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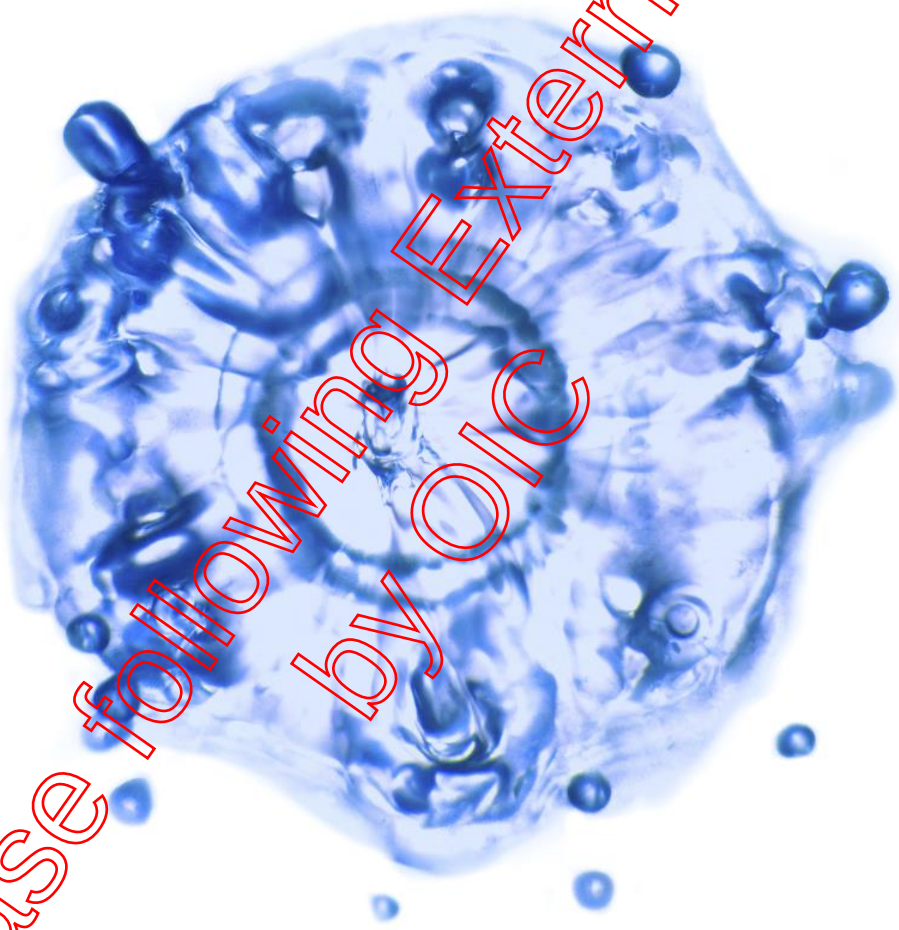

Redlands Coast Adventure Sports Precinct Business Case including Financial Feasibility Study and Economic Impact Assessment

Final Report - 20 December 2019

Redland City Council

Deloitte Access Economics

Kim Kerwin

Group Manager, Community and Economic Development

Redland City Council

20 December 2019

Dear Kim,

Final Report: Redlands Coast Adventure Sports Precinct Business Case including Financial Feasibility Study and Economic Impact Assessment

In accordance with the letter of acceptance dated **24 September 2019**, this Final Report provides the findings of financial feasibility analysis and economic impact modelling of the development of a standalone Olympic standard whitewater facility and a scenario that considers the development of a Redland Coast Adventure Sports Precinct, co-locating a diverse range of whitewater, aquatic and adventure facilities.

Restrictions on report use

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Basis of our work

This **Final Report** reflects our economic research and analysis based on key inputs from Whitewater Parks International, LLC, data and reports provided to Deloitte by Redland City Council, publicly available data, and relevant studies related to whitewater facilities and the Olympic Games.

For all enquiries on this report please contact Steve Kanowski. Steve's contact details are skanowski@deloitte.com.au or 0477 727 754.

Yours sincerely

Steve Kanowski
Partner

Deloitte Access Economics Pty Ltd

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Glossary

Acronym	Full name
BAU	Business as usual
CGE	Computable General Equilibrium
DAE-RGEM	Deloitte Access Regional General Equilibrium Model
FRS	Fire and Rescue Service
FTE	Full time equivalent
ICF	International Canoe Federation
MSRC	Motorised Swiftwater Rescue Craft
PWS	Penrith Whitewater Stadium
QFES	Queensland Fire Emergency Services
RCASP	Redland Coast Adventure Sports Precinct
RCC	Redland City Council
SEQ	South East Queensland
SFR	Swiftwater Floodwater Rescue
WPI	Whitewater Parks International, LLC

Executive summary

Overview

The Redland City Council (RCC), as part of a Queensland bid to host the Summer Olympics in 2032, seeks to assess the financial feasibility and economic impact of delivering an Olympic standard whitewater facility in Redland City (Redland), to host the Olympic Canoe/Kayak - Slalom event. This report highlights a range of compelling reasons to support the development of a whitewater facility in Redland, including plans to integrate the facility within a new community facility, the Redland Coast Adventure Sports Precinct (RCASP).

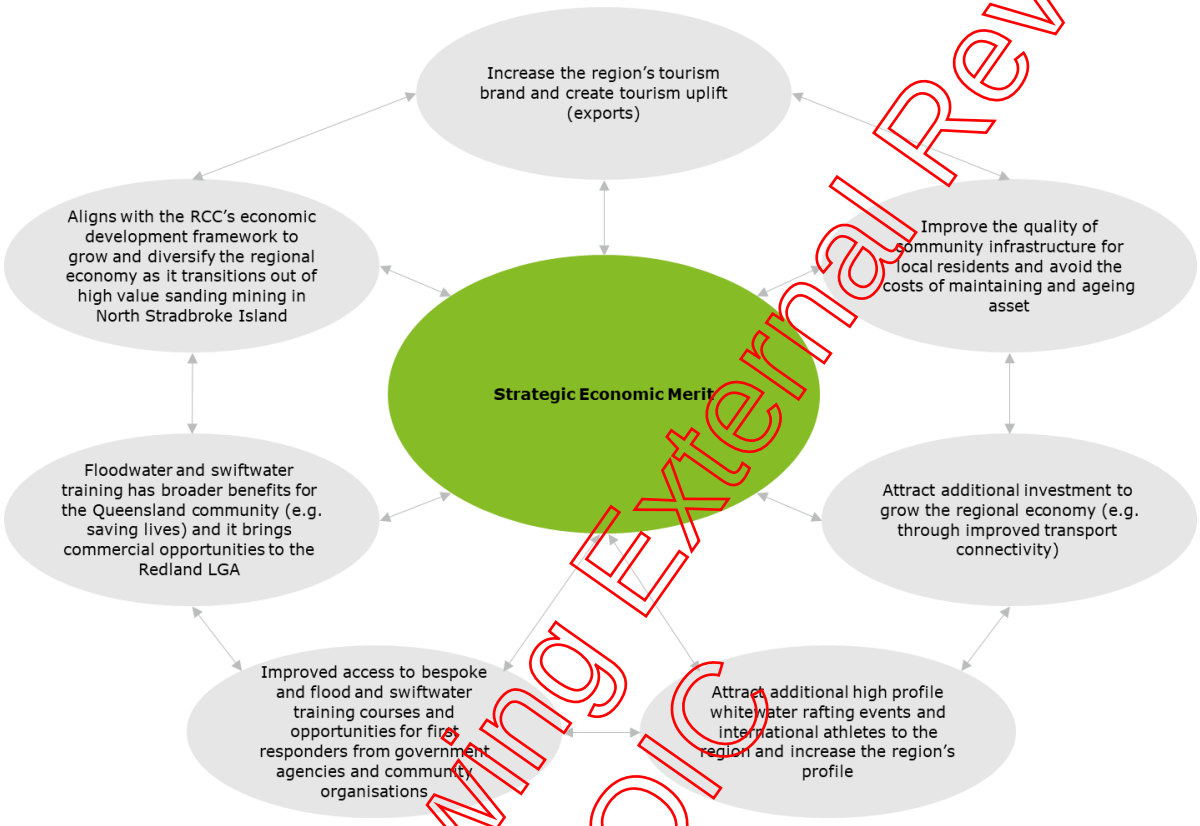
The vision of RCC is to develop a multi-purpose facility to serve a range of community purposes, co-locating a diverse range of whitewater, aquatic and adventure facilities. The RCASP addresses a current gap in availability of integrated sporting/recreational facilities for Redland residents (and visitors) that would need to be addressed over the longer-run, particularly given the age of the current Cleveland Aquatic Centre assets requiring redevelopment in the near future.

A **"catalytic investment"** of this type has strategic economic merit from a range of perspectives (Figure i), including:

- The potential to attract new investment into the region (e.g. investment opportunities to improve transport connectivity to the Greater Brisbane region and accommodation infrastructure)
- Improve the quality of community infrastructure in the region
- Capitalise on tourism opportunities
- Smooth the transition out of the high value sand mining industry (that will cease activity in the long-term), and
- Support jobs and economic growth.

The whitewater facility also presents an opportunity for a partnership with Queensland Fire and Emergency Services (QFES) to deliver flood and swiftwater training, deriving benefits for not only QFES but also the broader Queensland community. There is also commercial potential for QFES to deliver education and training services to the interstate and Asia Pacific markets, based on initial consultation with QFES.

Figure i Strategic economic merit in developing the Redland Coast Adventure Sports Precinct



This report estimates the **"financial feasibility"** and **"economic impacts"** of developing an Olympic standard whitewater facility and the broader RCASP. The RCASP has several components including aquatic facilities (the redevelopment of the existing Cleveland Aquatic Centre), gym and wellness facilities, retail space, community space (for live events), adventure sports facilities (e.g. high ropes), whitewater facilities and the delivery of flood and swiftwater training (partnering with QFES). With these developments currently in the early stages of conceptual design, it is important to highlight from the outset that this report presents 'order of magnitude' estimates.

The analysis has three streams. Firstly, the financial feasibility analysis of the development of a standalone Olympic standard whitewater facility (the whitewater facility). This stream of analysis will support decision making needs with respect to the 2032 SEQ Olympic and Paralympic Games bid for the International Olympic Committee (IOC), The International Canoe Federation (ICF) and State and Federal Governments. Secondly, the financial feasibility analysis of the development of the RCASP to inform RCC's strategic decision making. Finally, the economic impact assessment estimates the flow-on effects to jobs, output, tourism and businesses in the Redland and Queensland economy, from establishing both the standalone whitewater facility and the RCASP.

Deloitte Access Economics has partnered with Whitewater Parks International. LLC (WPI) in conducting this analysis. WPI has detailed knowledge and expertise (globally) in designing whitewater facilities for Olympic Games and in designing facilities for broader integration into communities for recreational use.

This analysis demonstrates that both the whitewater facility and the RCASP have the potential to generate strong demand within the Greater Brisbane region and from other regions (intrastate, interstate and internationally), given the diverse range of activities offered within the RCASP and a lack of substitute facilities in the region.

The following section summarises the findings of the financial feasibility analysis of the standalone whitewater facility, followed by the RCASP and finally the broader economic impacts on the Redland and Queensland economies.

Financial feasibility analysis

Standalone Olympic Standard Whitewater facility

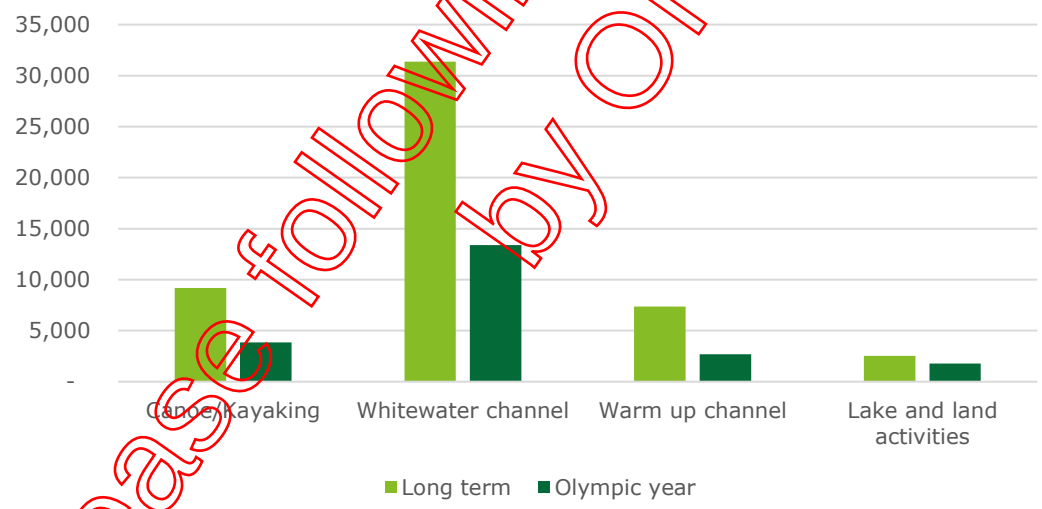
The capital cost of the whitewater facility is estimated to be $30.8 million ($2019) with construction assumed to occur in 2027 and operations commencing 2028. Annual operating revenue is estimated to be $4.1 million per annum, once full demand is realised (from 2035 onwards).

Annual operating costs are estimated to be $2.4 million per annum (with labour and energy costs representing significant components of running a whitewater facility) resulting in an operating surplus of approximately $1.7 million, at full demand.

Demand estimates for the whitewater facility were developed based on analysis of comparable facilities (both in Australia and globally), with characteristics unique to both Redland and the Greater Brisbane region and the long-term legacy uses of the facility. The Greater Brisbane region has been used as the catchment area, as there no other whitewater facilities in the region that are direct 'substitutes' for the proposed facility and precinct in the region.[1]

The demand forecasts also incorporate the lower demand trends (compared to full demand) from the catchment area occurring in the years between construction (in 2027) and the Olympics (in 2032). The demand profile in the year of the Olympics is lower compared to the 'steady-state' profile (Chart i), as the facility is made available exclusively to Olympic athletes (for set periods of time) in preparation for the Olympics and time allocated to return the facility for public use after the Olympics. During this year, general public access is restricted.

Chart i Projected base demand for the Redland whitewater facility (Olympic year and long-term use)



Source: Demand based on estimates provided by Whitewater Parks International
Note: This chart excludes participants using the facility for QFES flood and swiftwater training, as the financial model incorporates the financial revenue from QFES through a leasing fee (circa $100,000 per year) to RCC, not on a per person usage basis.

Following the Olympics, annual long-term demand is estimated to sustain at circa 50,480 persons, comprising mainly of usage of the whitewater channel, canoe/kayaking, warm-up channel, and lake and land activities. This level of demand is the core scenario (or medium scenario) of focus in this analysis, with low and high demand scenarios presented to provide a range of outcomes. The following section presents the key findings of the financial analysis.

[1] The Greater Brisbane Region includes the SA4 regions of Brisbane – East, Brisbane – North, Brisbane – South, Brisbane – West, Brisbane Inner City, Ipswich, Logan – Beaudesert, Moreton Bay – North, and Moreton Bay – South.

Financial net present value and sensitivity/scenario analysis

The financial analysis includes all income streams accruing to the facility and all associated costs, including capital costs of construction and ongoing operating costs. This analysis has been conducted from the perspective of RCC and assumed that the upfront capital costs to develop the whitewater facility are funded through capital grants.[2]

When capital is assumed to be funded, the financial Net Present Value (NPV) is positive over the life of the project. The financial net benefit of the whitewater facility is estimated to be $5.9 million over the period 2019 to 2050 (NPV at a 7% discount rate) (Table i).

A range of sensitivity and scenario analysis highlights that under the medium demand scenario, the financial NPV remains positive when operating costs are assumed to be 20% higher, as well as at a 4% and 10% discount rate. While this demonstrates that the financial NPV is relatively resilient to variations in these assumptions, without funding, the proposed development returns a net cost to RCC, across all demand scenarios.

Table i Summary Results whitewater facility in Redland (and sensitivities) – Financial NPV 2019 to 2050

Scenario	Low Demand (-20%)	Medium demand (central)	High demand (+20%)
Project case (7% real discount rate)	$2,073,686	$5,949,807	$9,825,928
20% higher operating costs – project case	-$722,302	$3,153,820	$7,029,941
Project case (4% real discount rate)	$4,537,421	$11,395,431	$18,253,441
Project case (10% real discount rate)	$893,858	$3,175,559	$5,457,260
Project case (without funding)	-$15,840,176	-$11,964,055	-$8,087,934
Project case (funding gap – part capital funding - 50%)	-$6,883,245	-$3,007,124	$868,997

Source: Deloitte Access Economics calculations and Whitewater Parks International
Note: These figures are the financial net benefit (net present value) to RCC, not calculated incrementally to the base case. Given the whitewater facility is not site specific, the opportunity cost of the land the development will be located on, cannot be taken into consideration.

This analysis highlights that the whitewater facility requires capital funding to provide a positive return from the financial perspective of RCC. This is consistent with the findings of a review of sustainable whitewater facilities worldwide, demonstrating that the most successful facilities generate a positive operating position but generally require a level of capital funding support to recover investment costs. This research also highlights that some facilities worldwide have been able to recover circa 25% of investment costs due to the operating surplus enjoyed over time. This includes facilities such as Penrith in (Greater Western) Sydney as well as Charlotte in North Carolina, USA, and Lee Valley in London, Great Britain.

Redland Coast Adventure Sports Precinct (integrated facility)

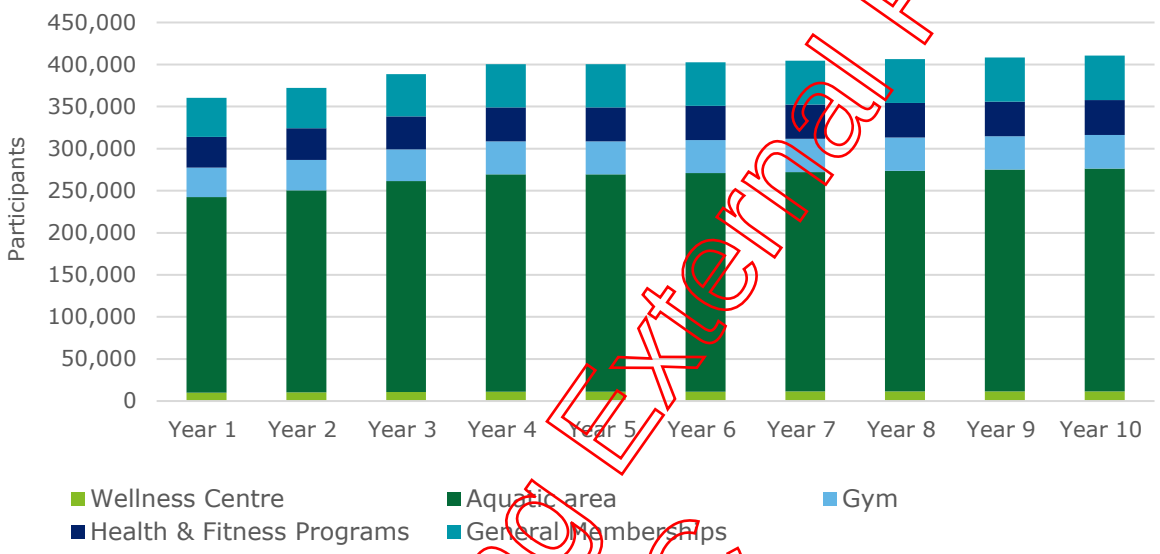
Capital costs for the RCASP are estimated to be a total of $68.7 million ($2018-19).

The demand forecasts of the whitewater facility integrated within the RCASP are consistent with the demand model developed for the standalone whitewater facility, including the revenue derived from QFES flood and swiftwater training operations.

[2] Capital grants refer to capital funding provided from a combination of State and Federal Government grants, and any potential private sources of funding. Any funding gaps within the sensitivity analysis requiring capital injections from RCC is assumed to be debt free.

The demand generated from the aquatic, leisure and wellness facilities are adapted from estimates within the Liquid Blu Master Planning Report[3] (provided to Deloitte Access Economics by RCC) (in Chart ii).

Chart ii Projected demand for aquatic area and other core components



Source: Adapted by Deloitte Access Economics from the Liquid Blu Master Planning Report

Additionally, the design of the integrated precinct is optimised through avoiding capital costs (of approximately $7.6 million) through the consolidation of certain aquatic facilities and whitewater facilities. Consolidated facilities include:[4]

- Water Play Splash Pad
- Water Play Splash Pad Concourse
- Waterslide
- Specific components of the administration building and retail facilities
- Provision of an access road.

Through consolidation of the facilities, administrative and salary cost synergies have been realised. Compared to if the facilities were developed separately, administrative costs are reduced by 5% and salary costs reduced by approximately $140,000 per year.[5]

The precinct will also generate additional revenue through inclusion of retail rental space, café and other merchandising facilities. Some parts of the precinct will be used for multiple purposes (that could further increase utilisation)[6], such as QFES running skills workshops and training in multipurpose rooms onsite. Whist this is not included explicitly due to a lack of specific data (and this being a conceptual design), an upside sensitivity has been conducted to capture higher utilisation.

The RCASP is also assumed to offer the option of adventure sports activities. This includes the potential for activities such as high ropes, rock climbing, zip line and gymnastics.

[3] Redland Aquatic and Emergency Precinct Development, Master Planning Report (2018)
[4] The 6 Lane 25m pool and the concourse have not been included within capital costs in this analysis as this pool was an infrastructure component required by Surf Life Saving Queensland and the operating model within Liquid Blu Master Planning Report. RCC advised that this component is not required within this current project.
[5] A Deloitte (2017) report found that cost synergies associated with consolidations and mergers typically range between 1-5% of combined costs.
[6] It has not been possible to quantify the impact of this on demand in this preliminary study, but it has been noted and could considered in more detail as part of a master planning study.

To estimate future demand for the adventure activity course, this analysis developed a demand model using demographic data for the Greater Brisbane region coupled with ABS participation rates for rock climbing, abseiling and caving; and pricing estimates based on similar facilities within the region.

The community open space also has the potential to be used for community events and festivals, increasing the social and cultural impact of the precinct.[7] The integrated nature of the RCASP is assumed to have the potential to stimulate tourism in the Redland region due to increased visitation and visitor expenditure, captured within the economic impact modelling.

Financial net present value and sensitivity/scenario analysis

The base case for this project is a case where it is 'business as usual' (BAU) for the Cleveland Aquatic Centre (i.e. no development of the whitewater facility or RCASP). The development of the RCASP results in an incremental financial net benefit of around $13.3 million (NPV terms at a 7% real discount rate) over the period 2019 to 2050, compared to the base case. Sensitivities have been conducted to analyse the impact on the financial returns to "upside" and "downside" variations in key variables (Table ii).

