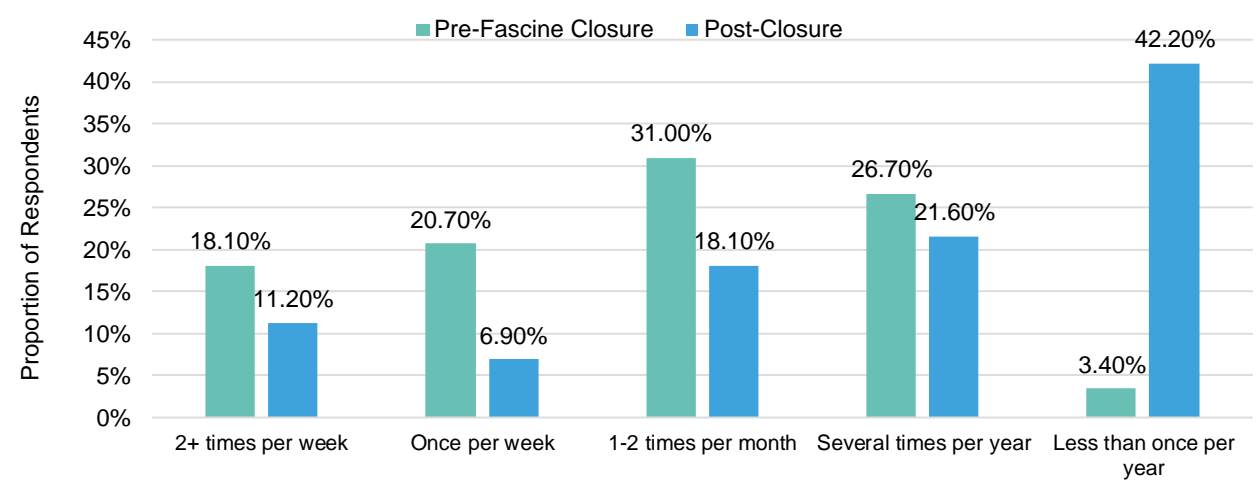
Survey Findings

The majority of Fascine users would regularly utilise the Fascine prior to its closure in 2017. The majority of users stated that they used to utilise the Fascine on a monthly basis or more frequently.

However, following the Fascine closure, respondents frequently used the Fascine less than once per year. An estimated 42.2% of respondents stated that they used the Fascine less than once per year compared to only 3.4% prior to the Fascine closure.

This indicated a clear difference in usage pre and post Fascine closure.

Frequency of Fascine Usage, Prior to and Following the Fascine Closure (pre-2017)



Source: Urbis Community Survey

COMMUNITY SURVEY RESPONSE

Survey Findings

The tables to the right were open ended comments providing an opportunity for respondents to comment on how the Fascine closure had directly affected them or the community.

A variety of different responses expressing a number of different grievances, including issues with water quality, being unable to use the boat ramp, property values, and activation of the waterfront were captured.

An opportunity was given to provide additional comments on the Fascine entryway program, with many respondents expressing a desire for a permanent solution to the issue, and a number of the responses stating a desire to see a solution as soon as possible.

Impact of the Fascine Closure – Selected Responses

Response

“Unable to use the boat ramp and undertake water sports in the Fascine as it has silted up which means the family activities are no longer achievable. The childhood experiences we had are unable to be shared or enjoyed by our own children with the Fascine being closed. The Fascine is a very important stepping stone for the youth of Carnarvon as it provides a safe environment for their introduction to the ocean.”

“Has severely affected the value of properties in the Northwater precinct having houses with their own jetties that are useless when it comes to having a boat and not being able to get out of the Fascine.”

“We used to service guests arriving by boat. We allowed them to use our facilities, fill gas and provide visitor information. Those people are no longer able to get into the Fascine and visit our town. Very bad for tourism.”

“There is a noticeable lack of recreational and commercial activities on the Fascine which seems disappointing given how many opportunities there are”

Additional Comments on Fascine Entryway Project – Selected Responses

Response

“Needs to have a permanent solution to be reopened as soon as possible.”

“The Carnarvon community has suffered for a long time with no answers or solution in sight for the repair of the Fascine.”

“I really hope that this funding is used to bring life back into this under utilized area and helps promote this gorgeous place we call home.”

“Would like to see the point made into a rock wall and the Fascine dredged out, as a permanent fixture.”

“Access to the ocean through the current Fascine channel is unsafe and will eventually lead to loss of life.”

04

LITERATURE / CASE STUDY REVIEW



LITERATURE REVIEW

Literature Review Findings

Previous studies demonstrate that the economic and social benefits of improved tourism and community infrastructure can be significant, flowing through to businesses, workers, visitors and residents (see appendix for literature summaries).

Water recreation infrastructure in particular have the capacity to drive growth and prosperity and enhance local quality of life by:

- Attracting visitors;
- Improving recreation opportunities and associated social wellbeing;
- Unlocking business opportunities; and
- Supporting property development.

