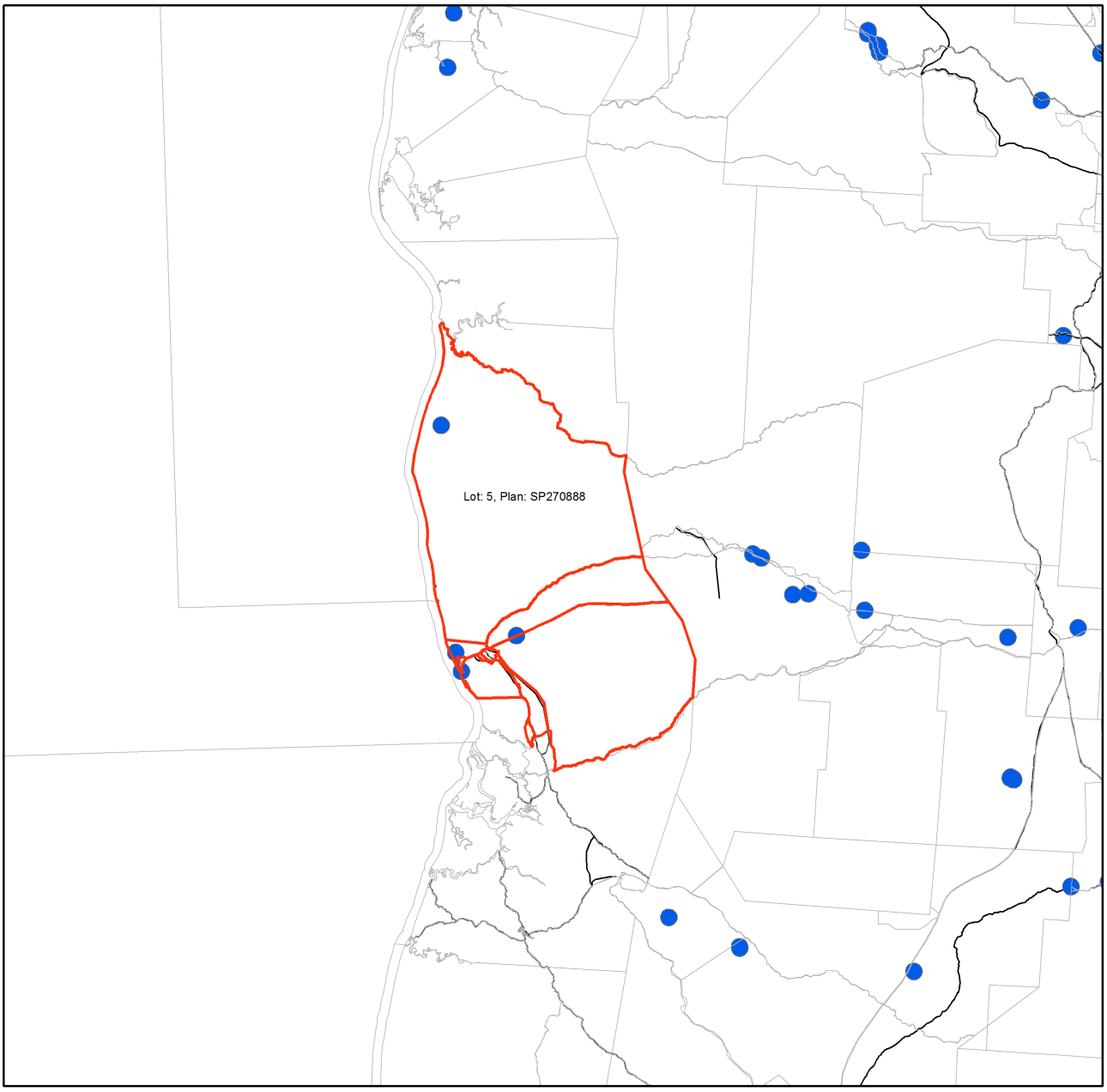
APPENDIX C

PROTECTED PLANTS FLORA SURVEY TRIGGER MAP

PREPARED BY THE DEPARTMENT OF ENVIRONMENT AND SCIENCE

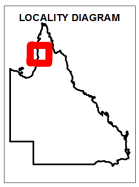
30/04/2019 08:16:13
Lot: 5 Plan: SP270888



Protected Plants Flora Survey Trigger Map

Legend

- Lot and Plan
- High risk area
- Cadastral line
  Property boundaries shown are provided as a locational aid only
- Freeways / motorways / highways
- Secondary roads / streets



N

0 9,600 19,200 28,800 38,400 48,000 m

This product is projected into:
GDA 1994 Queensland Albers

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

Protected plants flora survey trigger map

The protected plants flora survey trigger map identifies 'high risk areas' where endangered, vulnerable or near threatened plants are known to exist or are likely to exist. Under the *Nature Conservation Act 1992* (the Act) it is an offence to clear protected plants that are 'in the wild' unless you are authorised or the clearing is exempt, for more information see section 89 of the Act.

Please see the Department of Environment and Science webpage on the clearing of protected plants for information on what exemptions may apply in your circumstances, whether you may need to undertake a flora survey, and whether you may need a protected plants clearing permit.

Updates to the data informing the flora survey trigger map

The flora survey trigger map will be reviewed, and updated if necessary, at least every 12 months to ensure the map reflects the most up-to-date and accurate data available.

Species information

Please note that flora survey trigger maps do not identify species associated with 'high risk areas'. While some species information may be publicly available, for example via the Queensland Spatial Catalogue, the Department of Environment and Science does not provide species information on request. Regardless of whether species information is available for a particular high risk area, clearing plants in a high risk area may require a flora survey and/or clearing permit. Please see the Department of Environment and Science webpage on the clearing of protected plants for more information.