This analysis has assumed that only capital costs to develop the whitewater facility within the RCASP is funded through capital grants.[8] If the project received no capital grants however, there would be an incremental net cost to RCC of approximately $4.6 million (medium demand, compared to the base case).

Table ii Summary Results (incremental to base case), Redland Coast Adventure Sports Precinct (and sensitivities) – Financial NPV 2019 to 2050 (from RCC perspective)

Scenario	Low demand (-20%)	Medium demand (central)	High demand (+20%)
Project case*	-$922,279	$13,347,810	$27,617,898
Project case (with whitewater capital funding & partial aquatic facilities capital funding)**	$13,432,509	$27,702,598	$41,972,687
Project case (with 50% whitewater capital funding)***	-$9,879,210	$4,390,879	$18,660,968
Project case (fully funded)****	$28,311,106	$42,581,195	$56,851,284
Project case (no funding)	-$18,836,141	-$4,566,052	$9,704,037
20% higher operating costs – project case	-$13,916,740	$353,349	$14,623,438
Project case (4% discount rate)	$4,176,997	$27,509,001	$50,841,004
Project case (10% discount rate)	-$3,064,416	$6,129,184	$15,322,784

Source: Deloitte Access Economics based on data provided by Whitewater Parks International and RCC including updated financial analysis for the aquatic and related components provided developed by Liquid Blu Master Planning Report

Notes:

* This is the project case and assumes only investment costs of the standalone whitewater facility is 100% funded.

[7] It has not been possible to quantify the impact of this on demand in this preliminary study, but it has been noted and could considered in more detail as part of a master planning study.

[8] It is assumed that the whitewater facility is 100% funded within the precinct through a combination of State and Federal Government grants, and any potential private sources of funding. All other activity components (including the aquatic facilities) are assumed to not receive any capital funding. Any funding gaps within the sensitivity analysis requiring capital injections from RCC is assumed to be debt free.

** This assumes the investment cost of the standalone whitewater facility is 100% funded, the investment cost of the aquatic facilities to be 50% funded and no capital funding for the adventure course.
*** This assumes only investment costs of the standalone whitewater facility is 50% funded.
**** Based on consultation with RCC this scenario assumes that all capital investment costs of the RCASP (including whitewater, aquatic facilities and adventure course are funded)

In summary, the RCASP provides scope to deliver a diverse variety of community recreational activities and high quality infrastructure, attracting additional visitors to Redland community from the Greater Brisbane region, and other regions (intrastate, interstate and internationally).

It is important to note the financial NPV is contingent on receipt of capital funding. Without part funding, a positive net operating cash flow is achieved but the initial cost of capital is not fully recovered.

Economic impact analysis findings

The economic impact analysis was conducted using the Deloitte Access Economics Regional General Equilibrium Model (DAE-RGEM). To estimate the economic impacts a customised database was built splitting out the Redland LGA from the rest of Queensland. The industry structure has been tailored to capture industries of most interest, particularly art and recreation services, trade (capturing retail trade and wholesale trade), accommodation/food services, public administration and defence, and finance professional and business services.

Two economic scenarios have been modelled (the standalone whitewater facility and the RCASP) and the direct economic shocks are incorporated into DAE-RGEM, which calculates flow-on or "ripple" effects to jobs and economic output. This approach represents a broader economic perspective than the financial analysis that considers the "financial returns" to RCC.

The modelling includes direct construction spend in Redland LGA and operational output, which is based on the financial model outputs and mapped to the DAE-RGEM. The direct tourism spend is adjusted to be net of expenditure switching as this money is spent regardless (therefore not treated as additional). Past analysis and research on the impacts of hosting Olympic Games shows the "uplift effect" on tourism, for a period of 4 to 5 years either side of the Olympic year. Based on this research, an uplift factor is applied to tourism as explained in Section 3 of this report. The economy wide modelling considers operating efficiencies (as activities can be consolidated with the development of the RCASP) and there is assumed to be an improvement in labour productivity to reflect these efficiencies.

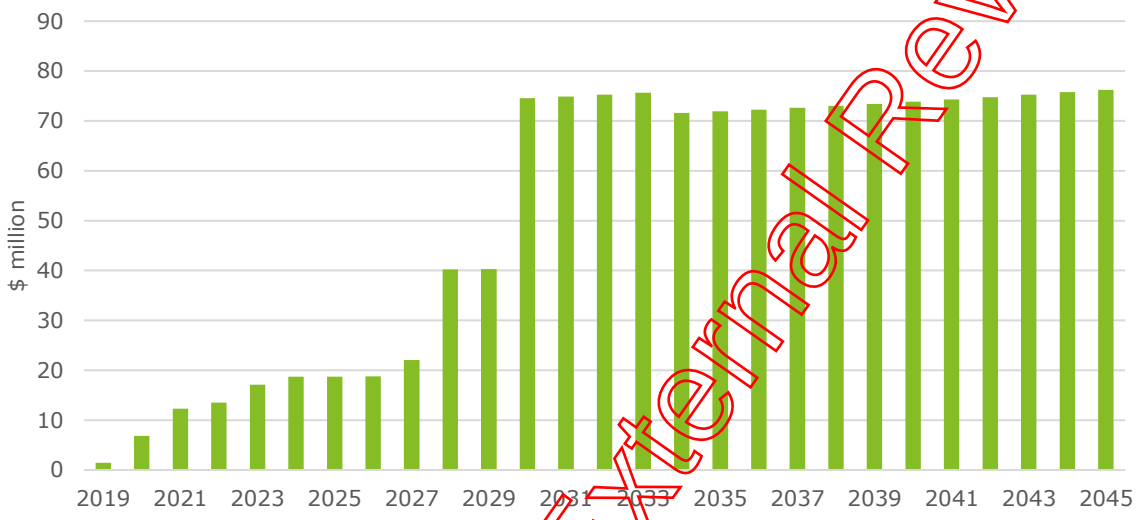
Redland Coast Adventure Sports Precinct (integrated facility)

This scenario analyses the economy-wide impacts of developing the RCASP including construction and operational revenues and additional tourism spending in the region associated with the co-located facilities, including the operations of the whitewater facility, aquatic area and adventure sports. The economic impact of constructing and operating a standalone whitewater facility is included in **Chapter 3** of the report.

Real Gross Regional Product

The scale of the project and associated activity results in significant positive flow-on effects to the Redland economy and Queensland. The increase in real Gross Regional Product in Redland is projected to be **$52 million** on average (in $2017-18) over the period 2019 to 2045.

Chart iii Deviation in real gross regional product in Redland LGA ($2017-18)



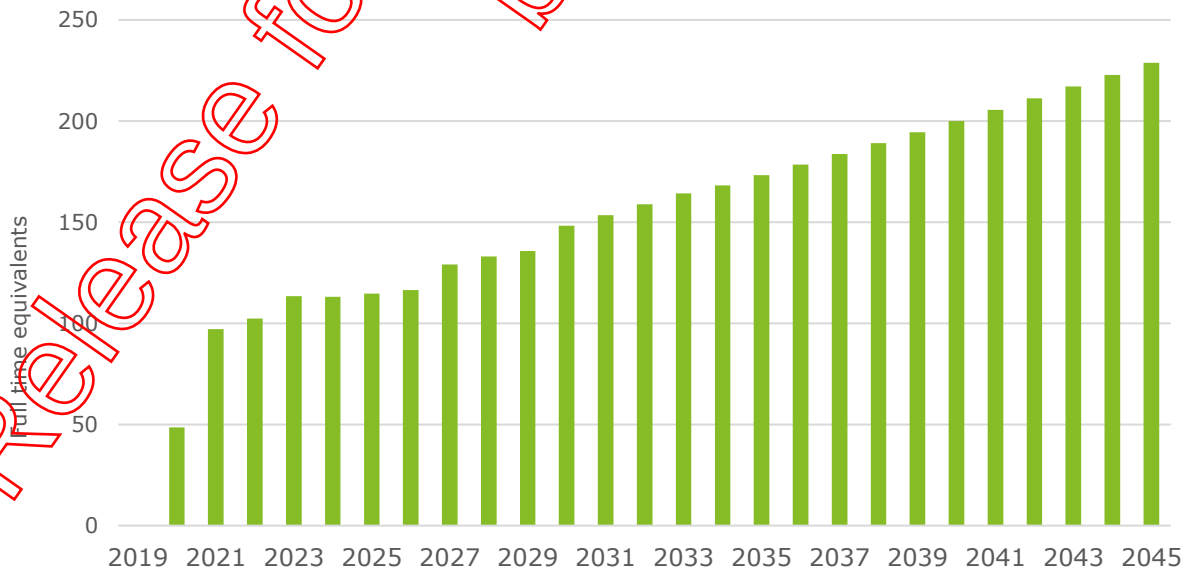
Source: Deloitte Access Economics Regional General Model (DAE RGEM)

The capital investment of an estimated $68.7 million coupled with the increased output in services and tourism related industries (including accommodation and food services, recreation services and trade) supports employment growth.

Employment

Over the construction and operations phase, aggregate employment is projected to increase by 152 full time equivalents (FTEs) in average annual terms. The time profile of aggregate employment is shown in Chart iv.

Chart iv Deviation in aggregate employment in Redland LGA, FTE's



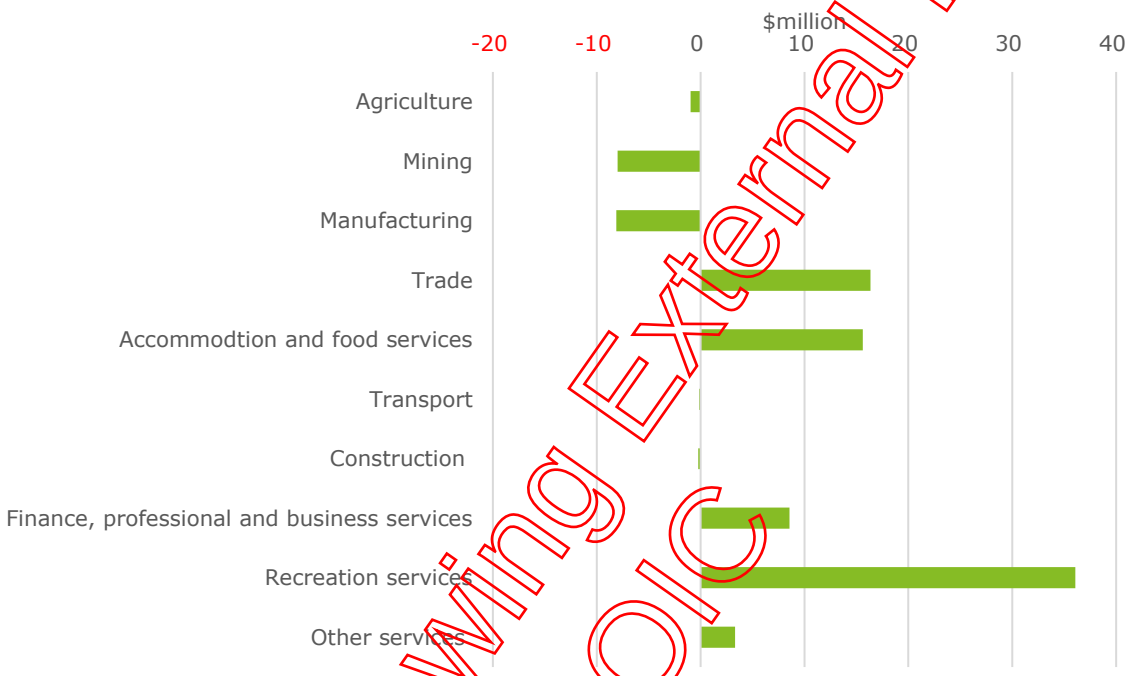
Source: Deloitte Access Economics Regional General Model (DAE RGEM)

Industry Output

The direct stimulus of capital investment and additional direct activity in recreation and tourism connected industries has direct flow-on effects to the output of related supply chain industries.

The average annual deviation in industry output from 2019 to 2045 is shown in Chart v. The increase in activity typically causes "crowding out" of activity (due to resource constraints) in other sectors. In this case agriculture, mining and manufacturing experience a reduction in output relative to the BAU. These industries experience growth but at a lower rate than in the BAU.

Chart v Deviation in real industry output (average annual), Redland LGA ($2017-18)



Source: Deloitte Access Economics Regional General Model (DAE RGEM)

The modelling highlights significant regional impacts, particularly with an integrated precinct due to higher capital investment and increased tourism within the region.

Overall, the strength of the RCC proposal lies in the integration and co-location of sporting, recreational, adventure and community facilities, helping to sustain long-term demand and the community value of the facility. The project brings forward infrastructure expenditure that would otherwise be required in the future. By doing so it unlocks new economic opportunities which may otherwise be foregone. It also potentially avoids significant operating and maintenance costs associated with an ageing asset such as the Cleveland Aquatic Centre.

The benefits of the RCASP extend beyond the financial returns to RCC and economic impacts estimated in this analysis. The (early-stage) design of the precinct and diversified nature of activities offered within the precinct create both social and economic legacies for the Redland community. In addition, the delivery of flood and swiftwater training by QFES adds a strong community element to the facility and provides a cost-effective training facility alternative for QFES. Training by QFES to deliver emergency service responses has important economic and social benefits that are not reflected in the analysis (e.g. preventing injury, potential loss of life, reduction in trauma and other disruptions).

1 Introduction

Deloitte Access Economics has been engaged by Redland City Council (RCC) to undertake financial feasibility analysis and economic impact assessment of a proposed Olympic standard whitewater rafting/canoeing/kayaking facility (the whitewater facility) in Redland City, as part of a Redland Coast Adventure Sports Precinct (RCASP). Deloitte Access Economics has partnered with Whitewater Parks International. LLC (WPI) in conducting this analysis.

This report presents our findings from the perspective of RCC, and the analysis considers both the stand-alone (not site specific) whitewater facility, to support decision making needs with respect to the 2032 SEQ Olympic and Paralympic Games bid, and the RCASP, including the redevelopment of the existing Cleveland Aquatic Centre, to inform their strategic decision making. Discussion of broader economic costs and benefits is also provided. The economic impact analysis (EIA) incorporates a Regional Computable General Equilibrium (CGE) methodology approach, as this methodology is deemed acceptable by the Queensland Government. Assumptions associated with this analysis are clearly specified in this report and sensitivity analysis is also performed on these assumptions and model specifications.

This study builds upon a range of studies, data and information including:

- The Economic Impact Assessment of Redland Aquatic & Emergency Precinct (Deloitte Access Economics, July 2016) and the existing financial model, updated for more recent cost estimates of RCASP and to include incremental costs/benefits of a whitewater facility
- Redland Aquatic Centre and Emergency Precinct Redevelopment Master Planning Report (Liquid Blu in collaboration with Otium Planning Group, Arcadis Pty Ltd, Place Design Group, TTM Group and 28 South Pty Ltd), for estimates of construction, capital and operational costs of RCASP (cost estimates for the development of Aquatic centre core elements, plus additional leisure, health and fitness elements)
- Key incremental costs and benefits and benchmarks for the whitewater facility provided by our project partner, WPI
- Ongoing data and advice provided by RCC and Queensland Fire Emergency Services (QFES) as well as desktop research of aquatic centre and whitewater facility benchmarks, similar facilities and precincts including retail data and analysis.

This report is structured as set out below:

- **Chapter 2** provides a background to the report, providing an overview of the Redland Coast Adventure Sports Precinct and strategic economic merit of the project
- **Chapter 3** presents the findings of the economic impact assessment which highlights the deviation in gross regional product and employment as a result of the project on the Redland and Queensland economy
- **Chapter 4** provides the findings of the financial analysis and sensitivity analysis as well as broader discussion of potential economic benefits such as health and community benefits
- **Chapter 5** concludes the report.

2 Background

2.1 Redland Coast Adventure Sports Precinct

A feasibility study commissioned by the Council of Mayors South East Queensland, *2032 SEQ Olympic and Paralympic Games Feasibility Study,* assesses the feasibility of hosting an Olympic and Paralympic Games (the Olympic Games) in South East Queensland (SEQ). Redland City is identified in this study as the location for the Canoe slalom (whitewater) event, as a legacy venue.

It is our understanding that RCC intends to develop this whitewater facility within Redland City, as part of the broader development of a RCASP. This would include a new aquatic centre, replacing the current Cleveland Aquatic Centre, which is nearing its end of life. The intention is for the whitewater facility to be co-located with aquatic and adventure sport facilities – creating social and economic legacies for the community beyond the 2032 Olympic Games. The proposed development also involves potential collaboration with QFES, with infrastructure components of the whitewater facility complimenting the scenario education and training swiftwater requirements of QFES.

This study has been conducted under the consideration that the RCASP is not site specific and does not take into consideration the decommissioning (including the financial demolition costs) of the exiting Cleveland Aquatic Centre. It is our understanding that the operations and management arrangements for the RCASP, based on discussions with RCC, will be undertaken by a third party.

This section provides an overview of each component of the proposed RCASP.

2.1.1 Redevelopment of the Aquatic Centre

The proposed RCASP will include an extended aquatic centre model incorporating wellbeing, leisure and retail facilities:

- Aquatic centre building with admin, office, retail, amenities café and crèche facilities
- Outdoor 51.5m x 21m 8 lane pool with moveable boom and access ramp (Depth range 1.4 - 2.1m)
- Two program pool halls and associated facilities
- Ancillary external works, services and landscaping to support aquatic centre operation
- Eight wellbeing consultation suites
- Wellbeing facilities including spa pool, sauna room (dry) and steam room (wet)
- Enlargement of proposed warm water pool (23m x 11.5m) including integrated, accessible spa
- Leisure water/ toddler zone adjoining LTS pool with beach transition (approx. 150m^2)
- Outdoor zero depth splash pad with various age zones and play equipment
- Three slide waterslide complex with tower
- Landscape upgrades including cabanas, deck chairs, outdoor furniture and umbrellas
- Additional 750m^2 gym/fitness studio area
- Additional car spaces.

The above aquatic centre model components are based on Model B specified within the Redland Aquatic Centre and Emergency Precinct Master Planning Report produced by Liquid Blu in 2018. The following adjustments have been made to reflect the specific requirements of this project:

- This financial analysis does not consider the decommissioning and demolition of existing leisure elements
- The outdoor 25m x 15m x 6 lane program pool is not considered, as this is not a requirement for RCC, IOC nor QFES.

2.1.2 Whitewater facility

Interest in a purpose-built whitewater facility has grown enormously since the concept was revolutionized in 1997 with the construction of Penrith Whitewater Stadium (PWS), home to the 2000 Sydney Olympic Games. This technological break-through, demonstrated successfully in Penrith, has since been embraced world-wide, as it makes it possible for whitewater rapids to be created almost anywhere in a customised, self-contained, and commercially oriented facility. This concept is especially sought after in regions where natural whitewater venues don't exist.

This design innovation, which is responsible for creating a now active whitewater facility industry, takes water and pumps it up from a reservoir to the elevated end of a circular concrete channel. The water fills an upper pool, and then returns through the channel to the reservoir via gravity. Adjustable components placed in the water's path create made-to-order rapids.

The exhilaration of swift currents and crashing waves attract all varieties of paddling enthusiasts, both young and old, from beginner to expert. Patrons can take repeated runs on the course in rafts, kayaks, canoes, and inflatable craft, returning to the top each time with the help of a motorised conveyor.

Since the completion of the Olympic competition in Australia, the PWS has become a popular public attraction and valuable community resource, demonstrating a notable contribution to local prosperity. This facility has put the City of Penrith firmly "on the international map", drawing hordes of interested athletes, paddlers and visitors to its unique brand of urban adventure.

Run as a commercial operation, PWS draws its greatest and most consistent revenue from guided raft trips. Around 35,000 people a year try rafting in Penrith because it's fun and exciting, it doesn't require previous experience, it's an activity they can share with friends and family, it's interactive and educational, it's unusual – something different – and it's convenient. The rafting program remains fully booked throughout the peak season and, because of Penrith's mild climate, activity continues in the channel through a large section of the year.

The commercial success of the Penrith facility underscores the revenue-producing potential a whitewater facility of this nature holds. Steady annual patronage has built a strong case for the development of similar facilities elsewhere, when convenient access to a rewarding whitewater experience can likewise be created.

Facilities like Penrith, when located near sizable populations, can be supported by a wide-ranging regional demographics in addition to existing and target-marketed tourism streams.[9] Beyond the direct and broader economic impacts a facility like this can have, it can also serve as a multifaceted community resource, providing a varied range of programming to meet the needs and interests of local residents. The demographics of Redland likewise support the development of a successful whitewater facility in the area.

Catchment

The demographics and base level populations that, year after year, continue to support successful whitewater operations around the world, provide evidence that populations of one million or greater, within a reasonable driving distance (60-90 minutes), is sufficient to supply predictable traffic through such facilities.[10]

An illustrative example comes from the small mountain community of Seu d'Urgell in Spain – a two-hour drive from Barcelona's over two million inhabitants. Although the population of Seu d'Urgell is only 11,000, they consistently host numbers in the range of 45,000 active users and 300,000 passive visitors at their whitewater centre annually. It is clearly a destination attraction that draws visitors from a distance.

[9] Based on WPI research
[10] Based on WPI research

These generalised demographic markers alone indicate that the region surrounding Redland could comfortably support a commercial whitewater facility. With the number of outside visitors already passing through, the mild climate that would allow for year-round operations, and the synergies that could be developed with other local facilities, the suitability of the area appears almost ideal.

While there is potential that exists in developing a facility like this in Redland, a project of such magnitude must be well thought out and thoroughly planned in advance to ensure that the correct mix of activities and proper size of development are wisely achieved.

Facility Components

Programming associated with a model commercial whitewater facility will typically include, to one degree or another, guided rafting, paddling instruction, private use, paddling club use, community programs, competitive programs, professional training, flood & swiftwater rescue courses, and special events.

In order to accommodate these various programs, a purpose-built whitewater facility will require certain core components, which will include, but are not necessarily limited to: a water source, both a start and finish pool, a concrete-lined channel of a prescribed length to connect the pools, a set of pumps to deliver the activity water, an obstacle system to guide the water through the channel and create hydraulic features, and a conveyor to take channel users and their crafts from the finish pool back to the start pool (Figure 2.1).

Figure 2.1 Redland whitewater facility schematic

Source: Whitewater Parks International

Beyond these core components, the full development of the overall site will also need to consider the refinement of the water source, acquisition of service utilities, construction of support structures and amenities, roadworks related to access and parking, master-planned landscaping, extended walkways, sport specific systems and equipment, facility theming, and the possibility of venue

lighting for night operations. All these items can vary the overall cost of the project, depending on specific circumstances and objectives.