Key Findings Identified in Published Literature

Findings	Summary of Findings
Value of Aquatic Recreation and Boating	<p>Recreational boating and fishing are highly popular activities for people along the coast of WA. Additionally, international visitors are found to visit more often and spend more at foreshore areas with coastal attractions.</p> <p>Moreover, environment, commercial and cultural attractions were found to be among the most important influencers for repeat tourism.</p> <p>Recreational fishing continues to grow in popularity in WA, with the number of recreational fishers doubling from 1990 to 2018.</p> <p>There have been numerous studies that have monetised the value of recreational activities, with household value on a per trip basis ranging from \$35 for beach trips up to \$143 for recreational fishing trips, based on the nonmarket value of recreation.</p> <p>Other studies applied a market rate for fishing and boating trips based on the cost of supplies and maintenance, which ranged from \$35 up to \$512 for multi-day trips.</p>
Property Values and Surface Water Quality	<p>Amenity improving enhancements which cater for the social and community space needs of current and future residents and visitors and increased the visual appeal of areas were found to catalyse private investment.</p> <p>Various studies have identified significant correlations between improved property values and higher amenity and surface water quality.</p>

Sources: see appendix

CASE STUDY REVIEW

JURIEN BAY BOAT RAMP & COMMUNITY BOATING



Location: Jurien Bay



Investment: In conjunction with the redevelopment of the Jurien Bay Town Centre, there was a \$1.2m investment in Jurien Bay boat ramps, parking facilities, and a universal access jetty.



Time Period: 2012-13

Impact: Jurien Bay became more popular amongst overnight visitors since 2014.

- The number of domestic overnight visits averaged 872,000 visitor nights per annum from 2014-2019, up from an average of 578,000 from 2000-2013.



- During this period of time, international visitation increased in the region from 92,000 visitor nights on average per annum from 2006-2013 to 144,000 visitor nights per annum from 2014-19.

Source: Urbis, Tourism Research Australia, Royalties for Regions Documentation

AUGUSTA BOAT HARBOUR



Location: Augusta



Investment: This \$35.6m project included boat launching ramps, holding jetties, 40 boat pens, a service jetty, car and trailer parking for more than 200 vehicles, four fully serviced lots for retail development, an amenities building and pavilion, security and lighting paths and landscaping.



Time Period: 2012-2014

Impact: Augusta became more popular among overnight visitors from 2015 onwards.



- The number of domestic overnight visits averaged 393,000 visitor nights per annum from 2015-2019, up from an average of 317,000 from 2000-2014.
- During this period of time, international visitation increased in the region from 35,000 visitor nights on average per annum from 2006-2014 to 51,000 visitor nights per annum from 2015-19.

Source: Urbis, Tourism Research Australia, Royalties for Regions Documentation

05

A blurred background image showing a person in a white lab coat, likely a healthcare professional, standing and writing on a clipboard. The setting appears to be a clinical or office environment with other people and equipment visible in the background.

IMPACT EVALUATION

CONSTRUCTION OPTIONS

Construction Value Findings

There have been several options provided for the development of this project.

The base case is the option of not constructing an alternate channel, but continuing maintenance dredging activities to maintain a temporary channel every two years.

The alternatives to the base case both involve developing a permanent solution for the Fascine. The following two options were considered preferred options and are the subject of this study.

- **Option 3:** Involves creating a new parallel channel.
- **Option 4:** Involves a new channel through the existing boat harbour that will also include a mechanical bridge over the channel to allow road access to the harbour.

The costs presented in the cost breakdown table are based on the Seashore Engineering draft options report and are subject to change throughout the detailed design phase.

Options Assessed by Project

Options	Description
No New Channel – Dredge Previous Channel	This option involves continuing maintenance dredging operations, and re-dredging the initial Fascine channel opening. This option involves a high level of future maintenance dredging cost.
Option 3 – New Channel Parallel to Previous Channel	This option involves dredging a new channel and channel opening parallel to the previous Fascine channel.
Option 4 – New Channel Through Boat Harbour	This option involves dredging a new channel that opens through the boat harbour. This option also requires sheet piling, and building a bridge over the new channel to allow access to the boat harbour at Pickles Point.

Source: Urbis, Seashore Engineering

Breakdown of Initial and Forward Costs over 10 years

Cost Category	Continuing Maintenance Dredging and Re-dredging Previous area	Option 3	Option 4
Capital Costs	\$0	\$6,000,000	\$16,100,000
Operating Costs (10 Year Timeframe)	\$4,250,000	\$850,000	\$850,000

Note: The costings presented in this table refer to the 'P90' costs, which are considered to be the higher boundary of the cost estimate, rather than the 'P50' costs, which are the expected costs. The forward costs for option 3 & 4 are based on the maintenance cost featured in the 10-year financial plan for option 3. This study made the assumption that maintenance costs would be comparable for both options. Option four may have cost savings on dredging in the long term, but will likely also feature additional costs from bridge maintenance and operation.

Source: Urbis, Seashore Engineering

ASSESSMENT APPROACH

Approach Summary

This section provides an assessment of the likely positive and negative economic impacts from the implementation of the project options. The economic impacts of the project options were measured in two phases:

- **Construction phase**, where the economic effect is due to the construction activity; and
- **Operational phase**, where the economic, social and environmental effects are due to the activity generated by use of new amenities and infrastructure.

All effects were measured in terms of the incremental impact of implementing the project options compared to not implementing the project options (i.e. status quo).