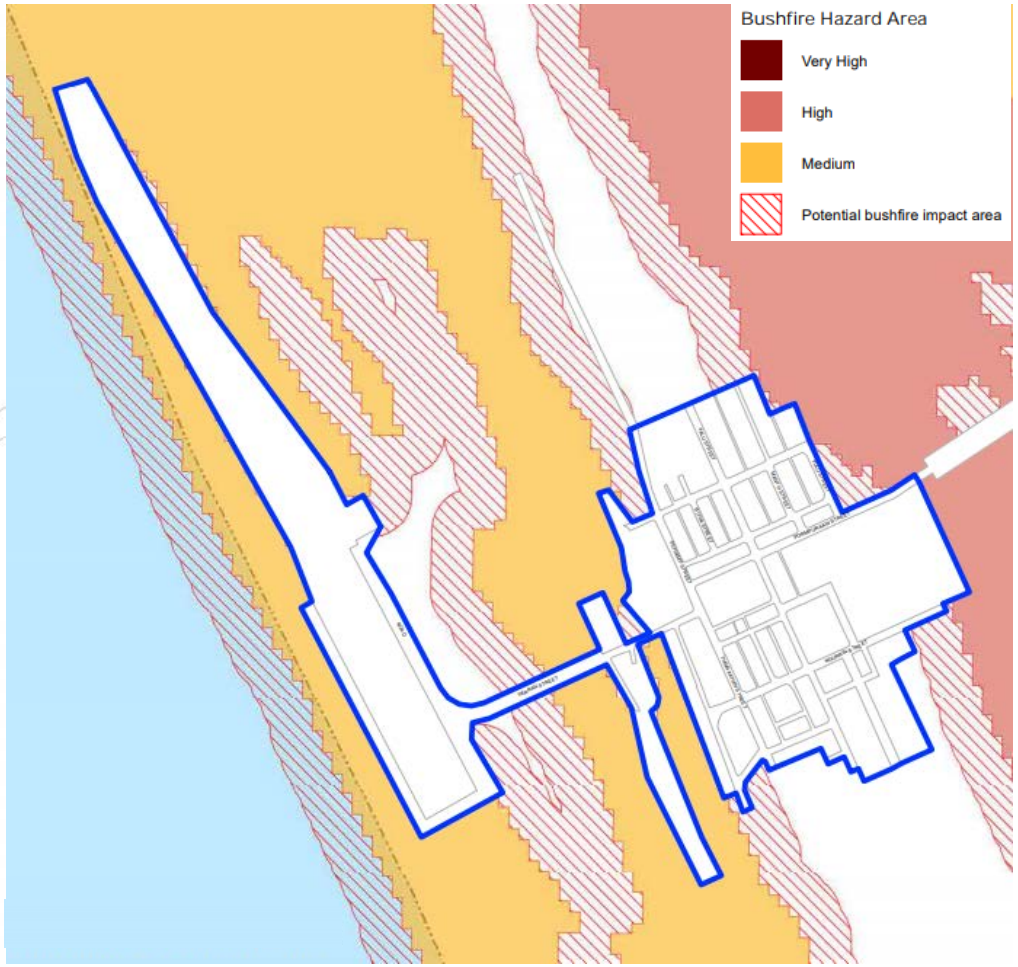
APPENDIX D

PLANNING SCHEME OVERLAYS

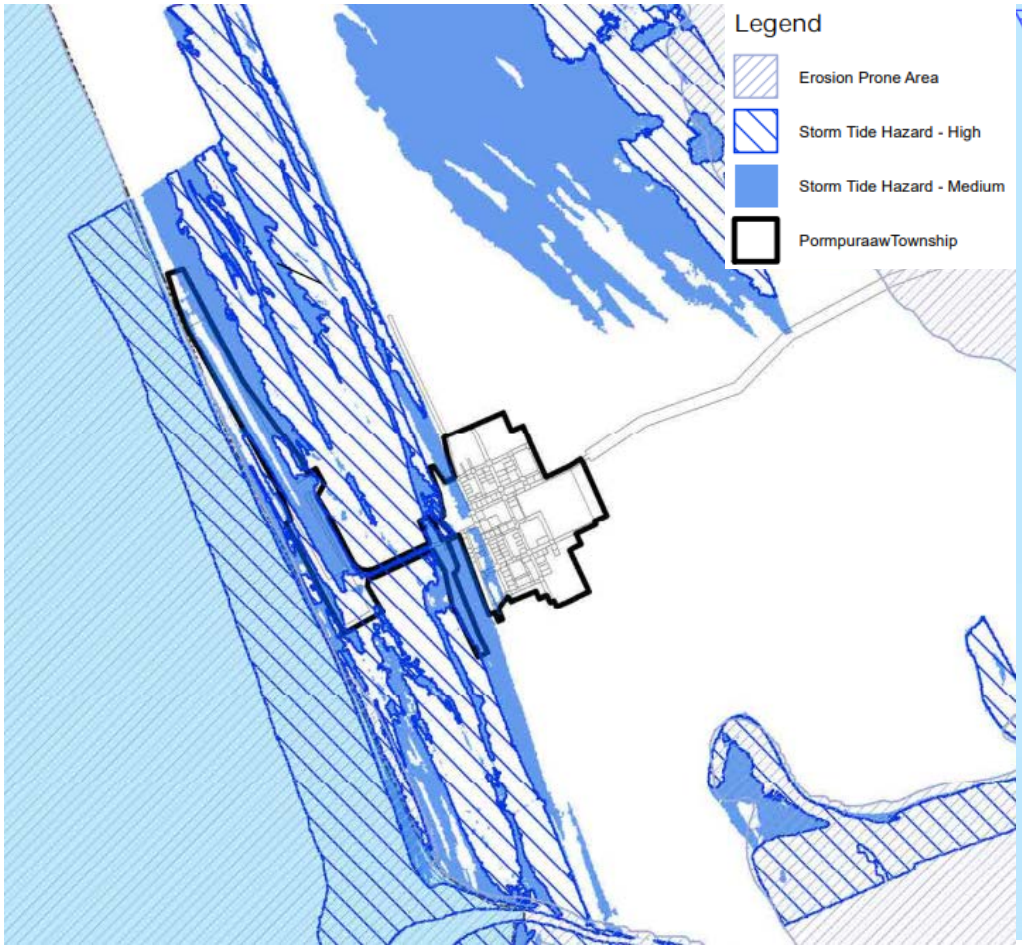
PREPARED BY PORMPURAAW ABORIGINAL SHIRE COUNCIL

PLANNING SCHEME OVERLAYS

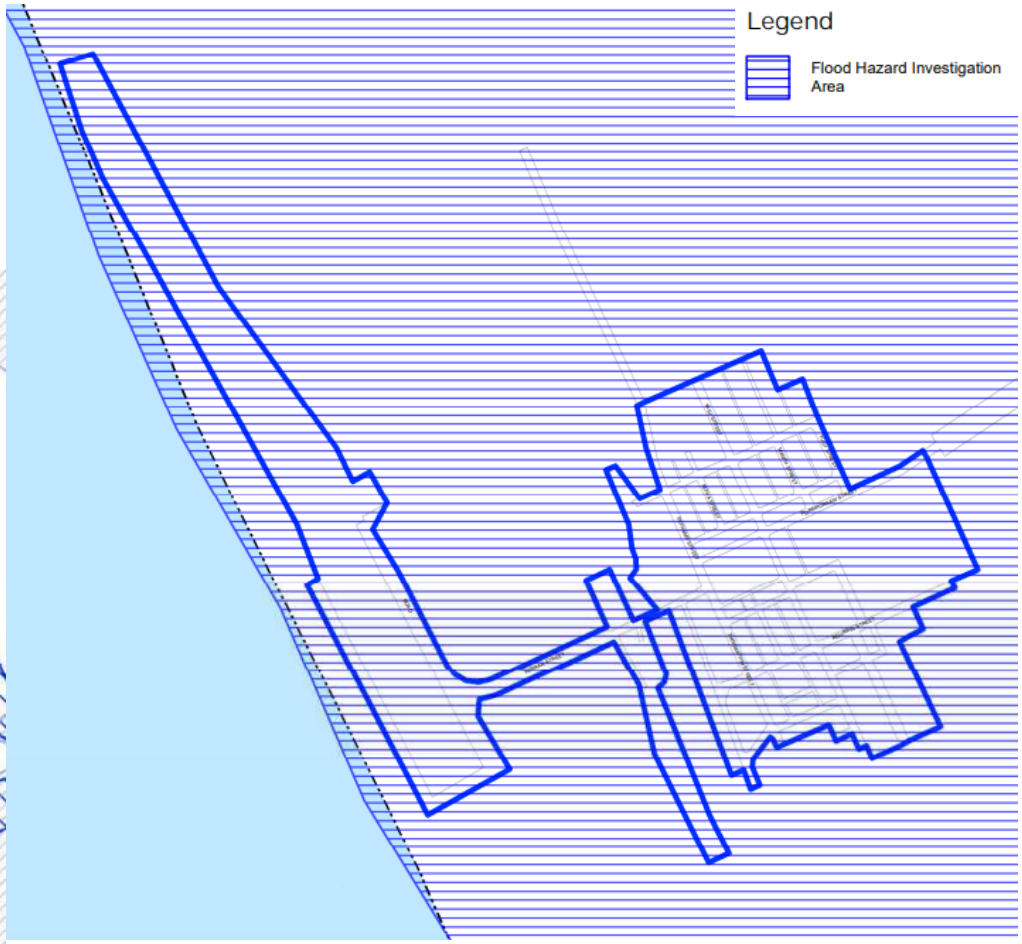
Airport Environs Overlay (Township)