All these components must be pre-planned and well organised to allow for smooth and efficient operation of the facility once completed. Operational systems will overlap in many layers of function and staffing. Having a structured and well-orchestrated operating plan will be another key element contributing to the facility's success.

Site Considerations

The size of the parcel needed for development of a whitewater facility, as conceptualised here, will depend on choices made concerning commercial and social requirements, programming needs, channel length, support structures, and accompanying amenities. Initially, a logical space requirement can be estimated, in conjunction with a workable length of channel, starting at a minimum of around five hectares (Vector Wero, NZ) and up to 20 hectares (London, UK).

Almost any appropriately sized site can be turned into a successful whitewater venue, however there are a range of factors that can have considerable impact on the cost of development. These include both the physical nature of the site and the planning and development constraints that may be imposed by regulatory agencies. First, the land must be available for development through appropriate ownership and zoning to facilitate recreational use.

Cost, ownership, location, size, access, visibility, zoning, distance to commercial centre, potential water sources, topography, soil conditions, prevailing weather, environmental issues, construction limitations and probable development costs all feed into the decision of a site's suitability and about when and how it should be developed.

Each specific site will need a thorough review of all characteristics that will ultimately determine its desirability and appropriateness. It is extremely important to examine any potential site in close detail, weighing all the criteria previously discussed in order to establish the most critical facility-related attributes and issues. This is typically undertaken as part of a feasibility study.[11]

Design

The envisaged design of the whitewater facility has been developed to ensure it complies to the International Canoe Federation (ICF) specifications for International Canoe Slalom Courses.

The facility includes conceptual components of the start pool, course, finish pool, lake and conveyor for hydraulic performance, access and egress, use by patrons, athletes and coaches, operation and maintenance. Key project requirements include:

- 2 x Channels (300m and 250m)
- Specialist Features or Sections
- Start Pools
- Terminal Reservoir/Lake
- Pumps and Pump Station (including electrical equipment and controls)
- Conveyors
- Obstacles
- Water Treatment Plant
- Gate System (to meet specifications for International Canoe Slalom)
- Operations Building.

[11] This study does not discuss site specific characteristics given the project is currently considered to be 'not site specific'.

As this analysis is conducted with the location of the whitewater facility not being site specific, the following information may have an effect on the final construction cost:

- Site topographical survey
- Ground investigation report
- Water quality and supply and waste access and proximity
- Power supply arrangements
- Access and Egress from existing roadways.

2.1.3 High Ropes and Adventure Activity Course

The high ropes & adventure activity course concept highlighted here demonstrates an example of integrating ancillary adventure-base activities into the overall adventure sports precinct operational program as a means of diversifying its business model and boosting its commercial profile.[12]

The high ropes & adventure activity course is designed to be situated behind the amphitheatre and adjacent to the flood and swiftwater training course. This site is also available for high ropes, belay, rope rescue and abseiling training for QFES and other emergency and rescue organisations.

A ropes course is a challenging outdoor adventure, personal development and team building activity which can consist of high and/or low elements. Low elements take place on the ground or just above the ground. High elements are usually constructed using utility poles and require a belay for safety.

Since the 1980s, ropes courses have evolved considerably. Modern ropes courses incorporate sophisticated belay and safety systems using wire rope, friction devices, and climbing harnesses to manage what before were unmanaged risks. Recent technological advances in pole hardware and climbing equipment along with industry-accepted installation and design practices have greatly reduced the risk to end users and to the natural environment. Modern courses make use of a variety of materials, often involving modular components and large steel super-structures.

Adventure parks with a more recreational orientation are becoming more and more popular around the globe. They are typically designed to accommodate large numbers of visitors. They focus on individual physical and mental challenges as a predominantly recreational activity. Neither climbing techniques nor special/specific physical fitness experience are necessary. Participants independently move through a variety of trails of increasing difficulty levels. Each trail consists of several courses that are connected by different acrobatic elements.

High ropes courses can be static and/or dynamic. With a static course, participants are attached to an upper wire, belay cable, with lanyard ropes and carabiners for safety. If a participant slips, they will be caught by the wire. Advantages of a static course include needing fewer facilitators, being able to get more participants up on the course at one time and allowing participants to do multiple elements without having to be lowered and climb back up after each. On a dynamic course, participants are connected to a rope, which someone on the ground will be holding onto and belaying the participant on the course. Participants on a dynamic course remain on a belay the entire time: climbing up to the element, doing the activity, and being lowered to the ground after. A vertical course is very similar to dynamic, except that the element is the climb up.

Additional components to core structured courses might also include low course challenges, abseiling platforms, team building elements, playground equipment and small children play areas, climbing / bouldering walls, fitness equipment, slides, along with the possibility of separate zip lines and/or canopy tours.

Space requirements and costs will vary with each unique design, as site specifics factors and project customisation warrant. As a broad stroke consideration, a small commercial application with a simultaneous capacity for 50-75 participants could be installed in as little as 250m^2 for something in the range of $900,000, with a contingency of 25%.

[12] Information on high ropes and adventure activity courses, and cost estimates, have been provided to Deloitte Access Economics by WPI.

In contrast, a large structured high ropes course installation capable of handling up to 160 patrons at once could fit within a 900m^2 footprint for a cost of $1.8 million, with a contingency of 25%.

2.1.4 Flood and Swiftwater Rescue and Training

Integrating a flood and swiftwater rescue facility into the existing 2 channel facility as envisaged for the Redland whitewater facility creates an exciting opportunity to develop a multi-purpose facility (athletes, recreation and rescue). Designing for flood and swiftwater rescue from the start, will strengthen the whitewater facility's operational performance by increasing utilisation in non-peak periods and improve its connection to the community while providing invaluable upskilling opportunity for QFES personnel.

In recent years, revolutionary thinking has brought the custom-built commercial whitewater recreation venue to life, now being built around the world in locations where natural whitewater cannot be found. The primary activity that financially sustains these commercial facilities is the guided rafting experience, where families and friends with no previous training can learn to paddle through the exhilarating whitewater, amidst the convenience of a managed venue designed specifically with the quality of their experiences in mind.

Following on from the success of the designed artificial, self-contained whitewater course for paddle-sport, the opportunity for swiftwater rescue training has developed at each of these venues. No venue, however, has been designed for this from the start, which has meant that the breadth of flood and swiftwater rescue training that can be completed at these venues is very limited.

A flood and swiftwater rescue training facility designed to integrate into the proposed Redland whitewater facility represents a unique opportunity to create a world class teaching and learning environment, providing QFES a much-needed rescue training facility.

Located in Redland, the facility would provide QFES with an accessible and cost-effective venue to use in adequately preparing employees, volunteers and associated service professionals to safely and effectively provide flood and swiftwater assistance when required.

Queensland Fire and Emergency Services

Through consultations with QFES personnel, what came through clearly and consistently was an identified need for improved cost-effective access to quality flood and swiftwater rescue and training opportunities.[13] Currently personnel travel to a number of locations namely, Caloundra Broadwater (Stillwater), Tully River in Far North Queensland or Derwent River Tasmania to be trained in swiftwater rescue techniques. Both venues entail significant travel and staff downtime costs. Neither facility is purpose built and is somewhat limited in the extent of different rescue and training opportunities available. Understanding that there will always be significant benefit from training on natural waterways and rivers a considerable amount of time and money can be saved in providing training on a central, purpose-built facility. Also, the range of scenarios, variable flows and designed environments create significant experiential learning opportunities for a much greater number of students. By providing improved learning opportunities within the Greater Brisbane area significant improvements in training outcomes and participant training opportunities can be realised.

Improved access to bespoke flood and swiftwater courses presents a significant opportunity for first responders from a number of government agencies, departments and community organisations in Queensland, Australia-wide and even internationally. Even basic training offered to first response personnel can improve outcomes and save the lives of both rescue personnel and members of the community affected by flood and fast-moving water events.

Consultations with QFES have informed an understanding of their current specialist water rescue resources constraints, programs and frequencies:

[13] Information on Flood and Swiftwater Rescue and Training Channels, and cost estimates, have been provided to Deloitte Access Economics by WPI.

- QFES Fire and Rescue Service (FRS) currently has a cap of 421 Swiftwater Floodwater Rescue (SFR) operators and technicians, and a cap of 150 Motorised Swiftwater Rescue Craft[14] (MSRC) operators.
- The SFR operation and technician course is seven days in the water, with a guideline of four days in a built SFR environment and the remainder in a natural SFR environment. SFR courses are run with four instructors and 18 participants. To maintain the correct allocation of personnel, FRS generally runs two of these courses per year. This course would require sole use of at least one channel, as rescue lines are strung across the water stream, on and off, for most of the training time.
- The MSRC course is run in two phases. Phase one is a five-day program run on the Caloundra Broadwater (Stillwater) with seven craft on the water at one time. Phase two is a four-day program run on the Derwent River Tasmania (previously Tully River). This phase has six instructors and 12 participants with six craft on the water at one time – there is potential to use a built SFR environment for some, if not all, of this training course depending on the final design.
- In SFR skills workshops, all SFR operators and technicians are required to attend a biennial two-day skills workshop. There are currently ten, two-day skill workshops a year on the Tully River – there is potential to use a built SFR environment for half of these workshops to be run, depending on the final design. The SFR workshops have 20 participants and four instructors.
- MSRC skills workshops are two-day skills workshop on the Derwent River. There are five of these workshops scheduled each year – there is potential to use the built SFR environment for some, if not all, of these workshops, depending on final design. The MSRC workshops have four instructors and 12 participants.
- The SFR and MSRC skills workshops are on the water for six hours a day 0900 to 1200hrs and 1300 to 1600hrs.
- The courses and skills workshops would normally be scheduled mid-week (not weekends), in the second quarter of each year, commencing after the April school holidays. The first quarter of each year is the Queensland Cyclone season, the third quarter is too cold for extended work hours, and the fourth quarter before the December school holidays is also a time when QFES could conduct the workshops.

Objectives

The following potential stakeholder and community objectives have been developed from consultations and general discussions with QFES personnel both recently and from previous discussions regarding the development of a swiftwater rescue facility at Whyte Island in 2012, and are key considerations for QFES in utilising the proposed whitewater facility:

- Create a cost effective swiftwater training facility that complements the existing training requirements of QFES, not only in terms of user charges but also user safety and participant learning outcomes.
- QFES would require the exclusive use of their own instructor cadre, and at times, the exclusive use of the water channels due to the nature of some training scenarios and use of equipment.
- Improve QFES position as a world leader in the provision of fire and rescue training.
- Provide an important and unique training opportunity that will assist trained personnel attending swiftwater and/or floodwater rescue events.
- To enable a greater number of first responders to effectively evaluate the specific and inherent dangers of the presented situation to allow safe rescue procedures to be followed.
- Improve the skill base of QFES personnel as well as other government and community agencies to be able to perform swiftwater rescue in a wide range of environments and flows.
- Design channels and environments with swiftwater or floodwater rescue in mind.

[14] The MSRC are a 3.8 metre fully inflatable zodiac craft with a 30hp Evinrude E-TEC two stroke outboard with a guarded propeller. Th Evinrude E-TEC complies to the USA emission standards. These craft operate in fast flowing water not the base lake.

- Design in the ability to alter water flow, direction, & hydraulics to create the opportunity to quickly and easily change parameters and difficulty of specific environments and challenges safely.
- Conduct multiple rescue scenarios in separate areas enabling several teams to be training simultaneously.

Any or all of these objectives associated with a customised flood and swiftwater rescue facility are possible. They can be prioritised and purposefully integrated with QFES's long-term vision.

Facility Components

In order to accommodate the various scenarios that would allow QFES to operate a 'world's best' flood and swiftwater rescue program, the concept would need to include specific hydraulic features plus some bespoke environments to imitate flood or swift flowing water situations.

There are many scenarios that can be recreated in a purpose built swiftwater rescue facility (Figure 2.2).

Figure 2.2 Examples scenarios for swiftwater rescue facility

Source: Whitewater Parks International

Design Considerations

The concept schematic design allows a 'world's best' rescue facility to be integrated into the Redland Whitewater Facility training channel. The intention here is to develop and explore the conceptual understanding of requirements of the flood and swiftwater channel and how QFES would be able to deliver the different rescue scenarios into their operations and training.

The conceptual understanding is developed from the previously described scenarios and skill training opportunities, which would need to be more fully developed in the master planning process to ensure that the features and environments envisaged are appropriately integrated into the multi-purpose training channel.

The requirements for land-based training would need to be explored and if possible integrated into the facility building footprint and design. QFES would require meeting and training rooms to support the education of hard skills and a more complete understanding of timing, access and utilization would be needed to understand this.

In our approach to this Concept Review, WPI has developed this information without a specific site determined as yet, and as such additional costs may be involved depending on specific site and services costs. Our objective was to broadly examine the nature of integrating the vision of QFES into the proposed concept, and the potential for its development within Redland whitewater facility.

Budget Income Considerations

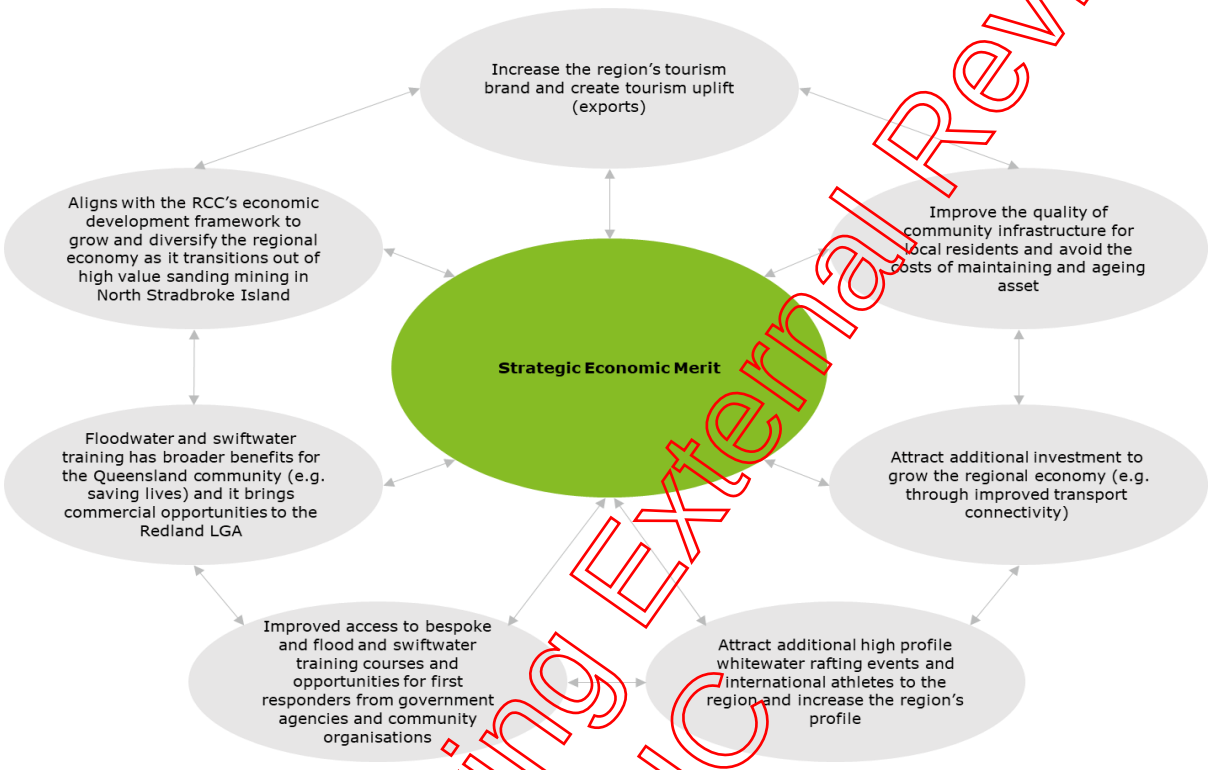
The financial revenue and expenditure have been developed from the level of demand anticipated by QFES. Access to the Redland whitewater facility is determined by way of channel lease, including electricity cost, and has been calculated at a half day (4 hours) cost of $900 or $2,800 for the Olympic Channel – entitling QFES sole access to the channels.

It is noted that pricing for access to the channel would not include swiftwater rescue instructors as QFES would provide their own, as well as any equipment required to deliver the rescue training. The program has been integrated into the annual budget as described by QFES and would allow for as many overlapping training classes as they would wish during the leased session times. The sessions developed for the purposes of this budget are between one and two four-hour sessions per day and would total 12 days per month. The session days would fall on four days between Mondays and Fridays, not on weekends or school holidays. This means no Swiftwater Rescue sessions are scheduled between December – February nor between May – August (due to the cold weather).

2.2 Strategic economic merit

The development of the RCASP has strategic economic merit across an array of areas; including economic growth, improving the quality of community infrastructure in the region, attracting increased investment to support and grow the region (e.g. investment opportunities to improve transport connectivity to the Greater Brisbane region), tourism uplift and QFES educational and training opportunities (deriving benefits for not only QFES but also the broader Queensland community) (Figure 2.3).

Figure 2.3 Strategic economic merit in developing the Redland Coast Adventure Sports Precinct



Development of the RCASP is strongly aligned to the Redland City Economic Development framework (2014-2041) which aims to build on existing growth by leveraging unique characteristics in the Redland area to build economic capacity and deliver prosperity for the city and community.[15] As the economic impact modelling shows (Chapter 3), the development of the RCASP will not only increase the Gross Regional Product but also achieve a sustained increase in employment within the region, with benefits felt in key industry areas such as construction (in the initial development of the precinct), retail trade, recreation services and tourism. The whitewater facility has the potential to attract additional high-profile whitewater sporting events and international athletes into the region, increasing the profile of the Redland region.

The development of the RCSAP also presents an opportunity to move forward with existing plans to replace the current Cleveland Aquatic Centre, which is nearing its end of life, and achieve cost synergies in construction costs and operating costs through consolidation of facilities, while also providing more broad reaching benefits to the community through the diversified offering of activities. There is the potential to enhance community engagement, beyond the adventure activities and aquatic facilities, through hosting community competitions, sporting competitions, events and festivals, resulting in social, cultural and economic outcomes for the region. The Redland City Tourism Strategy and Action Plan 2015-2020 calls for the need to activate public spaces for festivals and events. The design of the RCSAP fills this gap.

It is expected (based on previous experience) that the facility, when open, will attract a large amount of attention from the local and national media, enhancing the profile of the facility in both electronic and print medias. The resultant interest will position the facility to be used for television commercials, advertisements, product launches etc. It is also expected that the facility will host specialised sporting events including canoe/kayak racing, freestyle/rodeo competition, multisport/adventure races and other events.

[15] Redland City Economic Development Framework 2014-2041

There also exists an enormous opportunity to incorporate community events into the facility. An amphitheatre has been designed adjacent to the beach and passive recreation area. A large number of community events could make use of this facility including:

- Australia Day Festival, Food & wine festivals etc
- Movies/ Opera/ concerts etc.

The delivery of a whitewater facility with the co-location of other sport/recreation/emergency rescue uses, not just purpose built for the Olympics, can not only ensure the long-term sustainability of the facility but also ensure long-term benefits (both economically and socially) flowing back into the community.

The proposed development aligns strongly with the desire to grow the tourism industry in Redland. With a growing population and increasing emphasis on tourism, there is considerable strategic economic merit with the realisation of the RCASP. Redland City is only a 35-minute drive from Brisbane, with easy access to both the Brisbane and Gold Coast airports.

The Redland region already has a significant draw for tourists: islands, rainforests, rural hinterlands, farmlands, beaches, bays, creeks and freshwater lakes. These are all existing tourism assets, part of the Redland's existing tourism ecosystem.[16] The unique nature of the precinct has no comparable facilities in the region, and therefore has the potential to significantly draw visitors in from the Greater Brisbane region, but also from outside the region (intrastate, interstate and international), given the Olympic legacy aspect of the whitewater facility and the unique nature of the activities proposed to be offered within the precinct. These additional visitors contribute to the Redland economy through their expenditure on consumables such as food, retail and accommodation.

The proposed RCASP will diversify and complement existing tourist assets within the region, leading Redland towards its goal of becoming a year-round destination for tourists, leveraging its natural assets and diverse range of activities and experiences. This may also indirectly support the broader transition to tourism in parts of the Redland LGA including North Stradbroke Island, and assist in the transition away from sand mining (on North Stradbroke).

There is strategic economic merit in collaborating with QFES throughout the design and development stages of this project, through improving access to quality flood and swiftwater rescue and training opportunities. By offering QFES a cost-effective alternative to their current training operations located in Caloundra Broadwater (Stillwater), Tully River in Far North Queensland or the Derwent River in Tasmania, where significant travel costs are incurred, QFES can enhance their education and training opportunities. Currently, personnel need to travel to Caloundra Broadwater (Stillwater) and either Tully River in Far North Queensland or Derwent River in Tasmania to be trained in swiftwater rescue techniques. These locations entail significant travel and staff downtime costs.

In the past, QFES has provided training to other jurisdictions, both nationally and internationally. Such training opportunities have been a result of direct inquiries for QFES support, as opposed to pursued commercial opportunities. While the size of this market is unknown, QFES does have a commercial arm, "Training and Emergency Management" that has potential to become involved in this space in the future, expanding some of its training offering to the emergency services workers interstate and in the Asia Pacific.

2.3 Review of Aquatic and Whitewater Centres

A study of aquatic centres in the Sunshine Coast region of South East Queensland highlighted that most centres were running net operating losses and required some form of government subsidy in 2009-10.[17] The most recent (2016), *Sunshine Coast Aquatic Plan 2011-2026* indicated an operating deficit of $2.66 million for the ten government-owned facilities, which equates to an average of $266,000 per facility annually.[18]

[16] Redland City Tourism Strategy and Action Plan 2015-2020
[17] Sunshine Coast Council, 2011
[18] Sunshine Coast Council, 2016

In addition, analysis of historic Centre for Environment and Recreational Management (CERM) aquatic centre performance indicator benchmarking data suggests that most centres run at operating losses.[19] Despite this, some centres such as Noosa and Caloundra have diversified their service offering to include inflatable equipment, sports medicine facilities including on-site osteopath and massage therapists. This expansion in service offering can improve the commercial position of aquatic facilities and is considered in line with current trends towards more contemporary centres.[20]

A report published by the International Canoe Federation in 2014 entitled *Sustainable Whitewater Sport Centres* identified several 'critical success factors' that provide a basis for future venue specification, construction and delivery for whitewater facilities. Drawing on this report, desktop research, and information from WPI, several case studies are analysed to provide initial context for the proposed Redland Coast Adventure Sports Precinct. These case studies focus on the Lee Valley Whitewater Centre (London, UK), Penrith Whitewater Stadium (Sydney, Australia) and Vector Wero Whitewater Park (Auckland, New Zealand).