Assessment Principles

Principle	Description
Transparency is Paramount	Economic and social evaluations are heavily reliant on judgement. Because of this, it is crucial that the basis for analytical inputs, decisions and conclusions are properly explained and documented. A key benefit is it allows for more robust scrutiny of the analysis by other (independent) parties, thereby facilitating more informed debate and continual improvements over time.
Assumptions Linked to Sound Evidence Base	Credible and current published literature of ex-ante and post-ante studies should be referenced to support assumptions.
Guided by Government Guidelines	Assessments should closely adhere to government guidelines.
Recognition of Risks	Many of the costs and benefits are uncertain and therefore involve an element of risk. Importantly, this should be explicitly accounted for in a cost benefit analysis, primarily through undertaking a sensitivity analysis of key risk elements.

Source: Urbis

CONSTRUCTION PHASE

Impact Modelling Methodology

This study undertook an assessment of the potential economic activity supported by this project. The following impacts of the project were measured.

- **Direct impacts** are the initial round of economic output, employment and household income generated by an economic activity.
- **Indirect impacts** are the sum of production-induced (i.e. supply chain) effects and consumption-induced effects. Production-induced effects (Type I) are additional output, employment and household income resulting from re-spending by firms that receive payments from the sale of services to firms undertaking production.

The modelling assessed:

- **Economic activity** – the total dollar amount impact (or contribution to gross domestic product);
- **Employment** – the full time equivalent per annum employment generated by the project (referenced as FTE job years);
- **Value added** – the value added to materials and labour expended on the project; and
- **Supply chain impacts** – the value of further spending in the supply chain.

Construction Phase Impact Modelling Steps

Modelling Step	Description
Estimate Direct Impacts	Line item costs were allocated to relevant industry classifications based on project experience.
Calculate Consumption and Supply Chain (Indirect) Impacts	<p>This study used an Economic Impact Assessment (EIA) approach to estimate the impact of the project. At the core of EIAs are Input–Output (IO) tables. IO tables are part of the national accounts by the ABS and provide detailed information about the supply and use of products in the Australian economy, and the structure of and inter–relationships between Australian industries. IO tables are converted, through statistical analysis, into a series of economic multipliers. These multipliers represent the relationship between the direct expenditure associated with a project.</p> <p>The EIA assessed the additional effects from further rounds of spending in the supply chain, but has not included a consumption effect (Type II), which may result from consumer spending generated in the region.</p>

Source: Urbis

CONSTRUCTION PHASE (CAPITAL EXPENDITURE)

Estimated Impacts

The estimated impacts are summarised below.

- **Employment:** Option 3 of the project is expected to support equivalent to 9 full-time equivalent job years directly and total employment of 18 full-time equivalent job years. Option 4 is expected to support 25 jobs directly and 49 jobs in total.
- **Economic Contribution:** The project will create positive flow on effects for both upstream and downstream suppliers. The total effect of option 3 in terms of economic output is projected to be around \$10.5m. The total effect of option 4 in terms of economic output is projected to be around \$28.3m
- **Local Content (During and After Construction):** Local content outcomes can be achieved if local suppliers are engaged directly for accommodation and travel requirements. Post construction maintenance could achieve local content outcomes by means of engaging with local contractors and potential ongoing maintenance contracts.

Construction Phase Impact Findings, Option Three

Category	Direct Effect	Supply-Chain Effect	Total Effect
Economic Activity (\$m)	\$5.98	\$4.50	\$10.48
Employment (FTE Job Years)	9	9	18
Value Added (\$m)	\$2.30	\$1.81	\$4.11

Source: Urbis, REMPLAN

Construction Phase Impact Findings, Option Four

Category	Direct Effect	Supply-Chain Effect	Total Effect
Economic Activity (\$m)	\$16.14	\$12.16	\$28.30
Employment (FTE Job Years)	25	24	49
Value Added (\$m)	\$6.21	\$4.88	\$11.09

Source: Urbis, REMPLAN

VISITATION UPLIFT

Visitation Uplift Findings

Based on the change in visitation in the period from 2017-19 and the longer-term average from 2009-16, this study assumed that redeveloping the Fascine would have a positive uplift on current visitation levels (bringing them closer in line with historical averages).

An uplift of 3.4% was estimated for this project. This results in an increased volume of visitor expenditure equal to approximately \$1.8m per annum.

The increased visitation expenditure is estimated to directly support an additional 7 full-time equivalent ongoing jobs. Indirectly the expenditure could support an additional 3 ongoing jobs on a permanent basis.

As option 4 is expected to be constructed one year earlier than option 3, there is an additional year of visitation benefits expected from this option.

Net Additional Visitation Impact, Shire of Carnarvon

Scenario	Base Case	Option 3 or 4	Net Change
Annual Visitor Nights	371,431	384,063	+56,094
Estimated Annual Visitor Expenditure	\$53.5m	\$55.3m	+\$1.8m
Indirect Annual Economic Impact (Supply-Chain Flow On Effect)	\$30.5m	\$31.5m	+\$1.0m
Total Annual Economic Impact	\$84.0m	\$86.8m	+\$2.9m
Direct Employment	218	225	+7
Indirect Employment (Supply-Chain Flow On Effect)	66	69	+3
Total Ongoing Employment Impact	285	294	+10

Source: Urbis, REMPLAN

Net Additional Visitation Spend, Net Present Value, Shire of Carnarvon

Net Present Value Discount Rate	Option 3	Option 4
4%	\$26,828,092	\$28,413,365
7%	\$17,586,949	\$19,001,772
10%	\$12,120,107	\$13,386,785

Source: Urbis

RECREATIONAL BOATING

Recreational Boating Findings

Given that there is a direct impact on the boats currently moored in the Fascine, as they cannot travel to the open ocean, this study calculated the foregone value of boating trips.