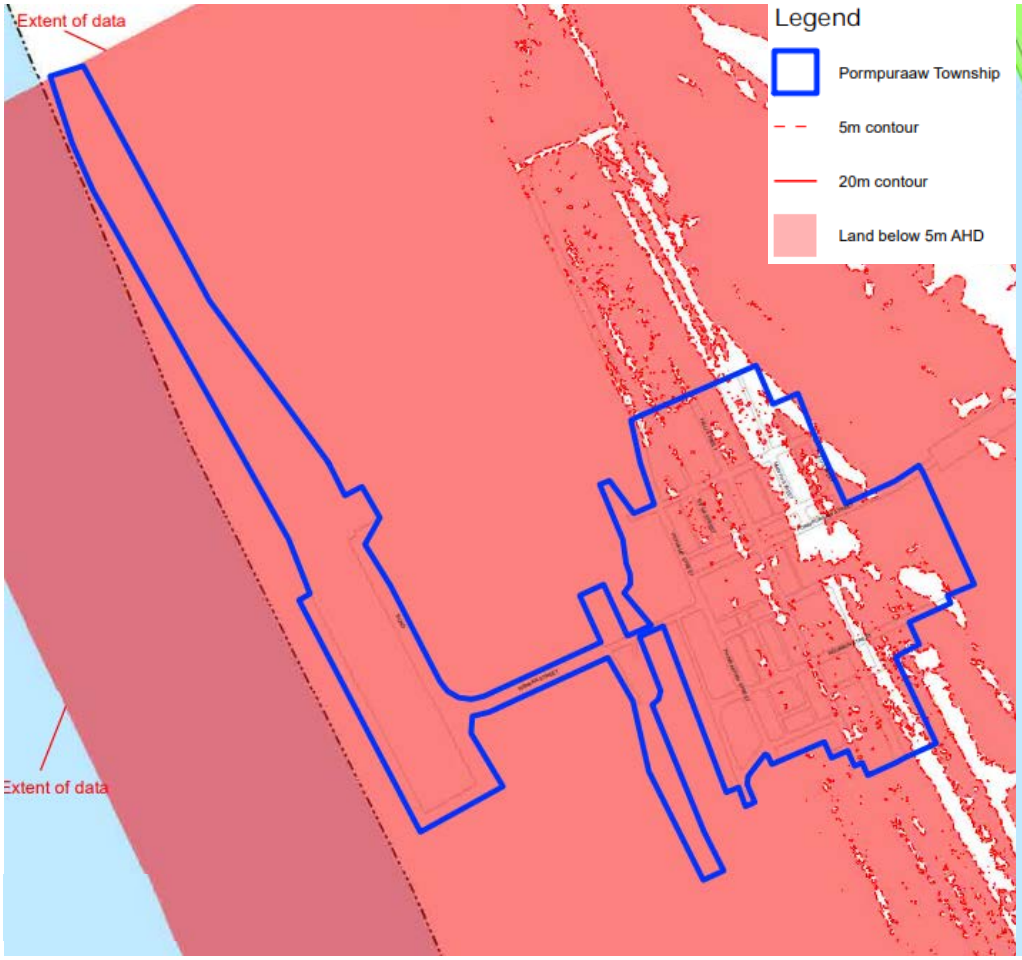
Bushfire Hazard Overlay (Township)



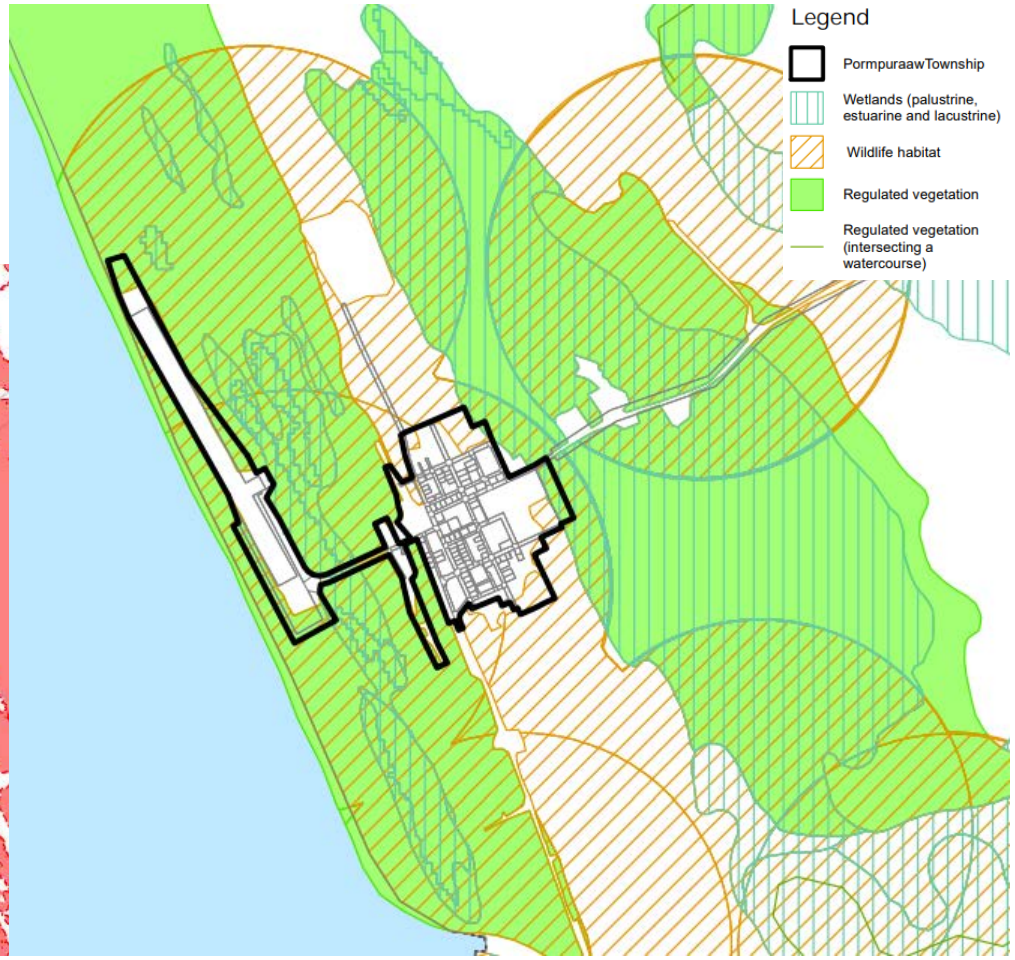
Coastal Hazards Overlay



Flood Hazard Investigation Area Overlay (Township)



Acid Sulfate Soils Overlay (Township)



Biodiversity Overlay

APPENDIX E

QUEENSLAND CLIMATE TRANSITION STRATEGY

PREPARED BY CARDNO

Department of Environment and Heritage Protection

UNDERSTAND | ADAPT | TRANSITION

Pathways to a clean growth economy

Queensland Climate Transition Strategy

Climate Change

Queensland Government

Minister's foreword

Queenslanders want action on climate change.

In an overwhelming response to our discussion paper Advancing Climate Action in Queensland: Making the transition to a low carbon future, Queenslanders told us that action on climate change is needed now to create new jobs and sustainable communities in Queensland. From tourism operators on the Great Barrier Reef, who witnessed the worst coral bleaching event ever seen, to resource communities keen to ensure the long term viability of jobs, to business looking for the markets of the future, to Indigenous communities who see the opportunity for home-grown, carbon-exporting industries: all want a strong economy and a healthy environment for our kids to enjoy.

Stronger national action remains the most effective and least-cost way to reduce Australia's—and Queensland's—carbon pollution. The Palaszczuk Government will continue to advocate for clear and credible national climate and energy policy settings that will cap and drive down carbon pollution, in accordance with our international obligations.

But we are also acting now to ensure our communities and workforce are ready to capitalise on the opportunities of the global transition, and that we are putting in place the right measures to attract the new investment and industries of the clean growth economy.

The International Renewable Energy Agency, along with International Energy Agency, estimate the global compact to keep global warming to well below 2 degrees Celsius will add $19 trillion to the world economy and create 6 million new jobs.

We will create our fair share of these jobs of the future here in Queensland.

In this Climate Transition Strategy we set out how we will set Queensland on the pathway to transition to a clean growth economy.