Analysis of these successful facilities revealed three broad themes:

- Diversity in service offering can contribute to sustainable operations
- International exposure through Olympic events may help establish facilities
- An emphasis on community engagement can contribute to the success of facilities.

[19] Howat, 2015
[20] Strategic Leisure Group, 2015

Case Study 1 – Lee Valley Whitewater Centre

Lee Valley Whitewater Centre is an Olympic canoe slalom venue developed for the 2012 London Olympics. The venue is located in the borough of Broxbourne in London, UK and is operated by the Lee Valley Regional Park Authority under the not-for-profit trust 'Lee Valley Leisure Trust Limited.' The Lee Valley Regional Park Authority is a statutory body responsible for managing and developing the Lee Valley under the *Lee Valley Regional Park Bill* 1966.[21] Operating as a not-for-profit trust enables the Park to benefit from an 80% reduction in business rate, furthering the centre's financial stability.[22]

The history of the Lee Valley has contributed to the selection of the site for the Centre and is an important factor to its success. The Lee Valley was historically home to a diverse range of industries, gravel pits, waterworks, distilleries and munitions factories. Much of this land became derelict over time and an initiative in the 1960s led to a Civic Trust appraisal of the valley as a vast leisure and green space to service London, Hertfordshire and Essex. To this day, it is the only regional park serving these regions - which have a combined population of approximately 9 million (2016) - and plays an important social and community role as the only greenspace of its kind in the area.[23]

The Centre is 106,900m^2 in size and as of 2013, attracted 150,000 visitors of which 51,000 were whitewater users. The Centre utilises a ground fed water supply with a regular flow of 13m^3/s and a pump electricity consumption of 4x1,000 kVA.

In addition to canoe slalom, the service offering includes whitewater rafting, hydrospeeding, tubing, inflatable obstacle course, various lake activities (canoeing, paddle boarding, swimming), disc golf, training facilities for the GB National Slalom Team and retail services including a terrace café and bar. It also hosts open water swimming assessments and several competitions. The diversity in service offering forms one of the success factors for the Centre, generating additional sources of revenue and servicing consumers whose primary interest is outside of whitewater activities. This is evident in the ratio of whitewater users to total visitors of approximately one-third, indicating that most visitors do not partake in whitewater activities at the Park.

The original construction of the park cost approximately £31 million (approximately $56 million)[24] and was completed within a year due to the reported length of prior preparation and accuracy of the executive project. In 2013, the existing facilities were expanded, adding further change rooms, increasing the size of the café area, creating offices and training areas for the GB National Slalom Team and improving spectator provisions around the Olympic course.

The Park had operating expenses in the 2013-14 fiscal year of approximately €2.8 million (approximately $4.5 million). Of this, €150,000 (approximately $240,000) were required for water treatment. In 2015, the facility was anticipated to break even and in recent years has been operating successfully.

[21] Lee Valley Regional Park Authority, 2019
[22] International Canoe Federation, 2014
[23] UK Office for National Statistics, 2016
[24] Converted to AUD using 2019 financial year average exchange rate published by Westpac: https://www.westpac.com.au/content/dam/public/wbc/documents/pdf/cb/fx-calendar-fin-year-averages.pdf

Case Study 2 – Penrith Whitewater Stadium

The Penrith Whitewater Stadium is an Olympic canoe / kayak slalom venue built for the 2000 Sydney Olympics. It is located at the foot of the Blue Mountains an hour west of Sydney, Australia and was constructed as a joint venture between Penrith City Council, the International Canoe Federation and the Olympic Co-ordination Authority.

The Stadium received an unprecedented amount of international exposure during the 2000 Games which has helped to establish the facility as a major sporting and recreation facility in Western Sydney.[25] Consequently, it attracts a relatively large number of visitors, approximately 108,000 (2013), given the population of the surrounding region of approximately 4.5 million (2016).[26]

The course draws water from a nearby lake using 6x300kw (1600 kVA total) submersible pumps with a regular flow of 14m^3/s. The course is 320 metres in length, varies from 8 metres to 14 metres in width and drops 5.5 metres top to bottom with a total size of 100,000 m^2. It utilises a "U" shape design, a moveable obstacle system and conveyor to carry rafts, canoes and kayaks from the bottom of the course to the top. It is the only whitewater course of its kind in the Southern Hemisphere.

Available from September to June, the Stadium's service offering includes whitewater rafting, kayaking, swift water rescue training and host to a variety of local, national and international slalom competitions. In addition to these whitewater related activities, the Stadium also offers retail in the form of a Café. The diversity of service offering is one of the success factors for the Stadium, generating multiple sources of revenue and providing a degree of stability to its operations.

Relative to the London case study, visitors are more likely to be attending the stadium to participate in whitewater activities. This is evident in the whitewater user to total user ratio of approximately 65% in 2013.

The original construction cost of the facility was approximately €4.3 million (approximately $7 million)[1] and took 21 months to complete. The low investment cost, particularly considering the size of the park, is reportedly the consequence of pragmatic design and operation.

Operating expenses at the Stadium in 2013 were approximately €1.2 million (approximately $2 million)[1].[6] The relatively low operating expenses can be partially attributed to the low electricity required to operate the Stadium's pumps, relative to the London case.

Rescue training and education is reportedly a significant and regular activity at the Stadium.

[25] Penrith Whitewater Stadium, 2019
[26] ABS, 2016

Case Study 3 – Vector Wero Whitewater Park

The Vector Wero Whitewater Park is located on the outskirts of Greater Auckland, an hour from the CBD. The Park is developed and operated on behalf of the community by Second Nature Charitable Trust who reinvest profits into educational and community programmes.[27]

Unlike the London and Sydney centres, the Vector Wero Whitewater Park was not an Olympic venue. As such it did not benefit from the international exposure that assisted in the establishment of the other two cases. Instead, an emphasis on strong community engagement, particularly with the youth, has established a social and icon value for the Park that has aided its performance.

Specifically, partnering with organisations such as Water Safety NZ, Aktive Auckland Sport and Recreation and John Walker Find Your Field of Dreams, the Park offers programmes to Children that promote confidence and skills in the water and the ability to manage moving water situations. The Park was given nearly $620,000 in sponsorships and subsidies in the 2018 year.[28]

The Park features two rivers, one grade 3-4 river that meets international competitive standards and another grade 1-2 river. The grade 1-2 river is 200m in length whereas, the grade 3-4 river is 300m in length and includes a 4.5m waterfall drop. It also includes a large pond (9000m^2) that is used for water confidence skills and various other activities. Consequently, the range of activities at the Park increases accessibility for those of varying skill levels.

The centre offers a primarily water sports-oriented service offering, with activities including whitewater rafting, kayaking and canoe slalom. The park also offers rescue programme training and hosts a number of school activities as part of its community engagement programme. Also at Vector Wero is the *Momentum* Hub. The *Momentum Hub* is a set of office spaces provided to "like minded not-for-profit" organisations for subsidised rent. The *Momentum Hub* is also the base for New Zealand's canoe slalom. Reportedly, there are plans to expand the Parks services to offer land-based activities in the form of high wire climbing facilities in the next 12-months.[29]

According to WPI, visitor numbers at the Park are estimated to be approximately 30,000-35,000 p.a.

[27] Vector Wero Whitewater Park, 2019
[28] Second Nature Charitable Trust, 2019
[29] WPI, 2019

3 Economic Impact Assessment

3.1 Introduction

The economic impact assessment estimates the flow-on effects to jobs, output, tourism and businesses in both the Redland and Queensland economy, from establishing the RCASP. The economic impacts of the whitewater facility and the RCASP are modelled separately, to support the decision-making needs with respect to the 2032 SEQ Olympic and Paralympic Games bid and for RCC's own strategic decision-making purposes.

The purpose of the economy-wide modelling is to demonstrate the "catalytic" effects an investment in integrated sporting/recreational facilities of this type is likely to have on the Redland economy. The financial feasibility analysis estimates the direct income and costs associated with the facilities and the net cash flows. However, this is only one component of the overall impacts of the proposed development. The economy-wide model (the Deloitte Access Regional General Equilibrium Model) can capture the flow-on impacts to economic activity, regional income and the potential to "induce" additional investment in the regional economy, as Redland becomes more attractive to investors. The modelled economic impacts provide a different lens for decision makers to analyse the overall economic potential of the investment over the medium to long-term.

Integrated sporting and recreational facilities of this type also offer benefits to the community, such as additional convenience, community integration and wellbeing. These aspects are not all captured in the economy-wide modelling. Hence the modelled impacts represent only part of the economic potential of this community precinct.

3.2 Scenarios

The economic impact modelling considers two scenarios as follows:

- **Scenario 1**: models the economic impacts of the construction and operation of a whitewater facility in Redland. The whitewater facility will host the 2032 Olympic Games Canoe/Kayak – Slalom event and after the Olympic Games will be used as a "community" and "sporting" asset for recreational purposes (hosting both people from Redland and visitors). It will also host professional whitewater sporting events (of different standards) and offer a range of programs linking community programs (such as school holiday programs) in the region to use the facility. QFES will utilise the facility to deliver some of their flood and swiftwater training. There is also commercial potential for QFES to deliver education and training services to the interstate and Asia Pacific markets.
- **Scenario 2**: models the economic impacts of construction and operation of the RCASP (i.e. whitewater facility including QFES flood and swiftwater training activities, aquatic precinct, lake and land activities, adventure high ropes activity area, retail space, gym space and community space). An integrated precinct offers a broader range of services to increase tourism opportunities and to appeal to the general public and organisers of larger sporting events. The RCASP is expected to have positive impacts for tourism and positive flow-on effects to local businesses and industry supply chains.

The estimated economic impacts of each scenario are compared relative to a "business as usual" (BAU) projection of the Redland economy.

3.3 Tourism "uplift"

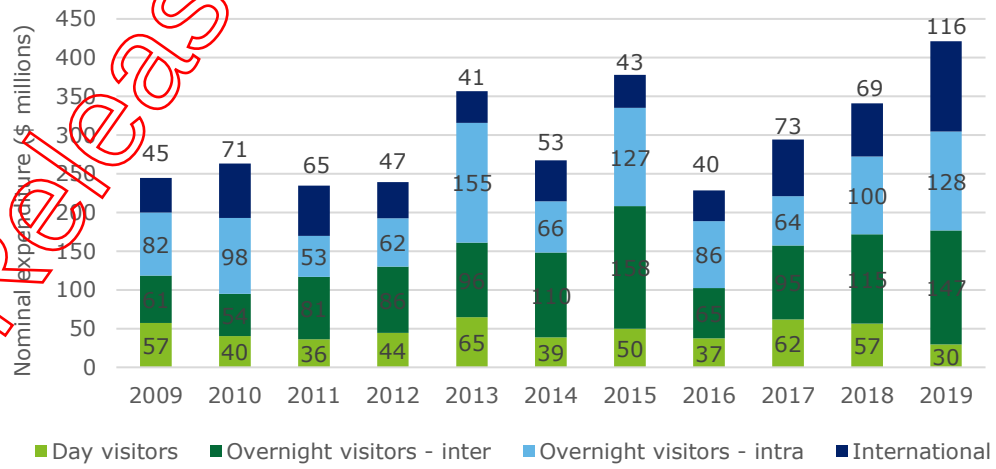
Tourism data for the Redland local government area (LGA) highlights the number of travellers to the region and the distribution across visitor categories (Chart 3.1). The trend growth rate over the 10 years to 2018-19 was 3.2% growth in the number of visitors and 4.1% growth in visitor spend. The majority of visitors are day visitors from the Brisbane LGA. This is likely to have a 'positive effect' on use of the future whitewater facility in the future, particularly given there are no comparable facilities in the region (that can act as substitutes).

Chart 3.1 Visitation to the Redland LGA

Source: Deloitte Access Economics calculations based on Tourism Research Australia

The composition of visitor expenditure is more evenly distributed across visitor categories (chart 3.2). The share of total expenditure by international visitors increased in 2018-19 and averaged $86 million over the past three years (in comparison to the 2009 to 2016 average of $50 million).

Chart 3.2 Expenditure by visitor type $2017-18



Source: Deloitte Access Economics calculations based on Tourism Research Australia

The "tourism uplift" factor is determined by considering other whitewater facilities, including two facilities which have hosted an Olympic Canoe/Kayak – Slalom event. The characteristics of each of these facilities is shown in Table 3.1.

Table 3.1: Characteristics of whitewater facilities

	Penrith, Australia	Charlotte, USA*	Lee Valley, Great Britain
Year	1999	2006	2011
Olympic games	2000		2012
Operation years	15	7	3
City population	190,000	750,000	12M
Visitors	108,000	750,000	150,000
Whitewater users	70,000	157,000	51,000
Size (square metres)	100,000	1,619,000	106,900
Pump electricity power (kVA)	1,600	3,500	4,000
Construction cost (Million Euros)	4.3M	16.15M	39.4M
Equipment cost (Euros)	167,000	935,000	486,000
Additional investment (Euros)	200,000	2,300,000	0
Expenses 2013 (Euros)	1.2M	10.1M	2.8M
City population	190,000	750,000	12M
Visitors to whitewater users multiple	1.54	4.78	2.94
Visitors to city population multiple	0.57	1.00	0.01
Whitewater users to area (square metre)	0.70	0.10	0.48
Visitors to area (square metre)	1.08	0.46	1.40

Source: Sustainable White Sports Centres, December 2014

* Notes: The Charlotte whitewater centre includes a fully integrated adventure and sports precinct however the facility has not hosted an Olympic Canoe/Kayak – Slalom event.

Based on the above information it is noticeable that Charlotte, USA is focused on a broader outdoor recreation model, compared to a standalone whitewater facility (Penrith and Lee Valley). It hosts activities such as mountain biking, rock climbing, aerial sports (zip lines and high ropes) and water activities such as stand up paddle boarding. It also hosts concerts (circa 50 events per year) and other types of events, such as food and music festivals. The facility considered the most reasonable to benchmark against, given the range of activities on offer and similarities with the proposed facility in Redlands is Charlotte, USA.[30]

Using base demand (which is 50,480 persons per annum, see section 4.2.2 for a detailed breakdown) and after excluding 10%[31] for visits by Redland residents it is possible to calculate the tourism uplift factor. The average spend per visitor is based on historical tourism data and the share of visitor profile (day, domestic overnight and international visitors).

[30] Noting there were no Olympics held at the Charlotte, USA facility.

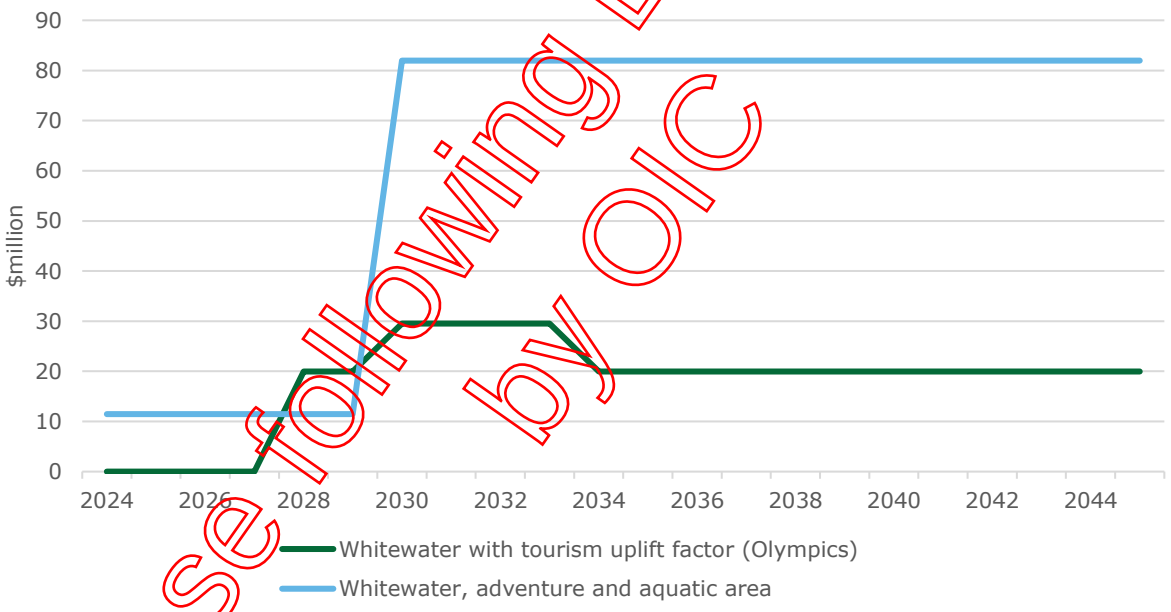
[31] This is based on the share of the Redland LGA population in 2036 relative to the Brisbane LGA (in 2031) and assumes that visitation by day visitors is proportional with projected population shares. Demand is scaled by factor of 90% to remove expenditure switching.

Tourism related expenditure by visitors to the whitewater facility is further adjusted by the Olympics factor, based on an econometric study on the impacts of the Olympic Games on tourism and exports.[32] After controlling for external factors, the study found that the multiple effect on direct tourism expenditure which could be applied is 1.17 (low case) and 1.48 (in the high case). In this study, the latter multiple has been used.

Additional tourism expenditure in the region related to adventure sports is accounted for by applying a multiple that considers incremental tourism spend associated with both whitewater and adventure sports activities. This is based on the population of Redland City in 2018 (157,000) and the visitors to city population multiple in Charlotte, USA (Table 3.1)[33], considered to be most comparable to the whitewater facility in Redland.

The additional tourism expenditure associated with the aquatic facilities is derived from the Liquid Blu Master Planning Report (2018) which estimated demand of the aquatic area at 255,000 visits per annum, averaged out over a 10 year period following opening in 2024. Assuming that most day visitors are local residents and some interstate/international visitors may use the aquatic facilities (but may also use the whitewater facility), only 10% of the additional demand is taken when determining the incremental tourism impact, to avoid overstating this effect.

Chart 3.3 Additional tourism expenditure associated with each activity $2017-18



Source: Deloitte Access Economics calculations and Whitewater Parks International

3.4 Scenario 1 – Direct Shocks (economic impact of the Olympic standard whitewater facility)

Capital expenditure to build the whitewater facility is estimated to be $30.8 million (undiscounted) and construction takes place in 2027. The operation of the whitewater facility also leads to a direct increase in recreation services output of circa $4 million from 2035 to 2050. Hosting an Olympic event brings additional tourism spend (or uplift) attracted to the region in the years prior to the Olympics and following the Olympic Games. Revenue associated with additional tourism spending is allocated to tourism connected industries.

[32] Song, W (2010)
[33] Noting there were no Olympics held at the Charlotte, USA facility.

3.5 Scenario 2 – Direct Shocks (economic impact of the Redland Coast Adventure Sports Precinct)

Capital expenditure to build the whitewater facility and the other facilities that together comprise the integrated RCASP at a total cost of $68.7 million ($2018-19). The RCASP offers a broad range of recreational, community and sporting activities to Redland residents and to visitors from both within and outside Queensland. In addition to capital stimulus, the following shocks have been incorporated into the economic impact modelling based on the financial feasibility analysis and tourism calculations:

- Progressive increases in recreational services output as the RCASP begins to operate (i.e. whitewater facilities, gym facilities, adventure activities, aquatic area facilities and wellness area facilities)
- Incremental tourism expenditure in the region (and the Olympic legacy effect) taking into account the whitewater facility, adventure sports and use of the aquatic area.

3.6 Economic impact modelling results

3.6.1 Whitewater facility

The construction and operation of the whitewater facility is predicted to have positive impacts on the Redland and Queensland economy.

Real Gross Regional Product

The increase in real Gross Regional Product (in Redland) is projected to be $21.5 million on average (in $2017-18) over the period 2027 to 2045. The impacts are similar for the Queensland economy, however there is a marginal shift of resources from rest of Queensland to Redland.

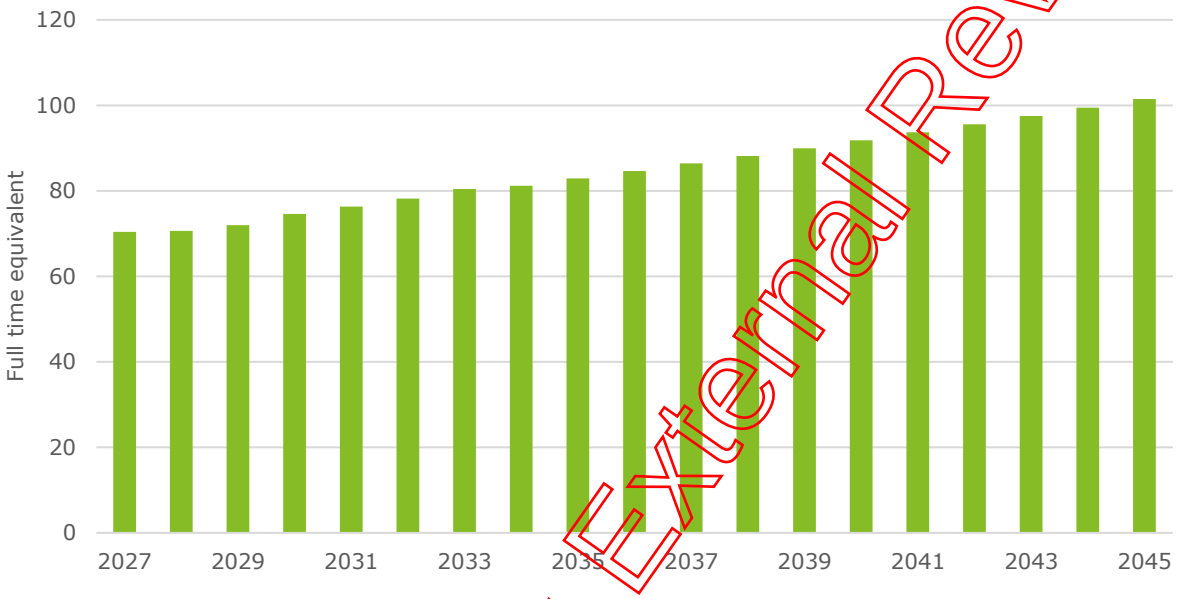
Chart 3.4 Deviation in real gross regional product in Redland LGA ($2017-18)

Source: Deloitte Access Economics Regional General Model (DAE RGEM)
Note: Construction occurs in 2027 and operation commences in 2028.

Employment

Over the period 2027 to 2045, aggregate employment increases by circa 85 FTE's in average annual terms. During the operations phase, the output of recreational services and other tourism connected industries in Redland is projected to increase compared to the BAU.