Based on the number of boats moored at the Yacht Club, the number of boats moored at the canal moorings in the Northwater estate, and studies that have assigned a direct economic value to boat trips at a household level, this study estimated a total annual impact of approximately \$43,615.

Given that there are moorings within the channel that haven't been included in this analysis, the above estimate of affected boats is likely a conservative one.

Recreational Boating Impact Assumptions

Metric	Value
Number of Boats moored at Yacht Club	43
Number of Boats Moored at Canal Moorings (residential)	18
Total Boats	61
Average Number of Boat Trips Per Annum	38
Recreational Value per Boat Trip	\$18.80
Annual Value of Net Additional Boat Usage	\$43,609

Source: Urbis, Carnarvon Yacht Club Survey (July 2020)

Net Additional Value of Recreational Boating, Net Present Value, Shire of Carnarvon

Net Present Value Discount Rate	Option 3	Option 4
4%	\$608,723	\$646,000
7%	\$398,788	\$432,058
10%	\$275,137	\$304,922

Source: Urbis

RESIDENTIAL LAND VALUE UPLIFT

Land Value Uplift Findings

This study calculated the value uplift that could occur due to the redevelopment of the Fascine based on studies that have identified a relationship between property values in a waterfront area and the quality of the waterway in terms of useability and surface clarity.

The total net additional value per lot sold is estimated at \$8,039. It is assumed that the sales rate is based on comparable estates of approximately 3 lots per annum. This equates to the estate being sold out as of 2039.

Residential Land Value Uplift Assumptions

Metric	Value
Volume of Northwater Land (future stages) (sq.m)	59,527
Proportion of Land Available for Development	56%
Developable Land (sq.m)	33,159
Blended price/sq.m (land locked and waterfront lots)	\$208
Escalation Rate	6.5%
Escalated price/sq.m	\$221
Average Lot Size (sq.m)	600
Lots Sold Annually	3
Additional Value per lot (\$)	\$8,039

Source: Urbis, Development WA

Net Land Value Uplift, Net Present Value, Shire of Carnarvon

Net Present Value Discount Rate	Option 3	Option 4
4%	\$270,760	\$281,591
7%	\$190,162	\$203,473
10%	\$137,789	\$151,568

Source: Urbis

OPERATIONAL PHASE

Additional Impact Findings

The project is expected to generate additional secondary benefits that were not analysed above but are still relevant to the project, such as improved vibrancy, physical recreation opportunities, supporting community preferences, and enabling the use of recent investments in Fascine infrastructure. However, the intangible aspect of these benefits means their nature and scope is highly uncertain. Although these benefits have important economic implications, they are difficult to accurately quantify and have therefore been assessed qualitatively.

Drawing on the literature review and case study analysis, the project is expected to provide the following key ongoing benefits:

- Population health and wellbeing, with improved vibrancy and activation of the site leading to increased physical activity;
- Supporting the community preferences for a permanent solution to the Fascine Entryway issue, while also improving business confidence in the town; and
- Enabling the use of public infrastructure investments that were completed several years ago, but are being underutilised currently.

Other Operational Impacts

Impact	Assessment Findings
Vibrancy and Activation	Since the Fascine entryway closure, there has been a decline in the number of recreational boats using the Fascine due to safety concerns, or an inability to take the boats out to sea from the Fascine. This has reduced the level of traffic along the waterfront and reduced the general amenity of businesses located in waterfront areas.
Physical Recreation Supporting Positive Health Outcomes	Redevelopment of the Fascine is expected to encourage additional participation in community activities and active recreation opportunities within the Fascine in terms of swimming and watersports, and along the waterfront open space areas. This increased physical activity is expected to lead to tangible mental and physical health cost savings and lead to increased workforce productivity, and lower risks of obesity and diabetes.
Permanent Solution Supporting Community Preferences	Through engagement with the Carnarvon community and business owners in the area, there is a clear and vocal preference for a permanent and effective solution that allows the community to be confident in the future of the Fascine for recreational boating and ocean access. Business owners are currently not confident in the future of the Fascine, and it is unlikely that the area would be able to attract additional tourism operators without this confidence being renewed.
Enabling the use of recent investments in Fascine Infrastructure	Currently, the Fascine is unable to be used to travel to the open sea for some boat users. This means that the recent investments in the Fascine boat ramp and broader public infrastructure in the town are not being used to the same extent as previously (before the closure of the entryway).