The first step is to set a goal, and that is for Queensland to achieve zero net emissions by 2050.

We will also:

- Generate 50% of Queensland's energy from renewable sources by 2030.
- Continue to advocate for national policies that will reduce carbon pollution.
- Lead by example by working to reduce the carbon pollution created by government operations and buildings.
- Take actions that will help create the jobs of the future in Queensland.
- Support businesses and households to increase their sustainability and decrease their expenses.

Queensland is already experiencing the impacts of a changing climate. Alongside this transition strategy is the Queensland Climate Adaptation Strategy 'Pathways to a climate resilient Queensland' which sets our our approach to protecting the people and places we love and Queensland's way of life.

Steven Miles MP
Minister for Environment and Heritage Protection and
Minister for National Parks and the Great Barrier Reef

Contents

Executive summary

The Queensland Government has set a state target to reach zero net emissions by 2050. Along with the interim target for at least a 30% reduction in emissions on 2005 levels by 2030, this target is a critical first step to drive the investment and action needed to transition Queensland's economy to a zero emissions future.

This Queensland Climate Transition Strategy outlines how Queensland proposes to prepare for this transition and set itself on the pathway to meet this target. The world is heading toward zero net emissions and the technologies enabling this transition are now competitive. Australia's ratification of the Paris Agreement means the nation will need to reach zero net emissions by 2050.

As Australia's highest emitting state, this will challenge Queensland. Yet Queensland is well positioned to capitalise on its strengths: its skilled workforce; its capacity to act as a major carbon sink; its strong innovation and research sector; and its strong communities. Many decarbonisation actions also produce co-benefits in areas such as health, amenity and the environment.

It is in Queensland's interests to position itself to respond to the economic transition taking place as a result of the world's need to address climate change. But that response must be at the right pace for Queensland, be supported by solid evidence, and be developed collaboratively with Queenslanders across the state. The transition is both technically and practically achievable and as Queensland will be particularly affected by the impacts of climate change, there is a lot to gain from undertaking actions to address it.

The Queensland Government is already using the state's competitive advantages to create the jobs of the new economy and build a solid platform for reaching the 2050 target. Early actions include the ground-breaking 50% renewable energy target by 2030, the Advance Queensland initiative—including the Biofutures 10-Year Roadmap—and a commitment to developing an Electric Vehicle Strategy to prepare Queensland for a transition to electric vehicles.

This Strategy proposes a two-stage approach to developing Queensland's long-term policy framework to reach the 2050 target. The first stage and associated policy approaches will be implemented over the next three years, noting that this period of time is likely to be characterised by policy uncertainty and instability at the national level.

Strong national action to cap and reduce carbon pollution will deliver the best outcomes for Queensland; however, there are many low risk 'no-regrets' actions that Queensland can take to position the state for a smoother transition as the global economy accelerates towards zero net emissions. These actions include de-carbonising our energy sector (and biggest emitting sector), developing our capacity as a carbon sink, developing our capacity to drive innovation at a community level through place-based initiatives, and for government to drive zero net emissions targets through its own activities.

This will position Queensland for the second stage, which is the deployment of a suite of substantive policy measures from 2020, representing the state's pathway to zero net emissions by 2050. These policy measures will be based on a significant body of work that will help Queensland to position itself against global trends.

Our commitment

Our vision is an innovative and resilient Queensland that addresses the risks and harnesses the opportunities of a changing climate.

We will make the transition to a low carbon, clean growth economy in a way that secures new jobs and opportunities for Queenslanders, supports and strengthens our communities and protects our precious natural environment.

Queensland Government's three key climate commitments

1. **POWERING QUEENSLAND WITH 50% RENEWABLE ENERGY BY 2030**
2. **DOING OUR FAIR SHARE IN THE GLOBAL EFFORT TO ARREST DAMAGING CLIMATE CHANGE BY ACHIEVING ZERO NET EMISSIONS BY 2050**
3. **DEMONSTRATING OUR COMMITMENT TO REDUCING CARBON POLLUTION BY SETTING AN INTERIM EMISSIONS REDUCTION TARGET OF AT LEAST 30% BELOW 2005 LEVELS BY 2030**

What do we mean by 'transition'?

The global economy is changing and Queensland is substantially influenced by these global trends. The jobs of today will not be the jobs of tomorrow.

'Transition' refers to shifts in the Queensland economy in response to the way the global economy is changing, and will continue to change, in response to an increasingly carbon constrained environment—from global trends such as automation, electrification, disruptive technologies, and information and communications technologies (ICT) innovation. These trends will be compounded by international and national measures to address climate change, as well as Queensland's commitment to action, which will drive structural economic change that will affect many of the state's industries.

A 2050 zero net emissions target for Queensland

Zero 'net' emissions means that carbon pollution may still be produced in one part of the economy (e.g. some industrial processes) and count towards our pollution profile. However, the Queensland Government will be looking to find ways to offset that pollution in another part of the economy, such as increasing carbon storage in the landscape.

Queensland joins Victoria, New South Wales, South Australia, Tasmania and the Australian Capital Territory in setting a **zero net emissions by 2050 target**.

A long-term, state-based target provides a strong signal for guiding policy and driving the investment needed to put Queensland on a pathway to a zero net emissions economy.

Queensland's 2050 zero net emissions target is a clear long-term goal which will:

- Protect the state's long-term interests by positioning the economy to be competitive in a world where carbon pollution is constrained
- Provide the Government with the policy direction to manage uncertainty by equitably allocating costs of transition and reducing the risk of stranded assets and economic shock in later years
- Provide a signal to industry and the community that can unlock opportunities for investment and innovation in the state
- Demonstrate that Queensland is doing its fair share in the global effort for a zero emissions world.

Queensland's target will guide the Government's pollution reduction policies, inform business expectations about the future, and provide context for community action. In doing so, Queensland's target will play an important role in linking decisions with longer-term timeframes that need to be made now and, ultimately, national and global climate objectives. The target will also help maintain Queensland's commitment and allow our progress to be monitored and evaluated.

Queensland has also set an **interim target of at least a 30% reduction in greenhouse gas emissions by 2030, contingent on continued national and global action to meet the goals of the Paris Agreement**. The purpose of this target is to guide Queensland policy makers and industry in their medium-term planning and investment, while providing a clear signpost for monitoring progress towards the 2050 target.

The journey so far

May 2016

- Released the *Advancing Climate Action in Queensland: Making the transition to a low carbon future* discussion paper, inviting Queenslanders to have a say on the directions and opportunities that should be pursued to build a cleaner, more sustainable and prosperous Queensland. The discussion paper received nearly 6000 responses from Queenslanders across the state.
- Released the *Carbon Pollution Projections: Queensland's Baseline Greenhouse Gas Emissions to 2030*. The case for action on climate change was set out in these documents.

October 2016

- Released the *Queensland Climate Adaptation Directions Statement* and *Regional Climate Change Projections*. Consultation was held across the state on these documents and almost 300 submissions were received.
- Held the *Advancing Queensland: Building the new low carbon economy* industry summit where leading business representatives from across Australia gave their views on the opportunities for Queensland in a zero net emissions world.

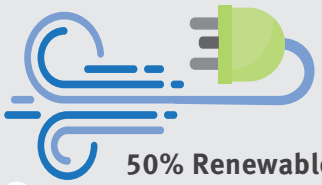
2017

- Release of *Queensland Climate Transition Strategy* and the *Queensland Climate Adaptation Strategy*—together they will form the Queensland Government's response to climate change.

EARLY MEASURES TO REVITALISE CLIMATE CHANGE ACTION IN QUEENSLAND

Queensland Carbon Plus Fund

$8.4 million will support the carbon farming industry and create jobs for Traditional Owners to deliver environmental, social and cultural benefits in Indigenous communities.