Chart 3.5 Deviation in aggregate employment in Redland LGA, FTE's



Source: Deloitte Access Economics Regional General Model (DAE RGEM)
Note: Construction occurs in 2027 and operation commences in 2028.

Industry Output

The increased activity generated by the whitewater facility has supply chain effects and this translates to changes in activity across a range of industries. The average annual change in industry output from 2027 to 2045 is shown in Chart 3.6. There are some "crowding out" effects as resources are reallocated to industries that expand in the region. It should be noted that agriculture, mining and trade continue to grow but at a slower rate compared to BAU.

Chart 3.6 Deviation in real industry output, Redland LGA ($2017-18)

Source: Deloitte Access Economics Regional General Model (DAE RGEM)

3.6.2 Redland Coast Adventure Sports Precinct

This scenario analyses the economy-wide impacts of developing the RCASP including construction, operational revenues and additional tourism spending in the region associated with all the integrated precinct operations, including the whitewater, aquatic and adventure sports facilities.

Real Gross Regional Product

The scale of the project is larger and therefore the associated activity results in more significant positive flow-on effects to the Redland economy and the Queensland economy. The increase in real Gross Regional Product (in Redland) is projected to be $52 million on average (in $2017-18) over the period 2019 to 2045.

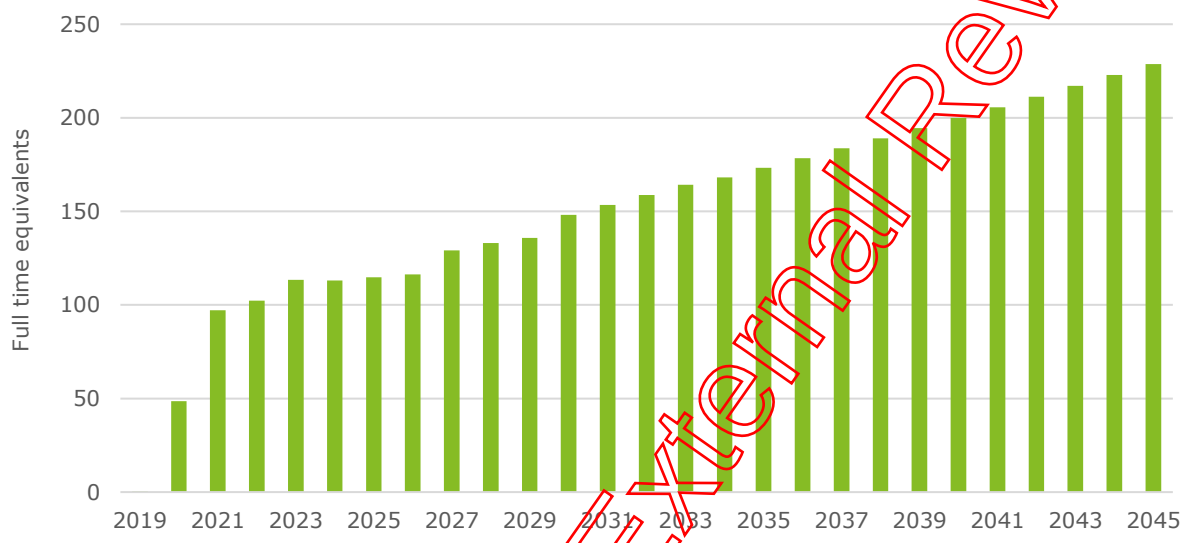
Chart 3.7 Deviation in real gross regional product in Redland LGA ($2017-18)

Source: Deloitte Access Economics Regional General Model (DAE RGEM)
Note: Construction of the redeveloped aquatic facilities occurs in 2023 and construction of the whitewater facility and adventure facilities occurs in 2027. Full operation of all facilities within RCASP commences in 2028.

Employment

The capital investment of an estimated $68.7 million coupled with the increase of output in services and tourism related industries (including accommodation and food services, recreation services and trade) supports employment growth. Over the construction and operations phase, aggregate employment is projected to increase by 152 FTEs in average annual terms. The time profile of aggregate employment is shown in Chart 3.8.

Chart 3.8 Deviation in aggregate employment in Redland LGA, FTE's

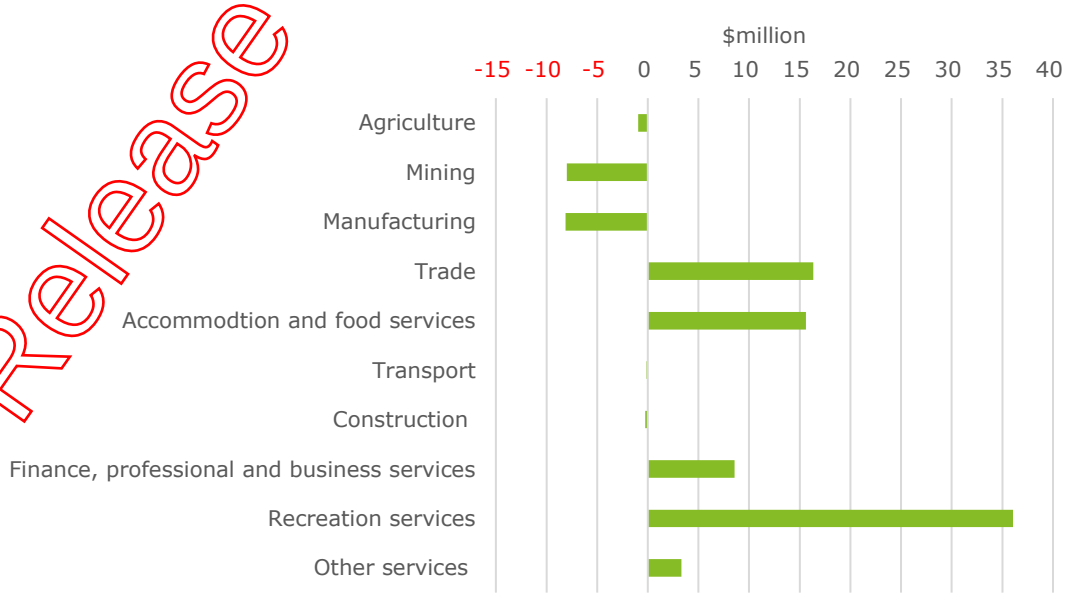


Source: Deloitte Access Economics Regional General Model (DAE RGEM)
Note: Construction of the redeveloped aquatic facilities occurs in 2023 and construction of the whitewater facility and adventure facilities occurs in 2027. Full operation of all facilities within RCASP commences in 2028.

Industry Output

The direct stimulus to the economy through capital investment and additional direct activity in recreation and tourism connected industries has direct flow-on effects, which also results in an increase in the output of related supply chain industries. The average annual deviation in industry output from 2018-19 to 2044-45 is shown in Chart 3.9. The increase in activity in construction, tourism and services related industries typically causes a degree of "crowding out" of activity (as resources are constrained in the economy). In this instance, agriculture, mining and manufacturing continue to grow but at a slightly lower rate compared to the BAU.

Chart 3.9 Deviation in real industry output, Redland LGA ($2017-18)



Source: Deloitte Access Economics Regional General Model (DAE RGEM)

4 Financial analysis

A financial evaluation or appraisal is a cash flow analysis, generally a discounted cash flow analysis. A financial analysis examines the cash income and expenditure of a project or programme and its impacts on a particular agency, usually the agency that is mainly responsible for carrying out the project or programme. The agency may be a private firm or government. This helps answer the question "is it a good investment for the organisation". In the case of this study, the financial analysis is conducted from the perspective of RCC as the owner of both the proposed RCASP as well as the standalone whitewater facility to support decision needs as part of the 2032 Olympic bid.

In 2016, Deloitte Access Economics delivered the financial analysis of the proposed redevelopment of the Redland Aquatic and Emergency Precinct. The financial analysis for the whitewater facility is integrated into the Deloitte 2016 financial model, and revenue streams and cost estimates updated for the Aquatic facilities, drawing upon financial estimates within the Master Planning report produced by Liquid Blu in 2018.

The 2016 model also considered a broader partnership between RCC and Surf Life-Saving Queensland. While this operating model is no longer relevant, the project scenario estimated demand and revenue for a broader precinct perspective including a crèche, food/café, retail and office space and gym/wellness programs. These existing estimates have been adapted and additional analysis conducted to account for opportunities to generate additional visitation/revenue from the integration of a whitewater facility and aquatic centre and potential for cost synergies by RCC.

This analysis is conducted over 32 years of operations, until 2050, for the Redland Coast Adventure Sports Precinct using a real discount rate of 7 per cent and expressed in $2018-19. In this study, the financial flows anticipated from RCASP are compared against the base case or business as usual scenario, which sees the Cleveland Aquatic Centre continue to operate under current arrangements.

4.1 Development of the base case

The base case serves as the reference point against which the project is evaluated. The base case for this project is a case where it is 'business as usual' for the Cleveland Aquatic Centre site (i.e. no development of the RCASP or whitewater facility). It should be noted that only the project case considering the broader RCASP precinct incorporating all facilities (aquatic redevelopment included) is compared incrementally against the base case; the whitewater facility is not site specific and the analysis therefore cannot take into consideration the opportunity costs of the land it will be developed on. The financial analysis results are therefore not directly and incrementally compared against the base case.

The base case represents a 'do-minimum' scenario. Under the 'do-minimum' scenario, it has been identified that significant capital upgrades will be required on a "like-for-like" basis due to the deteriorating condition of the current aquatic assets over the next 10 years. The replacement and maintenance capital is incurred over time to maintain a pool for the Redland Community as the existing pool nears the end of its useful life and has to be replaced. The costs and revenues associated with this facility are based on data provided by RCC from our 2016 analysis (and adjusted flows to $2019). This information has been used to help estimate the cost to RCC under the base case scenario into the future.

The leasing arrangements in the base case have been assumed to be consistent with the modelling undertaken by Deloitte Access Economics in 2016, where the Cleveland Aquatic Centre was under a lease arrangement with Belgravia Leisure (at this time the contract was to end in 2017).

Under this agreement, Belgravia retained the revenue and are only responsible for minor maintenance (in the order of $55,000 per annum) and are paid an annual management fee of around $250,000 per annum by RCC. In the base case scenario, the current lease arrangements are assumed to continue and is expressed in $2018-19.

Based on consultation with RCC it has been identified that the facility is not fit for purpose, near capacity and visitation levels are assumed to remain flat at current levels of attendance of around 210,000 attendances per annum.

There is no development of a standalone whitewater facility in Redland as part of the proposed RCASP and the many recreational and tourism type facilities it will offer. The Redland community has to rely on existing recreational facilities (such as the pool) in the region and visitation/demand declines as users switch to substitutes (and travel further to use a pool and associated facilities) and fewer visitors from outside the region use the facility.

4.1.1 Costs to RCC – Capital and operating jobs

Based on 10 years of data provided by RCC to Deloitte Access Economics in 2016, the annual cost to RCC is split in terms of operating jobs and capital jobs. Due to capital improvements made in 2006-07 and 2007-08 when the leisure pool and related facilities were installed, the trend in operating costs has been examined over the period 2009-10 to 2014-15 in the base case (and for the purpose of this analysis have been indexed to $2018-19 figures).

In 2016, RCC advised that operating jobs includes the management fee paid to Belgravia (which is around $250,000 per annum) plus other operating maintenance costs including water charges etc. These costs are incurred by the RCC and not the operator under the current leasing arrangements. The cost of operating jobs to RCC totalled around $600,000 per annum in 2014-15. Over the period 2009-10 to 2014-15, the cost of operating jobs to RCC has increased at around 2.5% in real terms. In the base case, these costs are expected to continue to increase in real terms up till 2022 when they are assumed to remain constant at around $380,000 per annum in real terms out to 2050.

In terms of capital jobs, recent costs were incurred in 2013-14 and 2014-15 to fix damage to water pipes in the centre along with other urgent maintenance. Furthermore, in the 2016 analysis, based on year to date figures for 2015-16, it was estimated an additional $250,000 has been spent by RCC on capital jobs. In the base case, capital maintenance is incorporated for the initial 3 years up till replacement of the 50 metre pool is assumed to occur in 2022.

In summary, analysis of historical cost data shows that the current condition of the aquatic centre is impacting financially on RCC with increasing maintenance costs as well as the management fee. RCC advises there is potentially a significant risk that future failure could occur and ongoing maintenance problems are possible in the base case scenario.

4.1.2 Costs to RCC – Capital replacement costs

The facility is currently not fit for purpose. In the base case it is assumed that the swimming pools at the aquatic centre will need to be replaced as these assets reach the end of their useful life. For instance, the 50 metre pool is over 40 years old having been constructed in 1978 and needs immediate replacement. The 2014 Cleveland Aquatic Centre Pool Condition and Maintenance Report[34] highlighted the deteriorating condition of the aquatic centre and the need for urgent capital upgrades to keep the pool operational into the future. This includes indicative estimates of replacement costs on a "like-for-like" basis.

[34] Cleveland Aquatic Centre, Updated Pool Condition Assessment and Maintenance Plans (July 2014) J.H. Cockerell, Specialist Pool Engineers

It is estimated that the initial upgrades to replace the 50 metre pool will cost in the order of $8.2 million ($2018-19). This is staged in the base case to occur in 2022. Stage two upgrades that occur over a time frame of 3 to 7 years after 2022, are expected to cost in the order of $4.7 million in real terms (assumed to occur in 2026) and beyond this an additional $4.7 million has been allocated (in 2029) for any for future capital works. RCC also advised in 2016 to include a 10% contingency for these capital replacement estimates.

It is expected that over time the installation of the new swimming pools will potentially result in a reduction in some components of ongoing operating costs for the pool. However, this is not factored in as it was not possible to accurately quantify the reduction in costs following discussions with RCC. Furthermore, RCC stated in 2016 that even following replacement, operating costs are likely to continue to be significant due to the sub-optimal configuration of the current aquatic centre.

In summary, significant capital expenditure is required to replace aquatic facilities on a 'like-for-like' basis in the base case. This is estimated at $17.6 million (in $2018-19). It is also assumed that RCC continues to provide on-going financial support to the operator which includes the management fee of around $260,000 plus operating maintenance costs of around $335,000 per annum in real terms ($2018-19) out to 2050.

4.1.3 Pool attendance and prices – Cleveland Aquatic Centre

Total visitors to the Cleveland Aquatic Centre have historically been around 210,000 per year. Over 2009-10 to 2012-13, attendance levels increased on average while over 2013-14 and 2014-15, these levels have declined. On average, the trend in attendances to the Cleveland Aquatic Centre has been relatively flat at around 210,000 per annum. This trend is expected to continue in the base case in the absence of any major improvements to the existing centre. The facility is not fit for purpose and near capacity, so visitation levels are assumed to remain flat at current levels out to 2050 in the base case. Aquatic centre revenue is estimated based on visitation and ticket price data. This data has been updated to reflect current ticket prices in 2019, and where this is not available, prices have been indexed to $2018-19 values (Table 4.1).

Table 4.1 Ticket Prices ($) over 2008-09 – 2015-16 & 2019

Prices	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2019
Adult	4.3	4.5	4.8	5	5.2	5.4	5.5	6.2
Child	4.3	4.5	4.8	5	5.2	5.4	5.5	5.1
Senior	4.3	4.5	4.8	5	5.2	5.4	5.5	5.1
Family (of 3)	11.2	12	13	13.5	14	14.6	15	16.75
Family (of 4)	14.8	15.5	16.5	17.5	18.2	19	19.5	21.8
Extra/Family	3.7	3.8	3.8	4	4.2	4.3	4.5	5.1
School	2.8	2.9	3.2	3.5	3.5	3.7	3.8	5.1
Child 3 & under	Free	Free	Free	Free	Free	Free	Free	Free
Adult 20 visit	67.5	76.5	81.6	85	89	92	95	100
Senior 20 visit	52.5	59.5	64.6	68	72	74	77.5	82
Swim membership (12 months)	410	420	440	450	499	510	525	552

Source: Data provided by RCC in 2016 and Cleveland pool website

Based on advice by RCC in 2016, in the absence of redevelopment of the aquatic centre it is expected that visitor growth to the centre will remain constant at its current level of around 210,000 attendances per annum. Hence, in real terms revenue from current operations is expected to remain flat at around $1.6 million on average in the base case out to 2050.

4.1.4 Base case cost projections to RCC and revenue forecasts

In summary, based on the estimated upfront capital expenditure required by RCC to replace swimming pool facilities, the ongoing payment of the management fee to the operator as well as annual maintenance costs incurred by both RCC and the operator; the net present cost of the base case scenario to keep the current aquatic centre running out to 2050 is estimated to be $22.8 million (real discount rate of 7%). These costs are estimated to be required by RCC to keep the existing centre operational and continue to provide these services to the Redland community under the existing arrangements and its current format.

Table 4.2: Indicative cost projections to RCC, base case, 2019 - 2050 ($2018-19)

Category	Forecast (2019 to 2050)
Capital replacement costs to RCC	
Stage 1 upgrades by 2022	$8,226,311
Stage 2 upgrades by 2026	$4,700,749
Stage 3 upgrades by 2029	$4,700,749
Annual management and maintenance costs to RCC	
Annual management fee	$262,216
Annual operational and capital jobs	$2,295,486

Source: Based on 2016 consultation with RCC and CAC maintenance report
Notes: Stage 3 upgrades were not costed and represent an indicative assumption and each stage includes a 10% contingency

Table 4.3: Indicative revenue projections, base case, 2019 to 2050 ($2018-19)

Category	Forecast annual average (2019-2050)
Revenue	
Casual attendances	$ 325,492
Learn to swim	$ 835,356
All other wet programs	$271,344
Pool hire	$ 74,641
Gym	$85,977
Pool shop/kiosk	$37,671
Total	**$1,630,481**

4.2 Project case – Standalone whitewater facility

This section discusses the key data and assumptions used to estimate the costs and benefits of the proposed standalone whitewater facility, to support decision-making needs as part of the 2032 Olympic bid. The whitewater facility, and the corresponding financial analysis incorporates the operational cash flows of QFES using the second channel for swiftwater rescue and training purposes, as it is assumed that even if the whitewater facility was to be developed without the broader precinct, QFES could still utilise the channel. It is anticipated that the whitewater facility will be built in 2027, with the first year of operations commencing in 2028.

The operation and management arrangements for the whitewater facility, based on discussions with RCC, will be undertaken by a third party. It is most likely that this arrangement will see the third party operator receive a management fee and incur operational costs. It is therefore assumed, in this project case, that the operational costs net out with a management fee, and this analysis considers only the operational costs likely to be incurred.

Deloitte commissioned WPI to develop demand and revenue estimates as well as estimates of the capital and operating costs of a whitewater facility in Redland, given their detailed knowledge and expertise in designing Olympic Games whitewater courses with ICF Performance Specifications, and whitewater facilities for recreational and community use globally.

4.2.1 Development capital costs - Whitewater facility

Based on information provided by WPI, the preliminary estimate for the capital costs for the development of the whitewater facility is estimated to total $30.8 million (Table 4.4).

Table 4.4 Estimates of construction costs of the whitewater facility, $2019

Basic Cost Estimate for Redland Whitewater Channels	**$**
Lake and Bulk Earthworks	1,400,000
Sub-total	1,400,000
Channel Construction	6,825,000
Pump Station Civils: Olympic Channel Pump Station	1,128,000
Pump Station Civils: Warmup Pump Station	807,900
Submersible Pumps	1,790,000
Site Connection – Contingency amount	500,000
LV switchgear/cabling	865,000
Conveyors	550,000
Obstacles	683,000
Subtotal Olympic Channel	**8,527,800**
Subtotal Warmup Channel	**4,621,100**
Landscaping, paving, slalom gate system, bridges, car park (provision)	4,074,580
Total Construction of Channels	**18,623,480**
Contingency 25%	*4,655,870*
Total Construction Cost including Contingency	**$23,279,350**
Building contingency	7,500,000
Total Construction Cost including Contingency (With Building)	**$30,779,350**

Source: Whitewater Parks International

Historical costs have been used to inform the estimation of indicative construction costs for the whitewater facility. Construction costs of facilities such as Sydney, London, Auckland and Brazil were reviewed and compared to define construction costs for the whitewater channels and associated structures and the operational building (Table 4.5).

Table 4.5 Comparison of construction costs for International Courses, indexed to $2018-19 AUD values

Course	Year Completed	Total Cost Whitewater Channels and Associated Structures	Total Cost Building	Total Project Cost	Channel Length (metres)	$ per linear metre ($AUD)
Penrith Australia	1999	$9,401,435	$2,109,837	$11,511,272	320	$29,379
London UK	2010	$38,400,873	$21,517,329	$59,918,202	460	$83,480
Wero NZ	2016	$23,031,461	$5,019,935	$28,051,396	500	$42,167
Redland	**(Proposed)**	**$23,279,350**	**$7,500,0000**	**$30,779,350**	**550**	**$42,326**

Source: Whitewater Parks International

Note: For comparative purposes, all figures are in $AUD and indexed to $2018-19 values.

To determine the costs of the two whitewater Channels, breakdown of the total of those costs per linear meter of channel was conducted. The range of costs per linear metre was approximately $83,480 (London, UK 2010) down to $29,379 (Penrith, Sydney 1999). There are limitations to both facilities:

- Penrith was built 20 years ago, very simply and without a lake (existing) or water treatment plant and was developed on a significantly smaller scale.
- London was an Olympic project built on a poor site with significant groundwater issues which added a premium cost.

Construction cost estimates have been based with a scope similar to the Auckland Vector "Wero" facility. The facilities in Auckland provide a better indication of scope ($42,167) per linear metre. The Wero was completed via a budget conscious process and each of the areas were designed and constructed as cost effectively as possible. The Wero course was designed and constructed to be compliant with the ICF Performance Specifications for Olympic Games whitewater courses. The cost for Wero is inflated because it includes a 5 meter raft able/paddle able waterfall. Removal of the cost of this feature from the total sees a reduction in the linear meter cost.

To determine the Operations Building construction costs, the costs at each of the facilities have been reviewed. We have reviewed the costs at each of the facilities, ranging between $2.1 million (Penrith) and $21.5 million (London). There are limitations to the buildings constructed at both Penrith and Auckland:

- Penrith was built 20 years ago, and was designed and constructed very simply, using block and metal. The covered area encloses office spaces, only adding to 100 square meters. The change rooms have only 2 toilets and limited change space (24 square meters in each).
- Auckland was designed and constructed on a budget of $5 million and also had enclosed office areas of only 150 square meters, however the toilet and change rooms facilities were more appropriately sized at 200 square meters. Additional accommodation for retail/food and beverage, meetings, classrooms and sport offices/athlete areas were developed in the adjacent container village and then leased to organisations for their use.

The London building is a more appropriate example of a building with large numbers of facility users, co-located with the national team high performance training centre. The London building was initially constructed for $18.5 million and an additional $11.6 million has been spent since 2012.