Source: Urbis

ADDITIONAL CONSIDERATIONS

Summary of Additional Considerations			
Options	Environmental Implications	Cost Implications	Safety Implications
No New Channel – Dredge Previous Channel	<ul style="list-style-type: none"> More frequent maintenance dredging is likely to lead to more displaced marine life and native flora. 	<ul style="list-style-type: none"> While initial costs are low, this option requires considerable maintenance costs over the next 20-30 years and is not a permanent solution. 	<ul style="list-style-type: none"> Given that the current channel requires certain tidal conditions for certain types of boats to get out, there are potential safety issues without a permanent solution, or heavy investment in channel marking.
Option 3 – New Channel Parallel to Previous Channel	<ul style="list-style-type: none"> Given that this option involves dredging an entirely new channel, the potential environmental impact is likely to be higher than the other options. 	<ul style="list-style-type: none"> Initial costs are in between the other options, with less maintenance being required for this option compared to the base case. 	<ul style="list-style-type: none"> There are unlikely to be any additional safety risks.
Option 4 – New Channel Through Boat Harbour	<ul style="list-style-type: none"> This option has a smaller construction footprint and is likely to have fewer environmental risks. However, there is a potential requirement to expand the boat harbour, which would lead to additional environmental risks. 	<ul style="list-style-type: none"> This option features the highest initial costs. There are likely to be some additional costs in terms of maintaining a mechanical bridge. This could offset the potential channel maintenance costs due to the opportunity for cost savings associated with aligning maintenance with that of the Boat Harbour channel. 	<ul style="list-style-type: none"> Bringing recreational boats through a commercial harbour is likely to increase the risk of potential collisions and property damage. This is a particular risk for sailing boats and yachts which would be required to use the harbour.

Source: Urbis

06

The background of the slide features a faint, stylized financial line chart with multiple data series in shades of blue and white. A solid horizontal bar with a gradient from teal to dark blue is positioned below the '06' and above the main title.

COST BENEFIT ANALYSIS

ASSESSMENT APPROACH

Approach Summary

A Cost Benefit Analysis (CBA) is the most commonly used and most comprehensive of the economic evaluation techniques. It compares the monetised benefits and costs of a project to determine the desirability of a project.

This study uses a net benefit approach. This only analyses the incremental, or additional, benefits and costs that can be estimated with a degree of accuracy. This approach is considered to be the most appropriate to assess the net economic benefits that accrue from the project as it enables direct comparisons with alternative proposals.

The steps in CBA include:

- Identify the quantifiable benefits that are able to be monetised;
- Calculate the value (in monetary terms) of the quantified incremental benefits and costs in net present value (NPV) terms using the discount rates;
- Calculate the 30-year total net present value – the total present value of all net benefits minus the present value of economic costs to determine whether net benefits exceed (or undershoot) costs related with the project; and
- Sensitivity analysis based on alternative economic impact assumptions and discount rates.

Assessment Assumptions

Assumption	Description
Discount Rate	Discounting is the reverse of compounding (adding) interest. It reduces the monetary value of future costs and benefits back to a common time dimension – the base date (i.e. 2020). Discounting satisfies the view that people prefer immediate benefits over future benefits (social time preference) and it also enables the opportunity cost to be reflected. A real discount rate of 7% was adopted for this assessment. A sensitivity test involved utilisation of 4% and 10% discount rates.
Timeframe	The benefits were identified on an annual basis over a set period and calculated in net present value terms at the defined discount rate. For this study, a 30-year timeframe was assessed as this represents the notional life span of the improvements before significant future investment is required.
Benefit Escalation	This assessment assumed constant visitation spending and boat ownership levels which is conservative in nature (i.e. no escalation was applied to the benefits).

Source: Urbis

BENEFIT INPUTS

Summary of Inputs

This cost benefit analysis included the following inputs:

- Capital costs;
- Ongoing maintenance costs;
- Net additional visitation spending;
- Net additional value of recreational boating; and
- Net additional property value uplift.

Assessment Inputs

Input	Description	Metric
Capital Costs	The upfront capital cost was based on the Seashore Engineering report.	Option 3 was estimated at \$6m and assumed to be constructed during 2024. Option 4 was estimated at \$16.1m and assumed to be constructed during 2022/23.
Maintenance Cost	The maintenance cost was based on the Seashore Engineering report 10-year operating expenditure estimates.	The maintenance cost is assumed for every four years (\$500,000 and \$350,000).
Visitation Uplift	In the period from 2017-2019, visitation declined 10% relative to the longer term average from 2009-2016. In these same periods, the proportion of visitors participating in aquatic activities in Carnarvon fell from 32.8% of visitors to 25.9% of visitors. The redevelopment of the Fascine is expected to help alleviate this decline.	Visitor nights were assumed to increase by a net of approximately 3.4% following the completion of construction.
Recreational Boating	This study identified the number of boats moored at the Yacht Club and the number of residential boat moorings at the Northwater canal development and assigned an economic value to boating trips based on studies reviewed in the literature summary. Using detail on annual boat usage from the community survey and the average capacity of boats based on sizes sourced from the Yacht Club survey, the foregone value of these boats not being able to use the Fascine was calculated.	An economic value of \$18.80 per boat trip per annum for the boats that are unable to effectively use the Fascine entryway currently.
Property Value Uplift	Studies reviewed in the literature summary indicated a property discount rate for waterfront properties located along poorly maintained waterways with poor surface water quality. This study applied these discount rates to the potential future lots sold at the Northwater Development.	A net property value uplift of 6.5% was assumed for future stages of the Northwater development.