50% Renewable energy target by 2030

1 million or 3000MW solar rooftops

Green Bonds

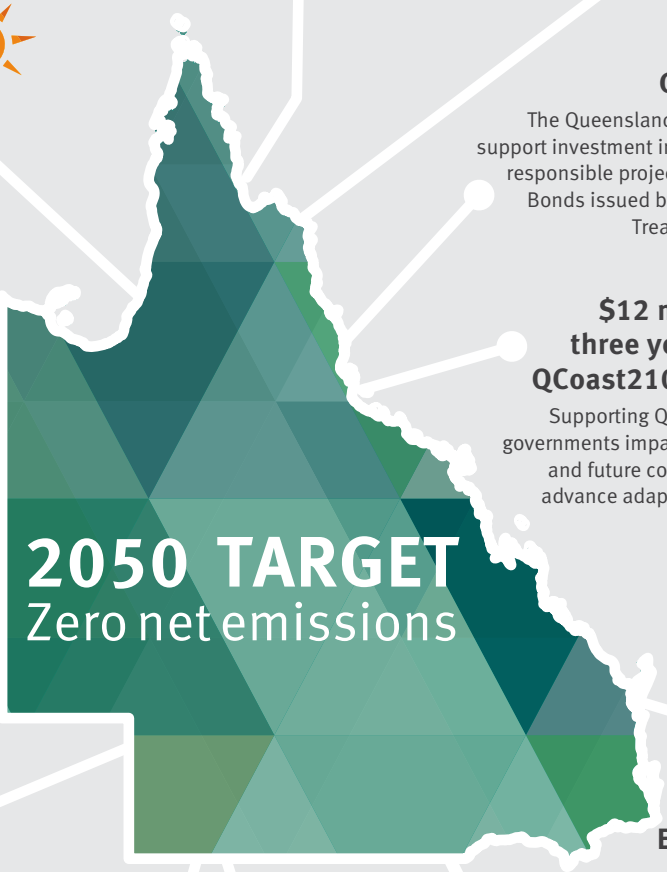
The Queensland Government will support investment in environmentally responsible projects through Green Bonds issued by the Queensland Treasury Corporation.

$12 million over three years for the QCoast2100 program

Supporting Queensland local governments impacted by existing and future coastal hazards to advance adaptation planning.

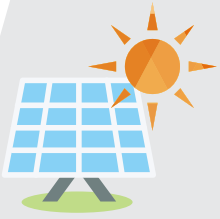
Advance Queensland Biofutures 10-Year Roadmap and Action Plan

The Government has set a vision for a **$1 billion** sustainable and export-oriented industrial biotechnology and bioproducts sector.



Electric Vehicle Strategy

The **Queensland Government's Electric Vehicle Strategy** will prepare Queensland for a transition to EVs.



Solar150

Providing long-term income certainty to support the development of up to **150 megawatts** of large-scale solar power generation in Queensland.

$3 million Climate Adaptation Strategy

The Government has developed a **Queensland Climate Adaptation Strategy** to improve opportunities and reduce risks to our communities, economy, infrastructure and environment from current and future climate impacts.

Queensland Building Plan Discussion Paper

Building on early commitments to **improve the sustainability of privately owned buildings and homes** and work towards achieving **Green Star ratings for government buildings**.

Sustainability assessments for all government capital projects over $100M

As part of the **State Infrastructure Plan**, all state government projects of **greater than $100 million** in value will undertake a sustainability assessment, including climate change considerations.

Global drivers

The 2015 United Nations Paris Agreement was a landmark commitment by more than 190 nations, including Australia, to limit global warming to "well below" 2 degrees Celsius, above pre-industrial levels and as close to 1.5 degrees as possible. It committed the world's governments, including Australia's key trading partners, to zero net emissions by the second half of this century.

Since Paris, a major shift in global investment towards zero emissions sources of energy has accelerated with the International Energy Agency highlighting that global investment in renewable energy and energy efficiency now tops $US0.5 trillion.

The groundswell of climate action from sub-national governments, cities and businesses has also increased after Paris. More than 170 states and regions in 33 countries representing over 1 billion people support the goal of zero net emissions by 2050 as part of the Under2 Coalition.

KEY POINTS

- The world is committed to the Paris Agreement.
- Zero emissions technology is now cost-competitive.
- The global economy is already transforming.

National drivers

Australia needs to do its part as a nation to meet the commitments made in the Paris Agreement.

Strong, coherent and consistent policy drivers in response to climate change are needed at a national level to reduce emissions at the lowest cost across the Australian economy and to support Queensland's—and all state and territories'—efforts to transition to a zero net emissions economy.

Queensland will continue to advocate for effective and responsible national policy settings through the Australian Government's National Climate Change Policy Review in 2017 in collaboration with other states and territories.

Other states and territories are active in developing assertive climate change policies and actions with a number adopting zero net emissions targets.

Industry continues to advocate for stronger policy measures and, in many cases, is ahead of government in the action they are taking in response to the global transition. Industry has been clear in their conversations with the Queensland Government that certainty in climate change policy is critical to their ongoing success.

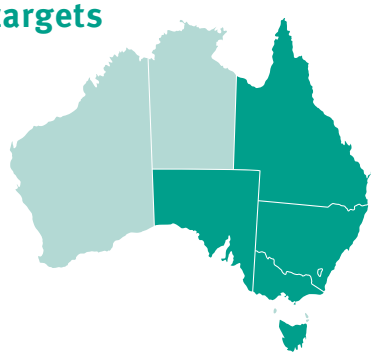
But Queensland can't wait for the national policy position to become clear and do nothing in the meantime. There are actions that the Queensland Government must take to prepare the state for the inevitable transition that it will have to make. By getting on the right path now, Queensland can get ahead to ensure the state is not disadvantaged in the long run and that the pathway to a zero net emissions future plays to its strengths.

Queensland will continue work on climate change action within its own borders and will seek opportunities to collaborate across state boundaries. Queensland joins Victoria, New South Wales, South Australia, Tasmania and the Australian Capital Territory in having set a zero net emissions by 2050 target. In the absence of policy leadership at the national level, the states will continue to work together through the Climate Action Roundtable to find ways to collaborate to achieve the 2050 target.

KEY POINTS

- Strong, effective climate change action at a national level is needed.
- Business, industry and the community are already working to manage their transition.
- States and territories will continue to work together on climate change.

States and territories with zero net targets

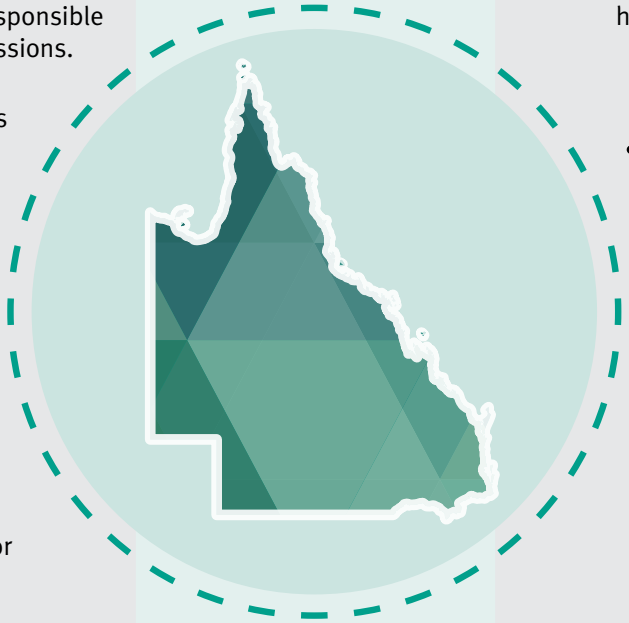


Make climate change policy a prominent agenda item at COAG meetings so that the information regarding each State's carbon reduction contribution is reported and evaluated.