The London building is also uniquely integrated into the start pond for the Olympic course, and it also houses the Olympic Course electrical panels plant and the lake water treatment plant. This increased the cost of the facility, and this analysis has made allowances for these items elsewhere in the estimate. Therefore, it has been estimated that the budget amount for a building that would cater for the Legacy operations requirements of the whitewater facility would be approximately $7.5 million.

The second channel will have a dual utilisation purpose, bring constructed as both a warm up channel and for training purposes for QFES. There are assumed to be no additional capital outlays associated with QFES' use of the whitewater facility.

The capital costs within the project case for the whitewater facility, in this analysis, is assumed to be fully funded.[35] Sensitivity analysis surrounding different funding scenarios is presented below (Section 4.2.6).

4.2.2 Forecast attendance and demand analysis - Whitewater facility

The development of the whitewater facility is expected to result in a high level of participation rates across the range of activities offered within the facility, over the long-term due to the quality and diversity of proposed facilities and flexibility of services.

To estimate future demand, this study developed a demand model using estimates provided to Deloitte by WPI, experts in this subject area, and demographic data coupled with ABS participation rates for other water sports.[36]

An Australian Sports Commission 2011-12 Participation in Sport and Physical Recreation report highlights that the total number of Australians participating in other water sports is 19,600.[37] For the Australian working age population (15 - 64 years) in 2019, the participation rate is estimated to be 0.12% (Table 4.6).[38]

Table 4.6 Participation rates, Australia

Range estimates	Participation rate (% of working age population)
High	0.17%
Medium	0.12%
Low	0.07%

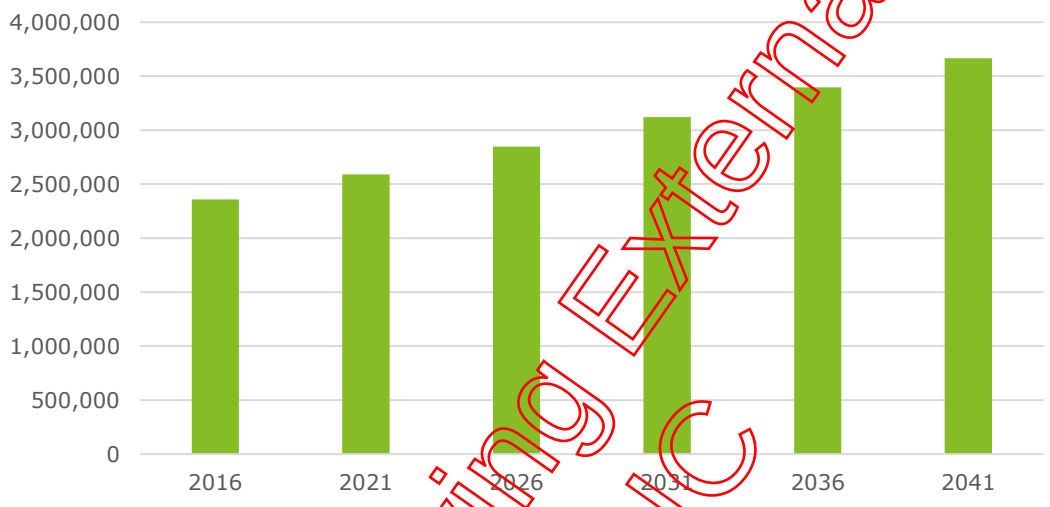
Source: Australian Sports Commission, ABS
Note: Based on the relative standard error (RSE) of circa 40%, there is assumed to be a range of 1.4 to 0.6 times the central estimate.

Local demand is captured through defining the catchment area of the whitewater facility (noting that it is currently not site-specific), assumed to be located within the Redland City / Cleveland region.

[35] It is assumed that the whitewater facility is 100% funded from a combination of State and Federal Government grants, and any potential private sources of funding. Any funding gaps within the sensitivity analysis requiring capital injections from RCC is assumed to be debt free.
[36] ABS define *other water sports* to be: white water rafting, rafting, dragon boat racing and water sports (other).
[37] Australian Sports Commission, 2011-12
[38] Based on the relative standard error (RSE) of circa 40% assumed to be a range of 1.4 to 0.6 times the central estimate. The 2013-14 ABS survey supports this statistic, with 0.1% participation rate for rafting.

This study has defined the catchment area to be Greater Brisbane, using ABS Statistical area 4 (SA4) data.[39] The 2016 modelling for the redevelopment of the aquatic centre defined a catchment area[40] within a 5 to 10km radius of the aquatic centre based on ABS Statistical area 2 (SA2) data. The Cleveland Aquatic Centre is the only public pool in this catchment area. The catchment area for the whitewater facility is assumed to be larger, as this facility would be the only available in the Greater Brisbane area offering whitewater activities, and it is assumed people would be willing to travel further.

Chart 4.1 Population projections to 2041, direct population catchment in Greater Brisbane



Source: Queensland Government Population Projections, 2018 edition (medium series)

In terms of age profile, the catchment area of Greater Brisbane has a working age population proportion of 66.4%, just below Australia's 65.8% in 2019.

Applying these water sports participation and frequency metrics to the working age population projections (2031) of the catchment area yields an estimated average annual attendance of around 40,585 per annum (Table 4.7). The population projection for the year 2031 has been used, given the Olympics occurs in 2032 and it is assumed construction will occur in 2027.

Table 4.7 Demand Scenarios, Greater Brisbane

Range estimates	Participation rate (% of working age population)	Demand estimates
High	0.17%	56,818
Medium	0.12%	40,585
Low	0.07%	24,351

Source: Australian Sports Commission, ABS, Queensland Government Population Projections (medium series)

[39] The Greater Brisbane Region includes the SA4 regions of Brisbane – East, Brisbane – North, Brisbane – South, Brisbane – West, Brisbane Inner City, Ipswich, Logan – Beaudesert, Moreton Bay – North, and Moreton Bay – South.
[40] Alexandria Hills, Cleveland, Ormiston, Thornlands and Wellington Point.

The participation estimates provided by WPI fall within the range above. WPI projects total participation to be approximately 50,480 at full demand. When applying the same relative standard errors (RSE) around this estimate, the range is higher than when using ABS and Queensland Government population projections (Table 4.8).

Table 4.8 Demand scenarios

Demand range estimates	Participation rate (% of working age population)	Demand estimates
High	0.17%	70,667
Medium	0.12%	50,477
Low	0.07%	30,286

Source: Australian Sports Commission, Whitewater Parks International

The WPI demand estimates are supported by benchmarks and analysis of other contextually similar whitewater facilities and considers additional factors such as the Olympic legacy characteristic of the facility and both national/international events (Table 4.9).

Table 4.9 Benchmark facilities, WPI

Location of facility	Approximate participation level (p.a.)	% of population of region
London	150,000	1.73%
Sydney	108,000	2.06%
Auckland	35,000	2.23%
Greater Brisbane	**50,537 (estimated)**	**1.62% (based on 2031 population projections)**

Source: International Canoe Federation report 2014-15, Whitewater Parks International, New Zealand Census 2018, Office for National Statistics (UK) 2016, ABS 2018

This study has used WPI's estimate in the financial analysis as they are likely to be a more accurate representative of the future demand profile for the whitewater facility. To help account for the uncertainty associated with future demand, a range of demand estimates have been developed including low (30,286), medium (50,477) and high (70,667). The higher estimate allows for the fact that some people outside of Greater Brisbane may travel further in the future including from other states; in particular, if the facility is able to position itself as both a national and international training facility.

These projections are also broadly consistent with Queensland Government Population Projections and ABS participation rates, which estimated indicative visitor projections at 40,818 attendances per annum and a range of between 24,351 and 56,818 per annum.

4.2.3 Forecast attendance and revenue by activity type - Whitewater facility

Benchmarking and analysis of other contextually similar whitewater facilities has informed the estimates of attendance types and associated prices.[41] A summary of the forecasted attendance and revenue by activity type is shown below (Table 4.10) and this section steps through the activity types and revenue streams forecasted within this study.

[41] Demand usage models broken down into activity types and associated prices have been informed by benchmarks provided by WPI.

Table 4.10 Forecast attendance and revenue by activity type, full demand (2035)

	Demand (number of persons)	Revenue ($)
Canoe/kayaking	9,181	$348,860
Whitewater channel	31,380	$2,981,100
Warm up channel	7,376	$405,680
Lake and land activities	2,540	$96,520
Swiftwater rescue operations		$104,400
Retail space rental		$180,000
Total	50,477	$ 4,116,560

Source: Whitewater Parks International

Note: Revenue for swiftwater rescue operations for QFES and retail space rental is not calculated based on per person usage, therefore only revenue is reflected in this table. The following section provides more detail on each activity type.

Paddle Sports

Paddle sports include activities such as:

- Canoe/Kayak programs: the number of canoeing association members that would use the facility and special canoe and kayaking whitewater coaching and education programs.
- Youth & Community Clubs: School sport and recreation programmes have the opportunity to assist with cementing the facility into the local community. This provides a social benefit and a marketing and exposure benefit.
- Canoe/kayak - slalom training: These are national team level paddlers. Penrith entices over 300 international paddlers in January and February with some bleed into the months either side. They charge $38 per day and paddlers usually train a minimum of 5 days on the whitewater per week. A significant proportion of these paddlers could be lured to Redland if appropriate and convenient accommodation is available. Penrith is an older style course which is still excellent to train on, but the development of a new style course would be difficult to resist for most teams.
- School vacation programs: School vacation programs are positive, promotional and financial programs that increase patronage in off-peak times and enhance community involvement and benefit.

Demand for paddle sports fluctuates according to the season. Canoe/kayak programs are estimated monthly based on the number of paddlers paying an annual, monthly or weekly fee. The usage model for paddle sports is based on seasonal usage and the type of pass sold (Table 4.11).

Table 4.11 Paddle sport usage model

	Annual Passes	Summer Monthly	Summer Weekend	Winter Monthly	Winter Weekend	Ave Number of Daily Passes sold per Month
November	12	10	8			130
December	12	25	12			260
January	10	40	12			260
February	6	35	12			160

	Annual Passes	Summer Monthly	Summer Weekend	Winter Monthly	Winter Weekend	Ave Number of Daily Passes sold per Month
March	3		8	10		130
April	2			6	6	65
May	1			4	6	65
June					6	20
July					6	20
August	1				6	20
September	1			3	6	65
October	3		8	7		65
Total passes sold	**51**	**110**	**60**	**30**	**36**	**1,260**

Source: Whitewater Parks International

The prices estimated for paddle sports also vary according to the season and the type of pass (Table 4.12).

Table 4.12 Paddle sport pricing rates

Passes	Rates ($)
Daily	38.00
Annual	1,500.00
Summer monthly	300.00
Winter monthly	200.00
Weekend Summer	75.00
Weekend Winter	55.00
Youth and Community Programs	20.00

Source: Whitewater Parks International

Youth and community club participation in paddle sports is estimated on an assumed number of 5,000 participations annually, at $15 per use. Slalom training is estimated based on the number of slalom paddlers, paying by the number of days per month. Revenue from summer vacation programs is estimated based on 200 children paying $100 per program, for 3 periods each year.

Rafting

Incorporated into the concept design of the whitewater facility is two channels: the Olympic channel (channel 1) and the warmup channel (channel 2).

To determine the volume of rafters using the facility on a monthly basis, WPI uses its proprietary 'Rafting User Model' (RUM) to calculate the volumes of rafters. The RUM is initially calibrated to reflect saturation levels for numbers of rafts capable of being able to be safely on the channel at once. When this has been done a maximum figure (depending on sensitivities of between 20 - 75% of the saturation number) is used for the highest demand day in the RUM, i.e., in most instances – the summer weekend. The RUM allows a number of discreet data fields to be used to create estimates of patronage over a 12-month period that can then be used to populate operating proformas that provide a financial snapshot and resultant revenue and expense profiles.

The RUM allows the pro forma to reflect expected participation rates due to local environmental and economic cycles. Each period is weighted to reflect assumed demand, and then each month is evaluated for the number of days that fall into each of the periods. This information is then fed into the model to estimate the revenues over the period required (Table 4.13).

Table 4.13 Monthly rafting usage

Months	Rafters per month Channel 1	Inflatables users per Month Channel 2	Channel 1 No. of operation days per month	Channel 2 No. of operation days per month
November	1,440	744	20	20
December	5,700	1,496	30	30
January	5,700	1,496	30	30
February	0	1,496	30	30
March	3,000	832	20	20
April	1,800	480	20	20
May	720	136	13	13
June	660	88	13	13
July	600	32	4	4
August	360	32	1	1
September	1,440	160	20	20
October	1,440	384	16	16
Total	**22,860**	**7,376**	**217**	**217**

Source: Whitewater Parks International

The price estimated for rafting varies according to the channel but remains consistent across all seasons (Table 4.14).

Table 4.14 Average rafting fee (per person)

Channel 1	$95.00
Channel 2	$55.00

Source: Whitewater Parks International

Lake and land activities

Lake and land activities include beach volleyball, kayaking, stand-up paddle boarding, inflatable activities and swimming. These activities are based at the beach and help create a fun outdoor family friendly recreation and relaxation activity zone and are estimated to cost $38 per person. The lake and land usage model estimated the monthly number of participants based on average hours per day, the number of days per month and the number of participants per hour (Table 4.15).

Table 4.15 Lake usage monthly model

Months	Ave hours per day	number of days per month	Number of pax per hour	Number of People
November	6	12	15	300
December	9	20	25	500
January	10	30	25	500
February	8	20	18	360
March	5	15	6	120
April	4	10	6	120
May	4	8	4	80
June	4	8	4	80
July	4	8	4	80
August	4	8	4	80
September	6	10	8	160
October	6	10	8	160
Total			127	2,540

Source: Whitewater Parks International

Retail Space Rental

There should be approximately 400m² of 'leasable' retail space. It is envisaged that there would be space available for:

- Function meeting spaces
- Café/restaurant and outdoor seating
- Pro-shop/gift shop.

Retail space income is estimated based on an assumed rental return from the retail space, at a monthly net lease amount of $15,000.

Queensland Fire and Emergency Services

This analysis assumes an operating model where QFES pays a leasing fee to RCC, estimated at $900 per half day on Channel 2, for swiftwater and floodwater rescue training. This assumption is based on the understanding that the operating model will involve a payment from QFES to RCC for use of the facility and this payment will cover the cost of additional electricity used during the training and simulations.

Based on consultation with QFES and WPI, it is estimated that usage of the channel will occur primarily in the off-peak seasons; March – May and September – November, accruing an estimated $104,000 per year in revenue for RCC.

Community Events

It is expected (based on previous experience) that the facility, when open, will attract a large amount of attention from the local and national media, enhancing the profile of the facility in both electronic and print medias. The resultant interest will position the facility to be used for television commercials, advertisements, product launches etc. It is also expected that the facility will host specialised sporting events including canoe/kayak racing, freestyle/rodeo competition, multisport/adventure races and other events.

There also exists an enormous opportunity to incorporate community events into the facility. An amphitheatre has been designed adjacent to the beach and passive recreation area. A large number of community events could make use of this facility including:

- Australia Day Festivals
- Food & wine festivals
- Movies, Opera & concerts etc.

On the community events side, an example can be seen with The Wero facility's *"The Great Auckland Duck Race"* which sees the community and businesses sponsor a duck. They get to paint the duck in their corporate colours or in any other whimsical manner they wish.

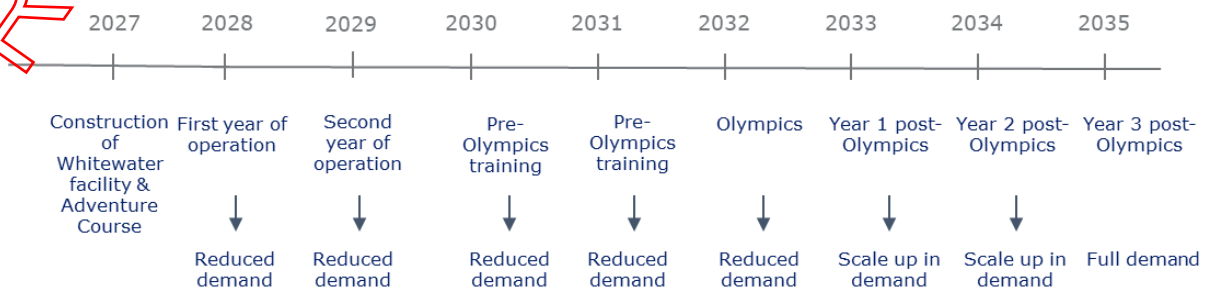
The ducks are then all started at the top of the course and the first to the finish line wins!

Source: Whitewater Parks International

Construction is assumed to occur in 2027, five years prior to the Olympics, with reduced demand (compared to full demand) from the catchment area occurring in the years between construction and the Olympics (Figure 4.1). Olympic revenue is impacted by several factors and is adjusted in response to the following:

- International athlete training is scheduled by the International Federation and usually is scheduled in four two-week blocks. This means that there is no other revenue producing activities scheduled during these times.
- The Olympic site is usually closed a minimum of one month prior to the official opening of the Olympic Village (which usually happens two weeks prior to the opening ceremony). Therefore, without understanding what the Olympic Games dates will be in 2032, we have arbitrarily selected the month of September as the time for this one-month Olympic window. The Olympic site is then closed for one month (minimum) after the Olympic Games to tear down the overlay and "make good" the Venue, which means the site will be closed until the beginning of November.
- Due to the very limited time that the venue can be operated, the activities and programs that are operated at the facility will be significantly reduced. We have taken an assumption that operation will be 50% of an operating year (at full demand) and then reduced again by 50% during the International Training Blocks (for each block of two weeks).

Figure 4.1 Demand timeline



Source: Deloitte Access Economics, Whitewater Parks International

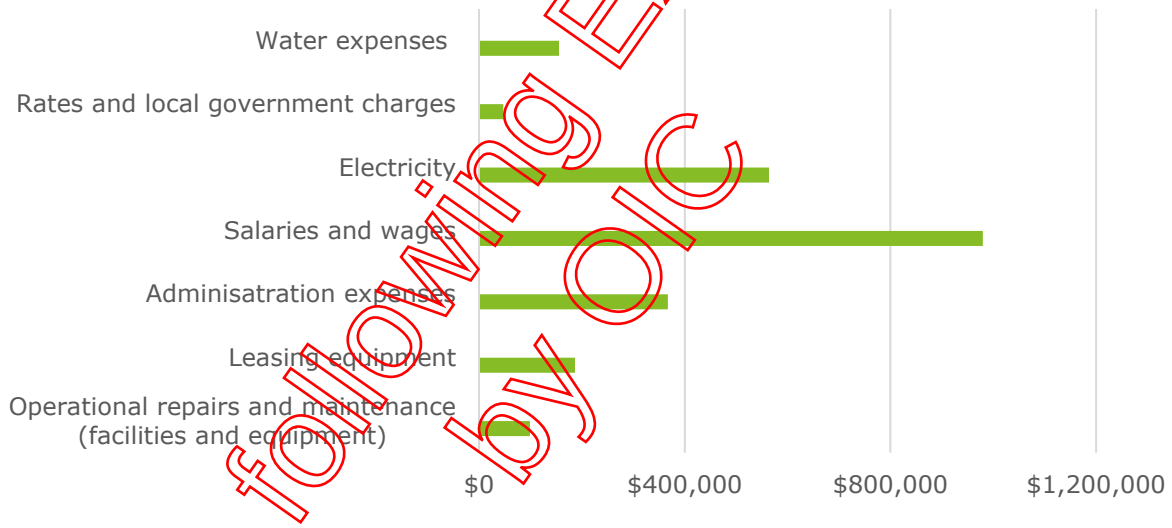
Based on these assumptions, at full capacity, the developed whitewater facility is expected to generate between $3.3 million to $4.9 million (in $2018-19) per annum on average out to 2050.

Based on consultation with WPI, they expect the facility to reach capacity quickly due to the Olympic legacy characteristics of the venue, which provides a boost in attracting attendance. The whitewater facility is assumed to reach full capacity for each demand scenario in 2035 with a three-year ramp up in visitation from 2032 assumed after the Olympics are completed. This three-year ramp up considers the fact that the whitewater facility will potentially need some time to build up its demand base and raise awareness in the community to develop the optimal mix of services that best meets future demand needs.

4.2.4 Forecast operating costs - Whitewater facility

Benchmarking and analysis of other whitewater facilities has informed the estimates of operating expenses.[42] Total expenses for an operating year (at full demand capacity) are estimated to be approximately $2.4 million (Chart 4.2).

Chart 4.2 Annual estimated operating expenses, full demand (2035-2050)



Source: Whitewater Parks International

Operational repairs and maintenance for equipment are estimated to be approximately 0.8% of total income per year, for short-term asset repairs and upkeep. Operational repairs and maintenance for facilities are estimated to be approximately 1.6% of total income per year, for short-term asset repairs and upkeep. WPI have formed the opinion that it is better to include an allowance for facility maintenance in the operating budget and have applied a percentage of revenue as a basis for providing contingency.

WPI have used their knowledge of other facilities to inform this view:

- Augsberg in Germany (1972 Olympic Facility) has not required a significant capital expenditure on its base facility over the period of its life to date, almost 50 years. Any capital expenditure has been in the addition of new buildings to the site adjacent to the channels.
- La Seu d Urgell (1992 Olympic Facility) has not required any significant capital expenditure on its base facility over the period of its life to date, almost 30 years. Again, any capital expenditure has been in the addition of new buildings to the site adjacent to the channels.

[42] Expenditure models have been informed by benchmarks provided by WPI.

- Penrith Whitewater Facility (2000 Olympic Facility) has not required any significant capital expenditure on its base facility over the period of its life of over 20 years (commenced operation September 1999.

In all cases the annual maintenance has been completed on each facility and where more major maintenance has been required it has been done to remedy or repair the existing facility and not to replace it with a new building or construction. Therefore, in light of the above, the opinion of WPI is that the effective life of these venues is in excess of 20 years.

The following assumptions have been made when estimating the cost for leasing equipment:

- Rafting equipment: estimated based on the amount of equipment required for the operation described in the above section.
- Canoeing equipment: estimated based on the amount of equipment required for the operation described in the above section.
- Motor vehicles: estimated have based on the total cost of one utility vehicle and one "mule/buggy".
- Facility equipment: furniture, fixtures and equipment have been estimated based on the total cost for the full facility.

Electricity costs have been estimated for building, lighting, conveyor and pumps (based on demand usage for both channels, incorporating estimates of QFES utilising channel 2). Electricity charges to operate the pumping system is calculated from the 'user model' duty cycle (operating days per annum) and local tariffs/maximum demand charge. More fully developed costs can be defined when pump type/manufacturer are defined, and actual tariffs negotiated with Energex. The total electricity estimate is 23% of overall operating expenses.