COST BENEFIT ASSESSMENT RESULTS

Cost Benefit Assessment Findings

The CBA results reveal that the project provides significant ongoing benefits. At the adopted discount rate of 7%, the net benefit is estimated to be approximately \$18-20m for both options, with the net benefit (benefits minus costs) ranging from \$13.4m for option 3 and \$6.4m for option 4.

This analysis excludes benefits that could not be reliably monetised (e.g. leveraged investment, business confidence) or were not considered to be direct effects from the project. Indirect costs and benefits would include those costs and benefits obtained through multiplier effects (e.g. those indirect impacts associated with additional visitor expenditure).

It should be noted that both options offer comparable monetised benefits, though the costs vary significantly.

Cost Benefit Assessment, Option Three

Impact Category	4%	7% (adopted discount rate)	10%
Costs (NPV)	\$5,588,432	\$4,824,787	\$4,184,423
Benefits (NPV)	\$27,707,575	\$18,175,900	\$12,533,032
Net Impact (NPV)	\$22,119,144	\$13,351,113	\$8,348,609
Benefit Cost Ratio	5.0	3.8	3.0

Source: Urbis

Cost Benefit Assessment, Option Four

Impact Category	4%	7% (adopted discount rate)	10%
Costs (NPV)	\$14,644,907	\$13,190,162	\$11,925,594
Benefits (NPV)	\$29,340,955	\$19,637,303	\$13,843,275
Net Impact (NPV)	\$14,696,048	\$6,447,141	\$1,917,681
Benefit Cost Ratio	2.0	1.5	1.2

Source: Urbis

SENSITIVITY ANALYSIS

Sensitivity Analysis Findings

As the visitation uplift benefit was determined to be the most significant benefit, this study estimated what the cost benefit analysis findings could be in different scenarios. The scenarios included:

- If the uplift in visitation was lower than anticipated at 2% instead of 3.4%; and
- If the uplift in visitation was higher than anticipated at 4% instead of 3.4%.

The sensitivity analysis has assumed a discount rate of 7% for all scenarios.

Indicatively, at the lower assumed uplift rate, the benefit to cost ratio is still strong for option three, but the proposition becomes less compelling for option 4.

Sensitivity Analysis, Option Three (7% Discount Rate)

Impact Category	2%	3.4% (Base Case)	4%
Costs (NPV)	\$4,824,787	\$4,824,787	\$4,824,787
Benefits (NPV)	\$10,980,795	\$18,222,480	\$19,637,303
Net Impact (NPV)	\$6,156,008	\$13,397,693	\$14,812,516
Benefit Cost Ratio	2.3	3.8	4.1

Source: Urbis

Sensitivity Analysis, Option Four (7% Discount Rate)

Impact Category	2%	3.4% (Base Case)	4%
Costs (NPV)	\$13,190,162	\$13,190,162	\$13,190,162
Benefits (NPV)	\$11,813,044	\$19,637,303	\$22,990,557
Net Impact (NPV)	-\$1,377,118	\$6,447,141	\$9,800,395
Benefit Cost Ratio	0.9	1.5	1.7

Source: Urbis

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RECOMMENDATIONS & IMPLEMENTATION CONSIDERATIONS



KEY RECOMMENDATION

A cost benefit analysis was undertaken to capture the expected benefits and costs (excluding benefits and costs unable to be robustly monetised). The results reveal that both options are expected to generate significant net economic returns for the region. To complement the cost benefit assessment, a qualitative options assessment was undertaken and found that Option 3 likely offers a stronger return on investment and should be pursued.

OPTION	STATUS QUO (BASE CASE)	OPTION THREE (NEW EASTERN CHANNEL)	OPTION FOUR (ACCESS THROUGH FISHING BOAT HARBOUR)
Pros	<ul style="list-style-type: none"> No initial capital expenditure. 	<ul style="list-style-type: none"> Substantially lower capital expenditure than other permanent solution option. Offers a permanent solution to issue, which has stakeholder support. 	<ul style="list-style-type: none"> Permanent solution that leverages existing investment in boat harbour.
Cons	<ul style="list-style-type: none"> Not a permanent solution. Over time, the frequent dredging costs will become significant. Goes against community preferences of permanent solution. 	<ul style="list-style-type: none"> Lower maintenance cost relative to status quo. Potentially features more environmental risks. 	<ul style="list-style-type: none"> May require additional operational costs to keep bridge in operation. Higher capital expenditure than other options by a significant margin. Potential issues around boat congestion bringing recreational vessels through commercial harbour.
Estimated Construction Cost	Capital expenditure: \$0 10 year maintenance expenditure: \$4.25m	Capital expenditure: \$6m 10 year maintenance expenditure: \$0.85m	Capital expenditure: \$16.1 10 year maintenance expenditure: \$0.85m
Benefit Cost Ratio (at 7%)	N/A	3.8	1.5
Conclusion	This option does not permanently fix this issue and is unlikely to realise the benefits that the other options would on a long term basis.	This option is expected to be the most cost effective. The benefits are expected to significantly outweigh the costs.	While this options provides similar economic, social and environmental benefits as option 3, it comes at a substantially higher cost. This option also features several risks that option 3 doesn't have, such as boat safety and congestion through the Boat Harbour.