QUEENSLAND DRIVERS

RISKS

- Queensland is Australia's highest emitting jurisdiction–responsible for 28% of national emissions.
- Queensland contributes around 0.3% of global emissions.
- ClimateWorks Australia modelling indicates a 31% increase in emissions to 2050 under business-as-usual.
- Emissions from land clearing continue to be a significant issue for Queensland.
- Queensland's high coastal population increases our vulnerability to sea level rise.
- Communities are vulnerable to more heatwaves and more intense rainfall events in some regions and droughts in others.
- The Great Barrier Reef is already being impacted by climate change, placing at risk the $6 billion and 69,000 jobs it contributes to our economy.



ADVANTAGES

- Queensland's large land mass has the potential to produce biofuels and develop a carbon farming industry.
- The agricultural sector is adaptive and responsive to climate change, ensuring its future competitiveness.
- The strong industrial sector produces many products that will be needed in the future economy and we have many mineral resources that will also be required.
- The long coastline and pristine environments provide opportunities in low carbon tourism.
- Research institutions across the state are already collaborating with industry on low emissions solutions.
- Many communities across Queensland are already responding to climate change.

Getting it right for Queensland

Setting a 2050 zero net emissions target and an interim 2030 target is ambitious, but it is an important first step in responding to global market and climate drivers. It signals to global and domestic business and industry where Queensland needs to be, and it will guide the Government's role in facilitating and enabling industries and communities to transition. Without this, Queensland risks being left behind in the national and global economy.

The Queensland Climate Transition Strategy builds on early action to establish a two-stage process for Queensland to achieve the 2050 target. The Strategy recognises the transition to a zero net emissions economy is both technically possible and economically responsible.

The Strategy recognises Queensland's strengths and natural competitive advantages: a skilled workforce; solar, wind and natural resources; capacity to be a carbon sink; strong innovation and research sector; and strong communities.

Importantly, it sets out the first stage to move the Queensland economy towards the 2050 target.

This first stage, over the next three years, is characterised by the need to keep pace against national uncertainty, and the need to continue to advocate for strong national action which will deliver the best outcomes for Queensland and Australia as a whole.

During this period there are many low risk 'no regrets' actions that Queensland can take to position itself for a smoother transition as the global economy accelerates towards zero net emissions.

These actions include de-carbonising our energy sector (the biggest emitter), and for government to drive zero net emissions targets through its decision making.

Further analysis of economic and international trends—underpinned by ongoing engagement with communities, industry and business—will guide the second stage of pursuing the most appropriate post-2020 pathway for Queensland in the context of national policy settings in place at that time. Progress will be reviewed in 2019 to identify a broader policy framework for Queensland's post-2020 action.

KEY POINTS

- It is in Queensland's interests to transition—and it is both technically possible and economically responsible.
- Queensland needs to keep pace with the transition in the global economy to take advantage of the opportunities and minimise the risks.
- Queensland has a good competitive advantage and a past history of making strong economic transitions.
- A two-stage approach to transition is sensible and will get Queensland on the most cost-effective pathway, but this is not a formula for inaction in the short term.

What Queenslanders said...

In response to *Advancing Climate Action in Queensland: Making the transition to a low carbon future* discussion paper:

- Commit to a target of zero net emissions by 2050.
- Integrate emissions targets across government and in key policy areas including mining, transport, vegetation management, housing, infrastructure, energy and waste.

"Set a clear framework, with binding emissions targets and monitoring based on credible scientific analysis (e.g. The Climate Authority) and Queensland's 'fair share' of emissions reductions."

"The problem we face is bigger than right here and now, and more important than the electoral cycle. There will always be jobs in new and non-polluting industries."

"The State Government's goal of 50% of electricity generation from renewable energy by 2030 is to be applauded."

"Queensland has a great opportunity to reduce our greenhouse pollution. What is needed is for all sectors of the economy to take part. Furthermore, the economic benefits of reducing pollution now will make it easier than delaying action into the future."

Climate change is the critical issue of our time and all levels of Government have a responsibility to act decisively. A failure to restrict average global temperature increases to "well below" the 2 degrees range, as outlined in the 2015 Conferences of Parties (COP21) Paris climate agreement, will result in catastrophic environmental, social and economic impacts.

...commit to targets that ensure less than 1.5 degree rise in temperature.

...emissions are currently an external cost in our economic system and this has got to change.

I would like to see the aim clearly stated as not reaching 1.5 degree according to the Paris Agreement rather than not reaching 2 degrees. Even 1.5 is too high for many ecosystems such as coral reefs.

Setting Queensland on the transition path

The transition to a clean growth economy is a process that has already begun.

A suite of actions has been developed that advance this transition in a way that secures new jobs and opportunities for Queenslanders, supports and strengthens our communities and protects our precious natural environment. These actions are based on extensive feedback received from both industry and the community over the past 12 months.

Our pathways

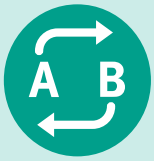
PATHWAY 1

Create an environment for investment shift and innovation

Response 1—Facilitate the zero net emissions industries of the future

Response 2—Lead by example

PATHWAY 2



Facilitate existing Queensland industries to transition

Response 3—Understand the risks and opportunities that a zero net emissions future presents for Queensland

Response 4— Encourage innovation and transition to low and zero carbon technologies

PATHWAY 3

Work with Queensland's regional communities to transition

Response 5—Work with Queensland's regional communities to transition

Response 6—Skill Queenslanders for new economy jobs

Our principles

Focused on opportunity	Flexible	Effective abatement	Cost effective	Maximise co-benefits and manage risks
We will identify and take up the opportunities that a zero net emissions transition provides	We will deliver early action to put Queensland on the path to zero net emissions that will remain complementary to emerging national policy	We will target areas of most emissions reduction potential, avoid emissions lock-in, and use effective mechanisms	We will target areas of: low abatement cost; feasible total cost; and dynamic cost efficiency (lowering long term transition costs through innovation, technology diffusion and investment security)	We will promote transition actions that support the Government's economic diversification and innovation agenda and deliver economic cobenefits such as jobs, industry development and lowered energy costs, and that support other Queensland Government objectives such as climate change resilience, reef water quality, biodiversity and air quality

Most importantly, Queensland will work from the strong platform that has already been developed.

The Queensland Government has already committed to a number of actions that will significantly deliver on reducing emissions, while creating jobs and facilitating the growth of new industries. This solid platform of activity includes:

- Commitment to a 50% renewable energy target by 2030—creating additional investment and jobs, particularly in regional Queensland.
- 1 million Solar Rooftops or 3000 megawatts of solar photovoltaics (PV) by 2020.
- Developing an Electric Vehicle Strategy to prepare Queensland for the transition to electric vehicles.
- Supporting carbon farming in regional and remote Indigenous communities through capacity building, recognising Indigenous benefits, and offsetting government emissions with Aboriginal carbon credits.
- Commitment to improve the sustainability performance of Queensland's commercial, residential and government buildings through the Queensland Building Plan.

The Government will build on this work to continue Queensland's transition.

This work will be supported and informed through ongoing community engagement as well as expert advice provided by the Queensland Climate Advisory Council (QCAC)—which will draw on additional expertise through the Queensland Climate Adaptation Partners group and Queensland's Carbon and Industry Network.

Before 2020, Queensland will also explore what may be required, by way of a legislative response, to assist us in meeting the target commitments we have made. Other jurisdictions have developed Climate Change Acts, and a similar approach for Queensland will be explored.

QUEENSLAND CLIMATE ADVISORY COUNCIL

- The Queensland Climate Advisory Council's (QCAC) purpose is to provide the Queensland Government with expert advice on opportunities and directions to maximise the economic and social potential of the transition to a zero net emission and climate resilient economy.
- The 15 members are eminent business, industry and research leaders who will act as a conduit between the Queensland Government and the private sector to identify priorities for climate change action and innovation.
- The QCAC's first role will be to apply its expertise to enhance the delivery of the Queensland climate transition and adaptation strategies. Following this, the QCAC will participate in the 2019 review of climate transition actions and will identify future policy actions for Queensland Government consideration.