There would be an initial cost of water incurred to fill the lake before operation commences in 2028, estimated to be $51,700 approximately.[43] The forecasted operating costs include a cost estimate of $102,000 per year for water purification and also $54,000 for an annual top up of water within the lake, to account for water evaporation.[44] Refer to Table 4.16 for a detailed breakdown.

The project capital costs include a cost estimate for a system, developed by a company called Sigma, to recycle all backwash water, removing the requirement to discharge waste water.[45]

[43] This figure is based on the lake to be roughly sized at 12,000m^2, holding approximately 18,000m^3 of water. The cost of water per kilolitre, taken from data supplied on Urban Utilities, for the initial fill up is approximated at $2.87.
[44] Given the size of the lake, the rate of pan evaporation estimated in Redland would be approximately 1400mm per year, and assuming evaporation from a lake/pond is only 75% of the pan evaporation, the extrapolated evaporation for the lake would be approximately 18,750m^3 per year. The cost of water per kilolitre, taken from data supplied on Urban Utilities, for ongoing annual top ups is approximated at $2.87.
[45] This cost has been incorporated into the capital costs estimates but not separately identified at this early stage of pre-design.

Table 4.16 Water top up requirements and estimated costs

Estimated water requirements	Estimate
Lake size (m^2)	12,000
Water storage (m^3)	18,000
Estimated rate of pan evaporation (in Redland) (mm per year)	1,400
Extrapolated evaporation (m^3)	25,000
% of evaporation from lake/pond of pan evaporation	75%
Evaporation top up amount (m^3)	18,750
Cost of water ($/kilolitre)	$2.87
Cost of initial fill up	**$51,660**
Cost of annual top up	**$53,813**

Source: Calculations by Whitewater Parks International

The estimated costs of salaries and wages incorporate estimates for full-time permanent staff and seasonal part time staff (7 months high and shoulder seasons) and also casual staff (Table 4.17). The hourly casual staff wages have been developed to reflect the staffing requirements of achieving the revenue budgets with respect to water usage and projected whitewater instruction, raft trips, lessons and activities. The instructors and guides' wages have been calculated on a per trip basis. Employment costs and benefits are calculated at 25% of salary and wages cost for permanent staff and 20% for hourly rate staff. This provision includes but is not limited to: staff replacement, recruitment costs, workers compensation insurance, employer taxes, and staff orientation and training.

Table 4.17 Staff positions

Permanent full-time	Permanent (seasonal) part-time	Casual staff
General Manager	Groundsman	Lake Lifeguards and Supervisors
Operations Manager	Canoe/kayak Coordinator	Commercial Rafting 1 - Guides + Safety
Administration/Finance Manager	Raft Coordinator	Commercial Rafting 2 - Safety
Programs Coordinator	Sales Receptionist	Kayak/Canoe Instructors
Marketing Coordinator	Sales Receptionist	
Maintenance Coordinator	Telephone Bookings	
Admin Assistant		
Receptionist		
Groundsman/Handyman		

Source: Whitewater Parks International

Total salary and wages estimates are 41% of overall operating expenses.

Public and business insurance estimates have been incorporated into administration expenses, however insurance for whitewater programmes should be determined when the full suite of activities has been settled. We have not included this aspect as it is assumed that RCC is a self-insurer. While extrapolating costs for normal business insurance is not difficult, determining the costs for insurance for the whitewater programs is not as straight forward. Wero in New Zealand has full insurance for the programs it runs for a cost of $30,000.

A budgeted amount has been estimated for accountancy, bank charges, cleaning and waste, computer and communications, marketing and promotions, motor vehicle expenses, postage, security, stationary, sundry expenses (including unbudgeted asset purchases of less than $1,000), and telephone and fax estimates. Other operating expenses includes expenses, such as water purification cost requirements. Further, a budget amount has been estimated for water rates and local government charges. As advised by WPI, there are no allowances for annual depreciation or any loan repayments at this early stage of schematic design.

Olympic expenditure in 2032 is impacted by the same factors outlined in section 0 impacting revenue during the Olympic year, therefore the operational expenses require similar adjustments accordingly. There are other considerations, however, as there are fixed costs within the facility that are not able to be reduced but depending on agreements put in place between RCC and the Olympic Games operator (Organising Committee of the Olympic Games – OCOG) these fixed costs could be offset by an Olympic Games Operating Agreement. Due to the very limited time that the venue can be operated, the activities and programs that are operated at the facility will be significantly reduced. It is assumed that operation will be 50% of an operating year (at full demand) and then reduced again by 50% during the international training blocks (for each block of two weeks). Operating costs have been adjusted accordingly.

4.2.5 Indicative revenue and operating projections - Whitewater facility

In summary, the range of indicative operating costs and revenue projections for the three demand scenarios are shown below (Table 4.18). A higher cost scenario is also presented which examines operating costs across all three demand scenarios.

Table 4.18 Indicative annual average whitewater facility revenue projections (medium scenario), 2030 – 2050 ($2019-20)

Category	2030	2031	2032	2033	2034	2035-2050
Expenses						
A – Operating costs	1,675,758	1,675,758	1,591,199	2,399,542	2,399,542	2,399,542
B – 20% higher costs	2,010,910	2,010,910	1,909,439	2,879,450	2,879,450	2,879,450
Revenue						
Low demand scenario	1,000,763	1,046,252	1,455,682	2,963,923	3,128,586	3,293,248
Medium demand scenario	1,183,607	1,237,407	1,782,103	3,704,904	3,910,732	4,116,560
High demand scenario	1,366,450	1,428,561	2,108,523	4,445,885	4,692,878	4,939,872
Operating position						
Low demand A	-674,995	-629,506	-135,517	564,382	729,044	893,706
Low demand B	-1,010,147	-964,657	-453,757	84,473	249,136	413,798

Category	2030	2031	2032	2033	2034	2035-2050
Medium demand A	-492,152	-438,351	190,904	1,305,362	1,511,190	1,717,018
Medium demand B	-827,303	-773,503	-127,336	825,454	1,031,282	1,237,110
High demand A	-309,308	-247,197	517,324	2,046,343	2,293,337	2,540,330
High demand B	-644,460	-582,349	199,084	1,566,435	1,813,428	2,060,422

Source: Deloitte Access Economics based on data provided by Whitewater Parks International

Based on these indicative projections, this demonstrates a projected operating position ranging from $413,798 to $2,540,330 when full capacity is assumed to be reached in 2035 and maintained out to 2050.

4.2.6 NPV to RCC and sensitivity analysis - Whitewater facility

Specifically, in NPV terms (7% real discount rate), the financial benefit to RCC out to 2050 of implementing the whitewater facility is $5.9 million. The following table demonstrates that these results are sensitive to key assumptions around costs, funding and visitation.

Table 4.19 NPV ($) to RCC, at 7% real discount rate

Scenario	Low demand (-20%)	Medium demand (central)	High demand (+20%)
Project case (7% real discount rate)	$2,073,686	$5,949,807	$9,825,928
20% higher operating costs - project case	-$722,302	$3,153,820	$7,029,941
Project case (4% real discount rate)	$4,537,421	$11,395,431	$18,253,441
Project case (10% real discount rate)	$893,858	$3,175,559	$5,457,260
Project case (without funding)	-$15,840,176	-$11,964,055	-$8,087,934
Project case (funding gap – part capital funding - 50%)	-$6,883,245	-$3,007,124	$868,997

Source: Deloitte Access Economics based on data provided by Whitewater Parks International
Note: These figures are the financial net benefit (net present value) to RCC, not calculated incrementally to the base case. Given the whitewater facility is currently not site specific, the opportunity cost of the land the development will be located on cannot be taken into consideration.

A break-even analysis, assuming no capital grants from the State and Federal Governments, or any other private sources of funding, highlighted that keeping other variables the "same", demand had to increase by 74% (approximately 88,000 persons in total), or an increase in revenue of approximately $12 million (in PV terms). In summary, the project case provides scope for cost recovery and profitability for RCC. It is important to note that this result is contingent on the realisation of a medium to high level of demand and ensuring adequate funding arrangements are in place.

4.3 Project case – Redland Coast Adventure Sports Precinct

This project case is the development of the RCASP, incorporating the replacement of the Cleveland Aquatic Centre, the whitewater facility, an adventure activity course (high ropes), and QFES swiftwater training operations (an overview of the RCASP is outlined in section 2.1). The analysis in this section looks at the financial feasibility of the broader RCASP, from the perspective of RCC.

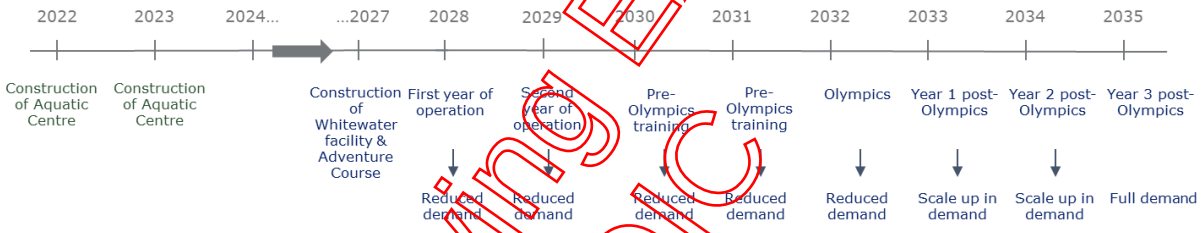
The operation and management arrangements for the RCASP, based on discussions with RCC, will be undertaken by a third party. It is most likely that this arrangement will see the third party operator receive a management fee and incur operational costs. It is therefore assumed, in the project case, that the operational costs net out with a management fee, and this analysis considers only the operational costs likely to be incurred.

This section discusses the key data and assumptions used to estimate the costs and benefits of the proposed development.

4.3.1 Development capital costs - Redland Coast Adventure Sports Precinct

The capital costs to develop the RCASP are approximately $68.7 million ($2018-19). This is comprised of $37 million for the redevelopment of the aquatic facilities, $0.9 million[46] for the development of the adventure course and $30.8 million for the development of the whitewater facility (including the swiftwater components for QFES). The development of the aquatic facilities will occur over 18 months in 2022 and 2023, followed by the development of the whitewater facility and Adventure Course in 2027 (Figure 4.2).

Figure 4.2 RCASP construction timeline



Source: Deloitte Access Economics, Whitewater Parks International

The capital costs estimated for the redevelopment of the aquatic facilities are informed by the 2018 Liquid Blu Master Planning Report (Model B), however Deloitte Access Economics has made some adjustments to account for the current projects' requirements. Based on advice from RCC, the development of the RCASP will result in the consolidation of some activities and construction elements with the development of the whitewater facility. These consolidations include external aquatic amenities (Building C in Liquid Blu's estimates), the water play splash pad, waterslide, and specific components of the administration building and retail facilities (Building A in Liquid Blu's estimates).[47] Cost savings in capital costs as a result of consolidation of capital totals approximately $7.6 million.[48]

Based on advice provided by RCC, this analysis has not considered the capital costs of the 6 lane 25m pool, as this was a requirement for SLSQ (this operating model is not relevant in this study), the costs associated with the decommissioning of the existing pool, or the capital costs associated with the existing site location of the Cleveland Aquatic Centre (i.e. access road from Wellington Street identified in the Liquid Blu estimates).

[46] These cost estimates do not take into account site preparation or the concrete footings necessary to support the core structures.
[47] The front of house (FOH), excluding the Creche and Creche amenities, and back of house (BOH) capital costs associated with Building A are assumed to be consolidated with the operational building estimates for the whitewater facility. The financial modelling has incorporated these cost savings into the operations building construction costs of the whitewater facility.
[48] The total capital costs estimate of 68.7 million incorporates these cost savings.

The capital costs within the project case for the RCASP are assumed to be fully funded for the whitewater facility.[49] The capital costs associated with the development of the aquatic facilities and adventure course are not assumed to be funded (therefore funded by RCC). Sensitivity analysis surrounding different funding scenarios is presented below (section 0).

4.3.2 Forecast revenue by area of activity - Redland Coast Adventure Sports Precinct

Total revenue of the RCASP is derived from operations of the redeveloped aquatic facilities, the whitewater facility and QFES swiftwater training operations, and the adventure activity course. The forecasted operating revenue of the whitewater facility and QFES operations are consistent as with the whitewater facility (section 0).

Aquatic facilities

Revenue forecasts for the redevelopment of the aquatic facilities have been informed by Liquid Blu's 2018 Master Planning Report. The revenue estimates are provided in the income areas of: aquatic area, gym, health & fitness programs, general memberships, café and merchandise and creche. The report highlighted that for modelling purposes, there is a lack of competitor aquatic facilities in the Council area and this has allowed for increased projected demand, especially within the Development Model B (used within this financial analysis).

Key assumptions within the revenue streams of the aquatic facilities include a four-year ramp-up in demand, with full demand being realised in 2026, and business growth slightly exceeding 100% until 2032 when annual revenue is held constant until 2050.[50] Aquatic, health and fitness and membership visits/program assumptions are based on similar facilities in similar population areas and benchmarked with CERM standards and case study reviews. Food, beverage and merchandising assumptions include a per visit spend for food and beverage and merchandising based on CERM averages for similar centres.

For food and beverage sales, the model assumes an average spend of $1.40 with a penetration of 70% of centre users. Merchandising sales penetration has been set at 60% of users with average spend of $1.20.

Adventure activity course (high ropes)

To estimate future demand for the adventure activity course (high ropes), this analysis developed a demand model using demographic data for the Greater Brisbane region coupled with ABS participation rates for rock climbing, abseiling and caving; and pricing estimates based on similar facilities within the region.

ABS highlights that the total number of Australians participating in rock climbing, abseiling and caving is 32,400 persons, and the participation rate is estimated to be 0.2% (Table 4.20Table 4.20).[51] It has been assumed the average frequency of participation per year is 10 times.[52]

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[49] It is assumed that the whitewater facility is 100% funded within the precinct from a combination of State and Federal Government grants, and any potential private sources of funding. All other activity components (including the aquatic facilities) are assumed to not receive any capital funding. Any funding gaps within the sensitivity analysis requiring capital injections from RCC is assumed to be debt free.

[50] Liquid Blu assumes year 4 is base year at 100% and year 3 is discounted by 3% to 97% of year 4 and year 2 is discounted by 7% to 93% of year 4 and year 1 is discounted by 10% to 90% of year 4 business growth, year 5 is set at 100% (same as year 4), year 5 100.5%, year 6 101%, year 7 101.5%, year 8 101.5%, year 9 102% and year 10 102.5%.

[51] ABS 4177 Participation in Sport and Physical Recreation, Australia, 2013-14

[52] The Australian Sports Commission 2011-12 Participation in Sport and Physical Recreation report has a mean times of participation per year (frequency) of 19.1 however, given the scope of the ABS category "Rock climbing/abseiling/caving", it has been assumed that the mean frequency for the context of a High Ropes Adventure Course would be approximately 50% of this category.

Table 4.20 Participation rates, Australia

Range estimates	Participation rate (% of working age population)
High	0.25%
Medium	0.20%
Low	0.16%

Source: ABS
Note: The range estimates are based on the relative standard error (RSE) of circa 23.4%.

Local demand is captured through defining the catchment area of the RCASP, that is assumed to be located within the Redland City/ Cleveland region. This study has defined the catchment area to be Greater Brisbane, using ABS Statistical area 4 (SA4) data (see section 4.2.2 for a more detailed breakdown of the catchment area).

In terms of age profile, the catchment area of Greater Brisbane has a working age population proportion of 66.4%, just below Australia's 65.8% in 2019. Applying these participation and frequency metrics to the working age population projections (2031) of the catchment area, yields an estimated average annual attendance of around 39,619 per annum (Table 4.21). The population projection for the year 2031 has been used, given the Olympics occurs in 2032 and it is assumed construction will occur in 2027.

A scale-up in demand has been assumed to occur over the 5 years leading up to the Olympic games, starting at around 50% of full demand (medium scenario in Table 4.21) in 2028 and scaling up to around 80% in 2031, before falling to approximately 50% during the Olympic games year (due to venue restrictions). Post-Olympics, there is assumed to be a fast scale-up over three years to full demand, due to the Olympics legacy venue effect.

Table 4.21 Demand scenarios Adventure Activities, Greater Brisbane

Range estimates	Participation rate (% of working age population)	Demand range estimates
High	0.25%	48,890
Medium	0.20%	39,619
Low	0.16%	32,107

Source: Australian Sports Commission, ABS, Queensland Government Population Projections (medium series)

Deloitte has estimated a cost of $34 per person for participation in the adventure activity, which incorporates the cost of participation, and the hiring of equipment such as shoes, harness and chalk bag.[53]

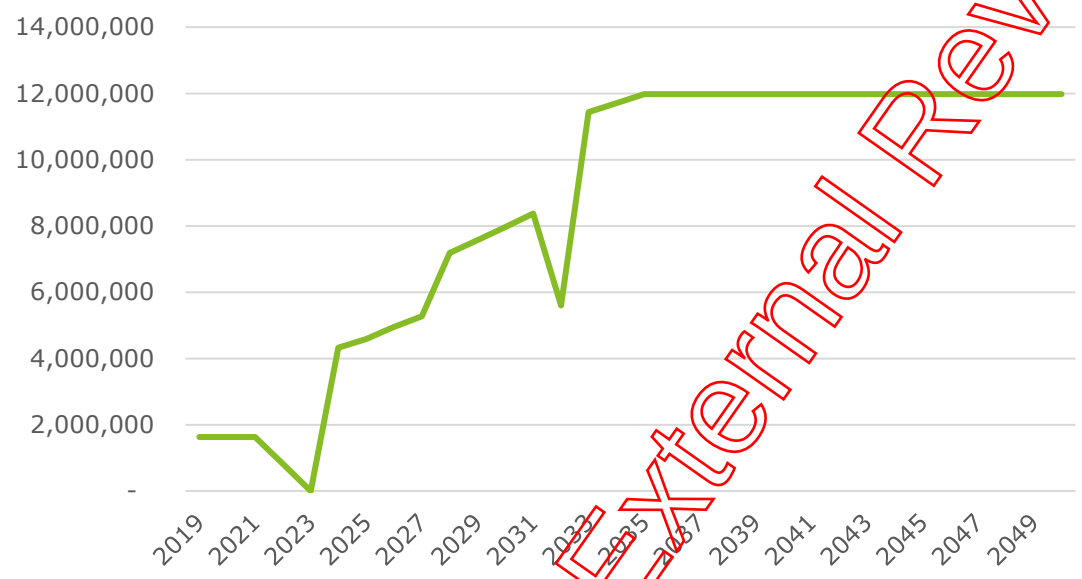
Redland Coast Adventure Sports Precinct

Under the project case, it is assumed that until redevelopment of the aquatic facilities occurs in 2022, revenue is consistent with the base case (current Cleveland Aquatic Centre). The RCASP is assumed to reach full demand for all components of activities in 2035 (Chart 4.3).

It has been assumed that in the year of the Olympics (2032), the retail, café and merchandise revenue generated spikes by 10% due to increased spectator patronage, dropping back to the underlying baseline in the year following. Revenue from participation in activities within the aquatic facility are also assumed to be reduced by 50% during the Olympic year.

[53] Urban Climb, 2019

Chart 4.3 Redland Coast Adventure Sports Precinct revenue, 2019-2050



Source: Deloitte Access Economics based on data provided by Whitewater Parks International and RCC

Rafting and the aquatic area are the key drivers of income for the RCASP, followed by the adventure activities, wellness centre and retail, café and merchandise (Chart 4.4).

Chart 4.4 Revenue by area of activity, a representative year at full demand (2035-2050)

Source: Deloitte Access Economics based on data provided by Whitewater Parks International and RCC

The retail, café and merchandise revenue stream contributed to approximately 9% of total revenue. The appeal of the RCASP drives this significant annual revenue (full demand) of approximately $12 million through not only increased attendance by aquatic and whitewater athletes and casual visitors, but also spectators who spend money within the RCASP.

The number of patrons attending the RCASP is also increased by incorporating multipurpose facilities, such as flexible rooms available for training and corporate functions etc. This is captured through the retail, café and merchandise stream of income.

4.3.3 Forecast operating expenses by area of activity - Redland Coast Adventure Sports Precinct

Total operational expenses of the RCASP are derived from operations of the redeveloped aquatic facilities, the whitewater facility (section 0), QFES swiftwater training operations and the adventure activity course. At this stage, a future management model has not been determined as such the model is set up so it could be operated in-house or through a third party.

It has been assumed that the operation of the adventure activity course will cost approximately $60,000 per year to cover costs of insurance, staffing and operational estimates.[54] This analysis also assumes an operating model where QFES pays a leasing fee to RCC, estimated at $900 per half day on Channel 2, for swiftwater and floodwater rescue training. This assumption is based on the understanding that the operating model will involve a payment from QFES to the RCC for use of the RCASP for training purposes and the payment will cover the cost of additional electricity used during the training and simulation operations.

Operating costs for the redevelopment of the aquatic facilities have been informed by Liquid Blu's 2018 Master Planning Report. The cost estimates are provided in the expenditure areas of: aquatic area, gym, health & fitness programs, general memberships, café and merchandise and creche, and undistributed operational costs. Consistent with the Liquid Blu report, there are no allowances for asset management and renewals in the operating budgets at this early stage of design as final design plant and equipment are not known. No allowances for annual depreciation or any loan repayments are made at this early stage of design.

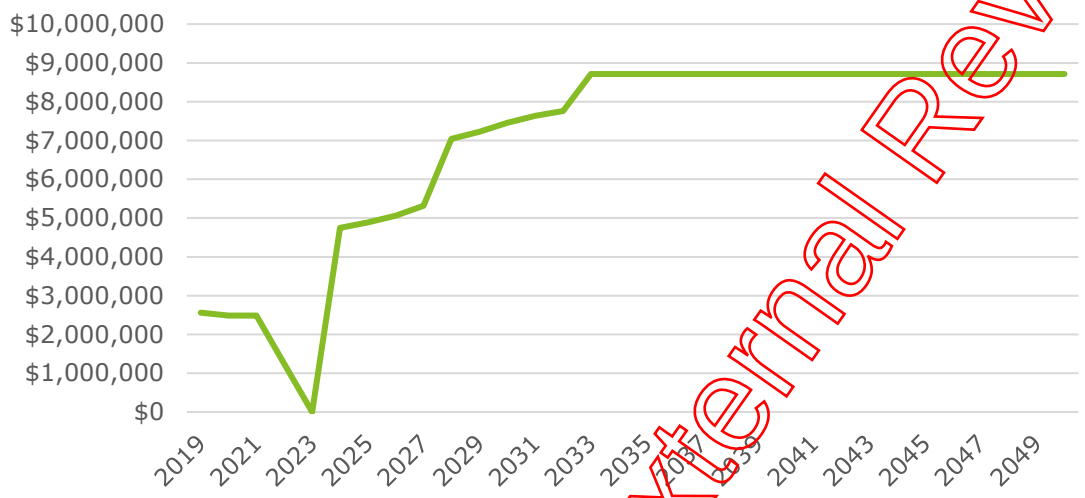
The forecasted operating costs of the whitewater facility within the RCASP are consistent as with the standalone whitewater facility (section 4.2.4), however the consolidation of the whitewater facility with the aquatic facilities, within the RCASP, allows for operating cost synergies.