Source: Urbis

DRAFT IMPLEMENTATION CONSIDERATIONS

Other Considerations

This study identified some considerations to help inform the delivery of this project.

Of key importance is the need to proactively engage with the resident and business community to ensure the project status, description, milestones and rationale are known.

There is also a need to ensure the expected visitation impacts can be supported by local businesses and that required investment is attracted to enhance tourism amenities (e.g. charter vessel businesses, accommodation).

Implementation Considerations

Focus Area	Strategy Consideration
Communication and Engagement	<p>The community and business consultation revealed considerable emotion and disappointment at the perceived lack of action to address the Fascine entryway closure in 2017. Whilst the recent funding announcement to support additional pens at the Boat Harbour will be beneficial to the community and support water recreation and visitation, there is an opportunity to continue to engage the community in the detailed design and implementation phases.</p> <p>Consideration should be given to:</p> <ul style="list-style-type: none"> Marketing the expected benefits of this project to encourage community engagement and support; and Community, business and visitor drop in sessions and public advertising of project status.
Tourism and Investment Attraction	<p>The success of the delivery of this project will depend on the ability to maximise economic and social impacts. As a core economic impact is increased tourism, there will need to be a coordinated approach to ensure tourism amenities and services have the capacity to expand to accommodate additional demand.</p>
Procurement	<p>Throughout the construction phases the objective should be to localise procurement wherever possible. Contractors, materials and labour should be sourced within WA, and where possible within the Gascoyne and Shire of Carnarvon. Local construction staff and training should be prioritised where practical.</p>
Monitoring and Evaluation	<p>Monitoring is critical for insightful evaluation because it provides a sufficient base of information about how a project or program was implemented, including whether and in what ways it deviated from its intended design. As such, an M&E Plan should be developed to ensure economic and social impacts are tracked and optimised.</p>

Source: Urbis

APPENDIX



GLOSSARY OF TERMS

Benefit Cost Ratios are indicators to determine whether the benefits of a project exceed the costs. A value greater than 1 implies there are net benefits.

Direct Impacts are the initial round of economic output, employment and household income generated by an economic activity.

Discount Rates represent the view that people prefer immediate benefits over future benefits and additionally enable for opportunity costs to be reflected when making judgements about the value of a project.

Economic Output is a measure of the gross revenue of goods and services produced by commercial organisations and gross expenditure by government agencies.

Full-Time Equivalent (FTE) Job Years refers to the total number of full-time equivalent jobs per annum.

Indirect Impacts are production-induced effects. Production-induced effects (Type I) are additional output, employment and household income resulting from re-spending by firms that receive payments from the sale of services to firms undertaking production. Consumption-induced effects (Type II) are additional output, employment and household income resulting from re-spending by households that receive income from employment in direct and indirect activities. These Type II effects were not assessed.

Induced Impacts are the expected outcomes of a project versus the business of usual approach whereby the project is not implemented.

Net Present Value is the sum of the present value of benefits and costs over a period of time.

Present Value reflects the current dollar value using a prescribed discount rate.

LITERATURE SUMMARIES

Reference	Summary of Findings
Artell, J. (2014) Lots of Value? A Spatial Heonic Approach to Water Quality Valuation, Journal of Environmental Planning and Management, vol 57, pp. 862-882	Very few studies have addressed the effects of water quality on recreational values in a hedonic property price setting. This study elicits the value of improved water quality capitalised in Finnish recreational property prices adjacent to the Baltic Sea, lakes and rivers. An expert-determined, water body specific water quality index that describes the usability status of the water is used instead of more specific, but also more problematic, water quality indicators. The study finds that water usability has a positive effect on property prices, with weak suggestions on non-linearity.
Pascoe, S. (2019) Recreational Beach Use Values with Multiple Activities, Ecological Economics, Vol. 160, pp. 137-144	Beaches provide multiple recreational opportunities, such as swimming, surfing, fishing, walking or just enjoying being by the seaside. Activities such as surfing, fishing and swimming generate higher levels of consumer surplus than more passive activities such as just enjoying the natural environment. We also find that Sydney residents have different values to non-Sydney residents. From our analysis, a trip to the beach provides a base level of consumer surplus of around \$10/trip for Sydney residents, with additional benefits derived from undertaking different activities. For example, surfing followed by a walk along the beach adds an additional \$17 to the value of the visit.
Rolfe, J. et al. (2012) Valuing beach recreation across a regional area: The Great Barrier Reef in Australia , Ocean & Coastal Management, vol. 69, pp. 282-290	The value of a single beach visit was estimated per person at \$35.09, which extrapolates to \$587.3 million in beach recreation values per annum. These values are likely to be conservative because opportunity costs incurred to live closer to the beach (e.g. housing premiums) have not been assessed. Contingent behaviour models were used to estimate the values of potential declines in water quality, with marginal effects assessed at \$1.30 per recreation trip to avoid each 1% decline in water quality
Bonetti et al. (2016) Canals vs. Streams: To What Extent Do Water Quality and Proximity Affect Real Estate Values? A Hedonic Approach Analysis	Our main results show a significant but conflicting impact of water proximity on real estate value: reducing the canal distance, we observe an increase in the residential housing sale price, in urban more than peri-urban environments; in contrast, reducing the stream distance, our results show decreases in property value. Moreover, a significant moderating effect of water quality on distance from streams is identifiable.
Windle, J. et al. (2017) Assessing recreational benefits as an economic indicator for an industrial harbour report card, Ecological Indicators, Vol. 80, pp. 224-231	This paper is focused on the assessment of recreational benefits as an indicator of economic value in the report card for Gladstone Harbour in Queensland, Australia. The trip value was estimated at \$35.01, \$61.44 and \$143.16 for beach, land and fishing recreation respectively. To extrapolate the values from the survey sample to the population of Gladstone, information was applied from the Queensland Government Statistician's Office and the Australian Bureau of Statistics.