PATHWAY 1

CREATE AN ENVIRONMENT FOR INVESTMENT SHIFT AND INNOVATION

Response 1

Facilitate the zero emissions industries of the future

Action

1.1	Achieve 50% renewable energy generation by 2030
1.2	Develop a Demand Management and Energy Efficiency Strategy
1.3	Deliver the Queensland Electric Vehicle Strategy
1.4	Expand carbon farming in Queensland
1.5	Reduce carbon emissions in the built environment
1.6	Support industry to shift to sustainable biofuels

What Queenslanders said:

- The future should be powered by clean and renewable energy and technology - particularly given we are the 'Sunshine State'.
- We need low-carbon construction, infrastructure and transport systems (e.g. low carbon building design, electric vehicles, biofuels and green star rated buildings).
- Key opportunities are in renewable energy, battery and power storage, cleaner technologies and electric vehicle industries.
- Facilitate carbon farming and offset programs to provide financial incentives to retain forested areas or to revegetate land, including initiatives to diversify land use (carbon farming, organic and small-scale farming, solar and wind farms).
- Provide industry funding and investment to mobilise innovation and action.
- Improve public transport systems to be low-emission, well maintained, affordable, reliable, frequent and integrated.
- Ensure industry emissions are monitored and use penalties or incentives to shape behaviour.

Innovation and investment utilising new technology are essential for the development and expansion of low and zero emissions industries. Growth in low and zero emissions technology industries and enterprises in Queensland presents a major opportunity for business, industry and communities across the state. The government has an important role to play as a facilitator for this investment and innovation.

The Queensland Government is helping local companies, entrepreneurs and startups to bring innovative new renewable technology ideas to the global marketplace. Advance Queensland programs like Ignite Ideas, Innovation Partnerships, the Business Development Fund and the Advancing Regional Innovation Program can help create a new zero emission industry sector in Queensland that will power economic growth and create the knowledge-based jobs of the future.

Platform technologies, in particular, provide a significant opportunity in this space. Platform technologies are used as a base upon which other applications, processes or technologies are developed. The Advance Queensland Platform Technology Program provides opportunities for collaborative partnerships that accelerate the development and deployment of significant industry-based 'game changing' platform technology projects with the potential for multiple industry application.

In addition to the work Queensland has already done to develop a strong platform of high impact, no regrets action, the Government will:

- Develop and implement a Queensland Demand Management and Energy Efficiency Strategy to complement the 50% renewable energy target. The strategy will include a mix of mechanisms tailored to achieving a state-wide energy efficiency goal. To determine an appropriate mix of measures, the Government will explore energy efficiency opportunities in Queensland and the potential to establish an energy efficiency obligation scheme.
- Develop a program to work with Queensland small-medium enterprises to take up energy efficiency measures and other sustainability initiatives that improve climate change mitigation and adaptation.
- Build on the CarbonPlus Fund, established in December 2016, to support landholders undertake carbon farming activities with social, economic and environmental co-benefits. The Government will address regulatory and administrative gaps; support research; engage with landholders on carbon farming opportunities; and investigate opportunities for investment in the revegetation and remediation of land under state control such as abandoned mine sites, unallocated state land, protected areas and forest reserves.
- Develop an action plan to support liquid fuel users switch to sustainable, low carbon biofuels, particularly where electrification may be difficult, such as in the aviation, maritime, freight, mining and agricultural sectors.

CASE STUDY: SOUTHERN AURUKUN SAVANNA BURNING PROJECT

In 2016, the Queensland Government made a significant commitment of $8.4 million to develop carbon farming in Queensland, and in particular to increase the participation and capacity of Aboriginal communities in carbon markets. Through this commitment, we hope to see more projects similar to the Southern Aurukun Savanna Burning Project that aims to reduce greenhouse emissions from fire.

Savanna fires release greenhouse gas emissions. By burning in the early dry season when fires are cooler and patchy, and burning less country, there are fewer emissions.

The Southern Aurukun project combines traditional knowledge of how to read country and knowing when to burn, with modern hardware (e.g. helicopters, fireballs and leaf blowers). The restoration of traditional patchwork burning has significant benefits for the environment.

This project is on Wik and Kugu country, to the south of Aurukun, and is carried out by the rangers at Aak Puul Ngantam in Cape York.

Improved fire management started in 2012, and a fire plan and carbon business plan were developed in 2015 so that the project could be registered under the Australian Government's Emissions Reduction Fund. The rangers have acquired significant knowledge about fire management and the logistics of running a project that can create recognised carbon credits.

In 2015, the project achieved 17,396 tonnes of abatement but the broader social and environmental benefits are what makes this project, and others like it, very exciting.

According to the project coordinators: *"Country is being managed the right way, connection to country is being revitalised and improved corridors are taking pressure off wildlife. Rangers and traditional owners have also gained an understanding of how management of their country is linked to climate change"*.

In the future, there is potential for greater cooperation with neighbours over fire management and a chance to rekindle broader clan networks.

Overall, the project helps fulfil the Wik and Kugu vision of sustaining their values and culture through healthy country and resilient and engaged communities.

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CASE STUDY: GRAZIERS REAPING THE BENEFITS OF CARBON FARMING

With the investment already made by the Queensland Government in carbon farming and our proposal to build Queensland as a significant carbon sink, we hope to drive more projects like the Maranoa Ecosystem Conservation Project #2, outlined below.

Working with local graziers within the Maranoa region, GreenCollar has pioneered a market-based approach that protects threatened forest ecosystems while providing graziers with additional income and increased productive capacity.

One property in particular—located between the Thrushton National Park and the Chesterton Range National Park in South West Queensland—is part of a broader ecosystem corridor being assembled in the Maranoa region. The property, which has been owned by one family for over 100 years, is one of the oldest pastoral properties in its district. The property has a long history of clearing and development for various productive purposes.

In 2016, after consultation with GreenCollar, the family performed a cost-benefit analysis to assess the benefits of managing parts of their property to maximise the carbon stocks and sell carbon credits under the Australian Government's Emissions Reduction Fund. The family concluded that the diversification of their income stream would not only benefit their current sheep grazing enterprise but also enable them to improve the long-term ecological integrity of their property as a whole.

The Maranoa Ecosystem Conservation Project #2 was one of the first 'Avoided Clearing' projects to be implemented in Queensland under the Emissions Reduction Fund and protects over 5,500ha of forest at threat of being cleared.

By protecting and enhancing large tracts of native vegetation and habitat, projects like these aim to maximise the co-benefits to the environment and improve the long-term viability of threatened ecosystems and the services they provide. They also provide graziers and landholders with a diversified income stream across the overall farm enterprise that can potentially increase their resilience to climate risks.

The Maranoa Ecosystem Conservation Project #2 is an example of transition action that can positively benefit landholders and help Queensland move towards a zero net emissions future.

Response 2

Lead by example

Action

2.1	Join the Under2 Coalition and support zero net emissions by 2050
2.2	Demonstrate leadership by reducing emissions from Queensland Government operations
2.3	Integrate zero net emissions goals into state infrastructure planning
2.4	Use the land use planning system to support delivery of zero net emissions
2.5	Develop a Zero Net Emissions Transport Roadmap
2.6	Explore options to regulate greenhouse gas emissions through the Environmental Protection Act framework
2.7	Integrate climate transition risks and opportunities into government decision-making
2.8	Reintroduce comprehensive vegetation management legislation

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What Queenslanders said:

- The Commonwealth Government should lead on climate change policy, but is failing to act.
- The Queensland Government should lobby the Commonwealth Government and act independently where necessary to drive change.
- The Queensland Government needs to lead by example and transition its own operations, for example: low-carbon government operations (buildings, vehicles, electricity and procurement).
- Develop a whole-of-government approach to reduce emissions and integrate low-carbon criteria across policy areas and in investment, infrastructure and innovation funds.
- Local government should be demonstrating action and engaging with communities to facilitate low-carbon initiatives and economies.

The Queensland Government will facilitate transition through policy, projects and procurement, drawing on interstate and international practice. The Government will create platforms for innovation, demonstrate leadership, create demand for new services and set policy direction to drive government and non-government action.