Administration expenses estimated across both the aquatic facilities and the whitewater facility have been reduced by 5% to account for such consolidated cost savings.[55] Salaries and wages is another area where cost synergies have been accounted for in the consolidation of the RCASP. The standalone whitewater facility estimated yearly salary costs for a General Manager and Operations Manager position and the Aquatic Centre accounted for a Centre Manager and an Operations Coordinator; these positions and salary estimates have been consolidated into only two management positions for the RCASP. The saving is approximately $140,000 per year on salary costs than if the two venues were separate.

At full demand in 2035, operating expenses are forecasted to be approximately $8.7 million (Chart 4.5). Under the project scenario, it is assumed that until redevelopment of the aquatic facilities occurs in 2022, operating costs are consistent with the base case (continuing operations of the current Cleveland Aquatic Centre).

[54] Project Adventures, a company which has been building adventure programs on challenge courses since 1971, suggests that costs can range between $30,000 and $100,000 depending on the design of the course.
[55] A Deloitte (2017) report found that cost synergies associated with consolidations and mergers typically range between 1-5% of combined costs.

Chart 4.5 Redland Coast Adventure Sports Precinct operating costs, 2019-2050 ($2018-19)



Source: Deloitte Access Economics based on data provided by Whitewater Parks International and RCC

4.3.4 Indicative revenue and operating projections – The Redland Coast Adventure Sports Precinct

In summary, Table 4.22 shows the range of indicative operating costs and revenue projections for three demand scenarios. To help account for the uncertainty associated with future demand for the aquatic activities, three scenarios have been developed and applied to the Liquid Blu revenue estimates across aquatic areas; low (80%), medium (100%) and high (120%). The high scenario allows for the fact that some people may more willing to travelling to the RCASP for the aquatic activities given the attractiveness and draw the RCASP offers. A higher cost scenario is also presented which examines operating costs across all three demand scenarios.

Table 4.22 Indicative annual average RCASP projections (medium scenario), 2030 – 2050 ($2019-20)

Category	2030	2031	2032	2033	2034	2035-2050
Expenses						
A – Operating costs	7,450,520	7,633,116	7,759,884	8,713,375	8,713,375	8,713,375
B – 20% higher costs	8,940,624	9,159,739	9,311,861	10,456,049	10,456,049	10,456,049
Revenue						
Low demand scenario	6,602,125	6,932,326	4,598,160	9,331,110	9,549,655	9,768,200
Medium demand scenario	7,970,655	8,374,319	5,596,766	11,430,664	11,703,845	11,977,026
High demand scenario	9,339,185	9,816,313	6,595,373	13,530,217	13,858,034	14,185,852
Operating position						
Low demand A (-15%)	-848,395	-700,790	-3,161,724	617,736	836,280	1,054,825
Low demand B (-15%)	-2,338,499	-2,227,413	-4,713,701	-1,124,939	-906,394	-687,850

Category	2030	2031	2032	2033	2034	2035-2050
Medium demand A	520,135	741,204	-2,163,118	2,717,289	2,990,470	3,263,651
Medium demand B	-969,969	-785,419	-3,715,095	974,614	1,247,795	1,520,976
High demand A (15%)	1,888,664	2,183,197	-1,164,512	4,816,843	5,144,660	5,472,477
High demand B (15%)	398,560	656,574	-2,716,489	3,074,168	3,401,985	3,729,802

Source: Deloitte Access Economics based on data provided by Whitewater Parks International & RCC

Based on these indicative projections, this demonstrates a projected operating position ranging from -$687,850 to $5,472,477 when full capacity is assumed to be reached in 2035 and maintained out to 2050.

4.3.5 NPV to RCC and sensitivity analysis – Indicative revenue and operating projections – The Redland Coast Adventure Sports Precinct

In NPV terms (7% real discount rate), the financial cost to RCC out to 2050 of implementing the proposed RCASP is $9.4 million. However, when compared incrementally to the base case, this represents a cost saving compared to the base case of around $13.3 million in NPV terms (7% real discount rate) under the medium visitor scenario. The following table demonstrates that these results are sensitive to key assumptions around costs, funding and visitation. A break-even analysis, assuming no capital funding from the State and Federal Governments or private funding sources, highlighted that keeping other variables the "same", revenue would have to increase (from the medium scenario) by 54%, an increase in revenue of approximately $46.2 million (in NPV terms).

Table 4.23 Summary Results (incremental to base case), Redland Coast Adventure Sports Precinct (and sensitivities) – Financial NPV 2019 to 2050 (from RCC perspective)

Scenario	Low demand (-20%)	Medium demand (central)	High demand (+20%)
Project case*	-$922,279	$13,347,810	$27,617,898
Project case (with whitewater capital funding & partial aquatic facilities capital funding)**	$13,432,509	$27,702,598	$41,972,687
Project case (with 50% whitewater capital funding)***	-$9,879,210	$4,390,879	$18,660,968
Project case (fully funded)****	$28,311,106	$42,581,195	$56,851,284
Project case (no funding)	-$18,836,141	-$4,566,052	$9,704,037
20% higher operating costs – project case	-$13,916,740	$353,349	$14,623,438
Project case (4% discount rate)	$4,176,997	$27,509,001	$50,841,004
Project case (10% discount rate)	-$3,064,416	$6,129,184	$15,322,784

Source: Deloitte Access Economics based on data provided by Whitewater Parks International and RCC including updated financial analysis for the aquatic and related components provided developed by Liquid Blu Master Planning Report

Notes:

* This is the project case and assumes only investment costs of the standalone whitewater facility is 100% funded.

** This assumes the investment cost of the standalone whitewater facility is 100% funded, the investment cost of the aquatic facilities to be 50% funded and no capital funding for the adventure course.

*** This assumes only investment costs of the standalone whitewater facility is 50% funded.
**** As requested by RCC this scenario assumes that all capital investment costs of the RCASP (including whitewater, aquatic facilities and adventure course are funded)

In summary, the project case provides scope for cost savings to RCC. It also provides scope to deliver higher community services and attract people to the visit the Redland community from the Greater Brisbane region, and even regions further away, with newly developed aquatic facilities and adventure activities. It is important to note the result is reliant on the funding arrangements in place. As a result, solid funding arrangements are required, and this should be further investigated as their consideration of this project progresses.

5 Conclusions

In this study Deloitte Access Economics has undertaken financial analysis focussing on the proposed development of a Redland Coast Adventure Sports Precinct (RCASP) and a standalone Olympic standard whitewater facility. In addition, economic impact analysis was undertaken using the Deloitte Access Regional General Equilibrium Model (DAE-RGEM). This estimates the regional flow-on effects of the proposed development.

Overall, this report highlights a range of compelling reasons to support staging the Olympic Canoe/Kayak - Slalom event in Redland, including plans to integrate the whitewater facility within a new community precinct, the RCASP, which will provide enhanced economic value into the future "over and above" what a pure sporting facility on its own is likely to create.

The financial analysis found that on an incremental basis RCC stands to benefit from development of the RCASP. The financial cost to RCC (2019- 2050) of implementing the proposed RCASP is $9.4 million (in NPV terms at a 7% real discount rate), however, this represents a cost saving compared to the base case (the existing Cleveland Aquatic Centre) of around $13.3 million.

The development of the RCASP results in cost savings to RCC across both capital and operating maintenance costs that would be required in the base case due to ageing pool facilities within the Cleveland Aquatic Centre. In addition, the consolidation of a broad range of activities into one central precinct – co-locating a diverse range of whitewater, aquatic and adventure facilities and the delivery of some QFES flood and swiftwater training programs – allows for cost synergies within both capital costs and operating costs. Avoided capital costs are estimated to total $7.6 million. Administration costs are optimised by approximately 5% annually, and salary costs are estimated to be reduced by $140,000 per year.

When considering the standalone whitewater facility from the financial perspective of RCC, a positive return requires capital funding. However, the analysis shows that a better value proposition for the RCC is developing a facility that can offer a wider range of facilities/activities to attract a larger visitor base from the Greater Brisbane region, and other regions (intrastate, interstate and internationally).

It is important to note that this result is reliant on the funding arrangements in place and demand conditions. Without these funding arrangements in place, or with significantly lower levels of demand, the RCASP achieves a positive net operating cash flow once operational but the initial cost of capital is not fully recovered.

An economic impact assessment of the proposed development was conducted using the DAE-RGEM. The modelling considered a range of direct impacts of developing the entire RCASP including construction, operational revenues and additional tourism spending in the region associated with the operations of the precinct. The scale of the project and associated activity results in significant positive flow-on effects to the Redland economy and the Queensland economy. The increase in real Gross Regional Product (in Redland) is projected to be $52 million on average (in $2017-18) over the period 2019 to 2045.

Overall the analysis completed by Deloitte Access Economics presents a strong case for RCC to move forward, as part of a Queensland bid to host the Summer Olympics in 2032 and pursue funding applications to State and Federal governments or seek private funding opportunities and continue consultations with other stakeholders such as QFES to progress the project.

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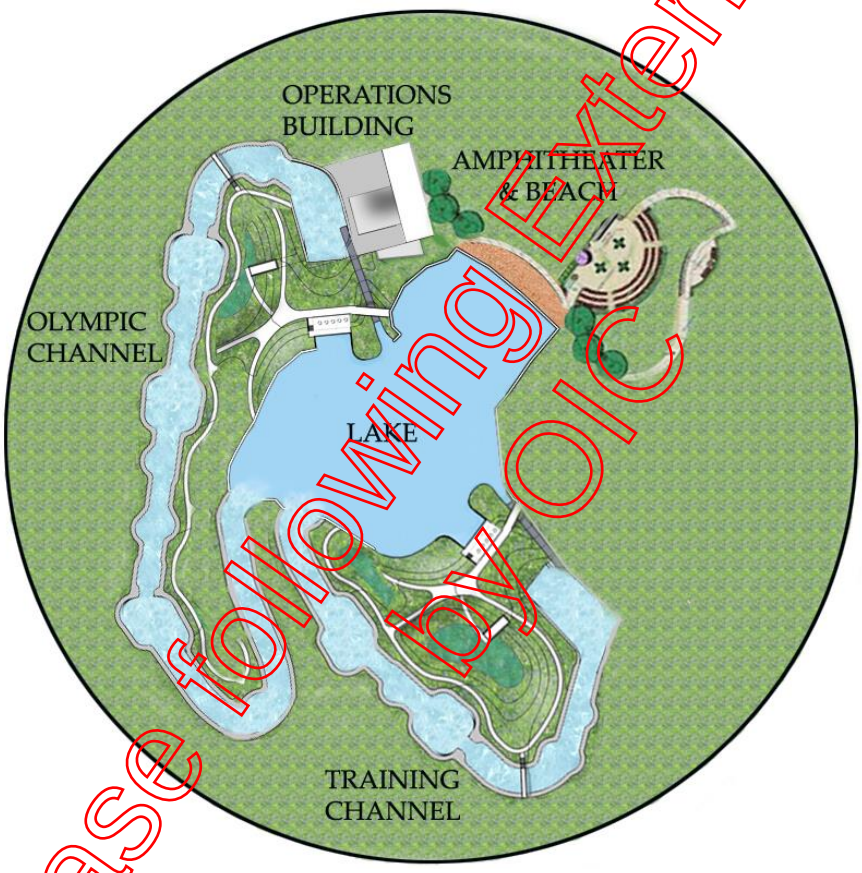
Appendix A Pre-design artist impressions

Figure A.1 Redland whitewater facility schematic



Source: Whitewater Parks International

Appendix B CGE Modelling Framework

Overview of DAE-RGEM

The Deloitte Access Economics – Regional General Equilibrium Model (DAE-RGEM) is a large scale, dynamic, multi-region, multi-commodity computable general equilibrium model of the world economy with bottom-up modelling of Australian regions. The model allows policy analysis in a single, robust, integrated economic framework. This model projects changes in macroeconomic aggregates such as GDP, employment, export volumes, investment and private consumption. At the sectoral level, detailed results such as output, exports, imports and employment are also produced.

Regional aggregation

The regional aggregation is specifically designed to capture the tourism aspects of development of the RCASP. The model is an integrated model between Australia's regions and the global economy.[56]

1. Redland Local Government Area
2. Rest of Queensland
3. Rest of Australia
4. Rest of the World.

Behavioural relationships

The model is based upon a set of key underlying relationships between the various components of the model, each which represent a different group of agents in the economy. These relationships are solved simultaneously, and so there is no logical start or end point for describing how the model actually works. However, they can be viewed as a system of interconnected markets with appropriate specifications of demand, supply and the market clearing conditions that determine the equilibrium prices and quantity produced, consumed and traded.

DAE-RGEM is based on a substantial body of accepted microeconomic theory. Key assumptions underpinning the model are:

- The model contains a 'regional consumer' that receives all income from factor payments (labour, capital, land and natural resources), taxes and net foreign income from borrowing (lending).
- Income is allocated across household consumption, government consumption and savings so as to maximise a Cobb-Douglas (C-D) utility function.
- Household consumption for composite goods is determined by minimising expenditure via a CDE (Constant Differences of Elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and imported sources. In the Australian regions, households can also source goods from interstate. In all cases, the choice of commodities by source is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption for composite goods, and goods from different sources (domestic, imported and interstate), is determined by maximising utility via a C-D utility function.
- All savings generated in each region are used to purchase bonds whose price movements reflect movements in the price of creating capital.

[56] This model builds on the computable general equilibrium model developed for the 2016 Study conducted for Redland City Council by Deloitte Access Economics

- Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Composite intermediate inputs are also combined in fixed proportions, whereas individual primary factors are combined using a CES production function.
- Producers are cost minimisers, and in doing so, choose between domestic, imported and interstate intermediate inputs via a CRESH production function.
- The supply of labour is positively influenced by movements in the real wage rate governed by an elasticity of supply.
- Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. A global investor ranks countries as investment destinations based on two factors: global investment and rates of return in a given region compared with global rates of return. Once the aggregate investment has been determined for Australia, aggregate investment in each Australian sub-region is determined by an Australian investor based on: Australian investment and rates of return in a given sub-region compared with the national rate of return.
- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.
- Prices are determined via market-clearing conditions that require sectoral output (supply) to equal the amount sold (demand) to final users (households and government), intermediate users (firms and investors), foreigners (international exports), and other Australian regions (interstate exports).
- For internationally-traded goods (imports and exports), the Armington assumption is applied whereby the same goods produced in different countries are treated as imperfect substitutes. But, in relative terms, imported goods from different regions are treated as closer substitutes than domestically-produced goods and imported composites. Goods traded interstate within the Australian regions are assumed to be closer substitutes again.
- The model accounts for greenhouse gas emissions from fossil fuel combustion. Taxes can be applied to emissions, which are converted to good-specific sales taxes that impact on demand. Emission quotas can be set by region and these can be traded, at a value equal to the carbon tax avoided, where a region's emissions fall below or exceed their quota.

Below is a description of each component of the model and key linkages between components.

Households

Each region in the model has a so-called representative household that receives and spends all income. The representative household allocates income across three different expenditure areas: private household consumption; government consumption; and savings.

The representative household interacts with producers in two ways. First, in allocating expenditure across household and government consumption, this sustains demand for production. Second, the representative household owns and receives all income from factor payments (labour, capital, land and natural resources) as well as net taxes. Factors of production are used by producers as inputs into production along with intermediate inputs. The level of production, as well as supply of factors, determines the amount of income generated in each region.

The representative household's relationship with investors is through the supply of investable funds – savings. The relationship between the representative household and the international sector is twofold. First, importers compete with domestic producers in consumption markets. Second, other regions in the model can lend (borrow) money from each other.

- The representative household allocates income across three different expenditure areas – private household consumption; government consumption; and savings – to maximise a Cobb-Douglas utility function.

- Private household consumption on composite goods is determined by minimising a CDE (Constant Differences of Elasticities) expenditure function. Private household consumption on composite goods from different sources is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption on composite goods, and composite goods from different sources, is determined by maximising a Cobb-Douglas utility function.
- All savings generated in each region is used to purchase bonds whose price movements reflect movements in the price of generating capital.

Producers

Apart from selling goods and services to households and government, producers sell products to each other (intermediate usage) and to investors. Intermediate usage is where one producer supplies inputs to another's production. For example, coal producers supply inputs to the electricity sector.

Capital is an input into production. Investors react to the conditions facing producers in a region to determine the amount of investment. Generally, increases in production are accompanied by increased investment. In addition, the production of machinery, construction of buildings and the like that forms the basis of a region's capital stock, is undertaken by producers. In other words, investment demand adds to household and government expenditure from the representative household, to determine the demand for goods and services in a region.

Producers interact with international markets in two main ways. First, they compete with producers in overseas regions for export markets, as well as in their own region. Second, they use inputs from overseas in their production.

- Sectoral output equals the amount demanded by consumers (households and government) and intermediate users (firms and investors) as well as exports.
- Intermediate inputs are assumed to be combined in fixed proportions at the composite level. As mentioned above, the exception to this is the electricity sector that is able to substitute different technologies (brown coal, black coal, oil, gas, hydropower and other renewables) using the 'technology bundle' approach developed by ABARE (1996).
- To minimise costs, producers substitute between domestic and imported intermediate inputs is governed by the Armington assumption as well as between primary factors of production (through a CES aggregator). Substitution between skilled and unskilled labour is also allowed (again via a CES function).
- The supply of labour is positively influenced by movements in the wage rate governed by an elasticity of supply is (assumed to be 0.2). This implies that changes influencing the demand for labour, positively or negatively, will impact both the level of employment and the wage rate. This is a typical labour market specification for a dynamic model such as DAE-RGEM. There is other labour market 'settings' that can be used. First, the labour market could take on long-run characteristics with aggregate employment being fixed and any changes to labour demand changes being absorbed through movements in the wage rate. Second, the labour market could take on short-run characteristics with fixed wages and flexible employment levels.

Investors

Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. The global investor ranks countries as investment destination based on two factors: current economic growth and rates of return in a given region compared with global rates of return.

- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises

costs by choosing between domestic, imported and interstate sources for these goods via a CRESH production function.

International

Each of the components outlined above operate, simultaneously, in each region of the model. That is, for any simulation the model forecasts changes to trade and investment flows within, and between, regions subject to optimising behaviour by producers, consumers and investors. Of course, this implies some global conditions that must be met, such as global exports and global imports, are the same and that global debt repayment equals global debt receipts each year.

Appendix C: Key financial analysis assumptions

Table C.1 Key financial analysis assumptions

Assumptions	Description
Period of analysis	2019 to 2050
Discount rate (%)	Real (4, 7, 10)
Real Analysis	$2018-19
Capital Expenditure data - undiscounted	
Pool estimated replacement cost - 'business as usual' ($2018-19)	$17,627,809
Standalone whitewater facility - 'project case' ($2018-19)	$30,779,350
Aquatic facilities (Liquid Blu estimates) - 'project case' ($2018-19)	$36,985,159
Adventure Activity Course	$900,000
Residual values – Project Case	
Aquatic facilities (assumed asset life of forty years). Based on Liquid Blu estimates, no allowances for annual depreciation or any loan repayments are made at this early stage of design.	
White water facilities: Operational repairs and maintenance for equipment are estimated to be approximately 0.8% of total income per year, for short-term asset repairs and upkeep. Operational repairs and maintenance for facilities are estimated to be approximately 1.6% of total income per year, for short-term asset repairs and upkeep. WPI have formed an opinion that it is better to include an allowance for facility maintenance in the operating budget and have applied a percentage of revenue as a basis for providing contingency.	
Cleveland Aquatic Centre - RCC Cost data 2019 – 'business as usual'	
Management fee payment	$262,216
Operating costs	$1,957,870
Capital and maintenance jobs	$337,616
Cleveland Aquatic Centre - pool user revenue 2019 - 2050 – 'business as usual'	
Casual attendances	$325,492
Learn to Swim	$835,356
All other wet programs	$271,344
Pool hire	$74,641
Gym	$85,977
Pool shop and Kiosk	$37,671
Standalone whitewater facility – costs and revenue streams 2035 - 2050	
Operating costs ($2018-19) (WPI estimates)	$2,152,356

Assumptions	Description
Operating revenues ($2018-19) (WPI estimates)	
Canoe / Kayak	$348,860
Rafting: Channel 1	$2,981,100
Rafting: Channel 2	$405,680
Land and Lake Activities	$96,520
Swiftwater Rescue Lease	$104,400
Retail space rental	$180,000
Redland Coast Adventure Sports Precinct – costs and revenue streams 2035 - 2050	
Operating costs ($2018-19)	
Aquatic facilities (Liquid Blu estimates)	$6,447,206
Adventure Activities	$60,000
Whitewater facilities (WPI estimates)	$2,152,356
Operating revenue ($2018-19)	
Aquatic facilities (Liquid Blu estimates)	$6,513,405
Adventure Activities	$1,347,061
Whitewater facilities (WPI estimates)	$4,116,560
Demand scenarios – visitors numbers linked to whitewater facility revenue (standalone & RCASP project case)	
Low demand	30,286
Medium demand	50,477
High demand	70,667
Redland Coast Adventure Sports Precinct – demand scenarios – visitors numbers linked to Adventure Activity revenue	
Low demand	48,890
Medium demand	39,619
High demand	32,107
Average cost (including equipment hire)	$34
Redland Coast Adventure Sports Precinct – key general assumptions	
Administrative cost synergies	5%
Salary and wages cost synergies	$140,000
Olympic year assumptions	
Due to the very limited time that the venue can be operated, the activities and programs that are operated at the facility will be significantly reduced. We have taken an assumption that operation will be 50% of an operating year (at full demand) and then reduced again by 50% during the International Training Blocks (for each block of two weeks).	

Limitation of our work

General use restriction

This Final Report is prepared solely for the internal use of Redland City Council. This Final Report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose of set out in our engagement letter dated 24 September 2019. Attention is also drawn to the Scope and Approach as per our proposal dated 6 September 2019, in which we refer to the scope of our work, sources of information and the limitations of the work undertaken.

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