METHODOLOGY, DEFINITIONS & ASSUMPTIONS FOR CONSTRUCTION PHASE IMPACTS

The REMPLAN Methodology

Analysis presented here uses REMPLAN economic modelling to assess current and potential economic impacts. REMPLAN is an Input-Output model that captures inter-industry relationships within an economy. It can assess the area-specific direct and flow-on implications across industry sectors in terms of employment, wages and salaries, output and value-added, allowing for analysis of impacts at the State of Western Australia level.

Key points regarding the workings or terminology of the model are as follows:

- REMPLAN uses either the value of investment or employment generation as the primary input. For this analysis, the value of total upfront investment has been used as the key input to assess the benefits of the construction phase.
- Outputs from the model include employment generated through the project and economic Gross Value Added (GVA) at the State level
- Outputs from the model include employment generated through the project at both the local and the state level.
- Employment generated is calculated over the life of the construction phase; or in terms of the on-going operations, total on-going jobs generated.
- Both the direct and indirect employment are modelled:
 - *Direct* refers to the effect felt within the industry as a result of the investment. For example, the construction phase will directly result in the creation of construction jobs.
 - *Indirect* effects are those felt within industries that supply goods to the industries directly affected.
- It should be noted that the results presented in this report are estimates only based on the existing state of economic activity in the area. Due to the static nature of input-output modelling, they have the potential to overstate the actual effects. Nonetheless, the analysis still reflects the fact that employment growth will be positive for the State and the local area.
- Urbis consider that in the absence of the investment package it is unlikely that similar projects would be undertaken within the same period, and therefore the investments can be considered *additional*.

Definitions

Construction cost is the estimated investment value for each development over the anticipated delivery period, measured in constant 2020 dollar (i.e. excluding inflation) excluding GST.

Gross Value Added or GVA is a measure of the value of goods and services produced in an area, industry or sector of an economy during a certain period of time. In this case, GVA represents the total economic contribution of the investment in each of the resorts. GVA is measured in constant 2020 dollar (i.e. excluding inflation) excluding GST.

COVID-19 AND THE POTENTIAL IMPACT ON DATA INFORMATION

The data and information that informs and supports our opinions, estimates, surveys, forecasts, projections, conclusion, judgments, assumptions and recommendations contained in this report (Report Content) are predominantly generated over long periods, and is reflective of the circumstances applying in the past. Significant economic, health and other local and world events can, however, take a period of time for the market to absorb and to be reflected in such data and information. In many instances a change in market thinking and actual market conditions as at the date of this report may not be reflected in the data and information used to support the Report Content.

The recent international outbreak of the Novel Coronavirus (COVID-19), which the World Health Organisation declared a global health emergency in January 2020 and pandemic on 11 March 2020, is causing a material impact on the Australian and world economies and increased uncertainty in both local and global market conditions.

The effects (both directly and indirectly) of the COVID-19 Outbreak on the Australian real estate market and business operations is currently unknown and it is difficult to predict the quantum of the impact it will have more broadly on the Australian economy and how long that impact will last. As at March 2020, the COVID-19 Outbreak is materially impacting global travel, trade and near-term economic growth expectations. Some business sectors, such as the retail, hotel and tourism sectors, are already reporting material impacts on trading performance now and potentially into the future. For example, Shopping Centre operators are reporting material reductions in foot traffic numbers, particularly in centres that ordinarily experience a high proportion of international visitors.

The Report Content and the data and information that informs and supports it is current as at the date of this report and (unless otherwise specifically stated in the Report) necessarily assumes that, as at the date of this report, the COVID-19 Outbreak has not materially impacted the Australian economy, the asset(s) and any associated business operations to which the report relates and the Report Content. However, it is not possible to ascertain with certainty at this time how the market and the Australian economy more broadly will respond to this unprecedented event. It is possible that the market conditions applying to the asset(s) and any associated business operations to which the report relates and the business sector to which they belong could be (or has been) materially impacted by the COVID-19 Outbreak within a short space of time and that it will have a lasting impact. Clearly, the COVID-19 Outbreak is an important risk factor you must carefully consider when relying on the report and the Report Content.

Any Report Content addressing the impact of the COVID-19 Outbreak on the asset(s) and any associated business operations to which the report relates or the Australian economy more broadly is (unless otherwise specifically stated in the Report) unsupported by specific and reliable data and information and must not be relied on.

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