The Queensland Government will sign the Under2 MOU to showcase its commitment to subnational global leadership on climate change and encourage others to do the same. The Under2 Coalition is a diverse group of subnational governments around the world who set ambitious targets (80 to 95% below 1990 levels by 2050) to combat climate change. A total of 167 jurisdictions spanning 33 countries and six continents have signed or endorsed the Under2 MOU—together they represent 1.09 billion people and $25.9 trillion in GDP, equivalent to over a third of the global economy.

To demonstrate government leadership, the Queensland Government will reduce its own emissions from government operations. The first step is to reinstate the requirement for all government departments to report on their emissions from energy and fuel use and air travel by 2018 to manage emissions from government operations.

The second step is to use its funding, policy and purchasing levers to deliver emissions reductions, as well as social and economic outcomes in Queensland.

The Queensland Treasury Corporation is also issuing certified green bonds to investors in environmentally responsible projects funded in part by the Queensland Government.

Queensland has already committed to undertake sustainability assessments (including climate change impacts) for all government capital works projects over $100 million, and will encourage sustainability assessments for projects under $100 million.

The Queensland Government will drive investment in sustainable infrastructure by integrating the zero net emissions goal into the infrastructure policy framework. The land use planning system can be used to help deliver the zero net emissions goal. Building on its commitment to improve the emissions performance of buildings, the Government will ensure that changes to land use and built form—at the state, regional and local level—reduce energy emissions, promote energy efficiency, support renewable technologies and protect natural assets which act as carbon sinks.

The Government will develop a zero net emissions transport roadmap. This will consider better integration of transport policy with land use planning to reduce travel demand and optimise public and active transport infrastructure and services. It will also look at ways to reduce emissions from private, passenger and freight transport, such as through improved vehicle and fuel efficiency, technology and innovation, and fuel shift.

Queensland will continue to advocate for a coherent national framework that addresses greenhouse gas emissions from industry on a nationally-consistent basis. Should no coherent national framework be developed by 2020, Queensland will pursue avenues under the Environmental Protection Act framework to regulate greenhouse gas pollutants.

Queensland also assured the international community that it remains committed to reinstating strong tree-clearing protection laws in the future.

Finally, the government will work to better understand the risks and opportunities that global climate drivers present for its own assets, and investments, and use this understanding to make better decisions.

> *Set an example for others to follow, employing best practice from cities around the world whose climate change response is more advanced.*

> *The Government should legislate a Queensland Climate Change Act, locking in the more ambitious targets, with an agreed upon charter providing principles and objectives that must be considered in plans, policies, programs and operational decision making across departments.*

GREEN BONDS FOR QUEENSLAND

The Queensland Government will support investment in environmentally responsible projects through Green Bonds issued by the Queensland Treasury Corporation (QTC).

QTC has worked with the international Climate Bonds Initiative to independently certify a list of Queensland projects that meet a set of environmental criteria and for which QTC can issue green bonds to domestic and international investors.

The list of potentially eligible projects include:

- renewable energy
- energy efficient processes and products
- low-carbon transport—electrified rail infrastructure and cycleways
- drought resilience and flood defence
- water and wastewater treatment plants and distribution infrastructure
- preservation of the Great Barrier Reef and other natural ecosystems
- low-carbon buildings
- other projects covered by new or revised climate bond sector-specific standards.

The issuance of QTC Green Bonds will support the Government's commitment to the environment and action on climate change and will mean Queensland joins an ever-growing worldwide movement in supporting greater investment in projects that create jobs and support the transition to a zero emissions and climate-resilient economy.

The green bond market has grown rapidly in recent years and is expected to continue to grow as new issuers enter the market and investor mandates for green investments increase.

PATHWAY 2

FACILITATE EXISTING QUEENSLAND INDUSTRIES TO TRANSITION

Response 3

Understand the risks and opportunities that a zero net emissions future presents for Queensland

Action

3.1	Identify the sectoral and regional risks and opportunities for Queensland of transitioning to a zero net emissions economy
3.2	Assess zero net emissions pathways for Queensland, including achieving the interim 2030 target
3.3	Undertake strategic workforce and industry foresight analysis
3.4	Work with industry to promote efficient and effective abatement of fugitive emissions

GLOBAL TRENDS DRIVING CHANGE IN OUR INDUSTRIES

Queensland's economy is fully integrated with global markets. Changes in those global markets will impact on our domestic industries and businesses, especially the products and services we export.

Some key trends that will impact Queensland's economy include:

- **Global demand for carbon offsets:** Post-2020, the global market for carbon credits is expected to grow significantly driven by national commitments to reduce emissions under the Paris Agreement—as well as major international sectors such as aviation and shipping with carbon reduction commitments. Queensland is well positioned to be a major supplier of products and services into this market through carbon farming of our land.
- **Low carbon food and fibre:** Queensland's agriculture sector is already highly efficient but markets are shifting towards suppliers that can provide products guaranteed to be environmentally and socially sustainable. For example, in 2013 the Coca-Cola Company committed to sustainably source 100% of its priority ingredients—like sugar, pulp and paper fibre, and citrus fruit—by 2020.
- **Innovation driven by carbon and resource constraints:** Climate change, natural resource constraints, and the transition to greener economies will drive demand for innovation—and global markets are already changing. Queensland has an opportunity to participate right now.

The global transition to a zero emissions future has significant implications for emissions-intensive, resource-based economies such as Queensland's. Even if Australia and Queensland were to take no further action on climate change, the economy would be affected by the mitigation efforts of other countries and by changing global technology and economic trends.

The transition to a zero emissions economy will take place over decades and will translate into different rates of change for different industries, regions and communities. To transition successfully to a zero net emission future, multiple pathways and options need to be explored. For some sectors, the change may involve use of new fuel sources or greater use of energy efficiency. For others, it may involve a more significant transition to new opportunities.

The Queensland economy is always evolving as conditions and technologies change. The Queensland Government proposes to work with industry to maintain the competitiveness of key Queensland industries and make the transition to a zero net emissions economy as smooth as possible for Queensland businesses and communities.

What can we do to understand impacts on our existing industries and communities?

Over the next two years, the Queensland Government will work to identify the risks, opportunities and costs of transitioning to a zero emissions economy. This will take into account various transition scenarios and external factors such as international action and global trends, as well as the direction of national climate policy, and assess the implications for the Queensland economy. The risks and opportunities will also be analysed on a regional basis, to better understand how different communities will be affected by the transition.

This information will be communicated in regional impact statements and industry impact statements and will be used to:

- Enable a clearer understanding of the trade-offs that may be needed in the economy and 'least cost abatement' options of reducing pollution
- Allow the Queensland Government to facilitate a dialogue with industry to ensure that existing industries remain competitive
- Inform Queensland Government advocacy at a national level and prepare Queensland to respond to national policy settings as they develop
- Assist those communities that will be most impacted by transition scenarios to understand the decisions they need to make and the opportunities and transition pathways available to them
- Allow the Queensland Government to collaborate with industry and communities to facilitate workforce transition where required
- Inform Queensland Government and local government decision making, planning and policy development for longer term post-2020 policy
- Facilitate a dialogue with the community to engage in the most appropriate solutions for communities to transition.

This analysis will allow the Queensland Government to collaborate with local government, industry and communities to identify what response is required to identified risks and opportunities and to facilitate workforce transition where required.

Using the results of this analysis, the Government will reassess the Queensland Climate Transition Strategy in 2019 and develop a suite of longer term policies to put Queensland on a pathway to zero net emissions by 2050.

In conjunction with this pathway and modelling work, the Queensland Government will monitor and evaluate the effectiveness of our policies and actions already underway to ensure they are effective in meeting the state's target.

While further work is needed to create a long term transition pathway that is right for Queensland, this is not a reason for inaction in the short term. There are many actions that Queensland can take to position the state for a smoother transition as the global economy accelerates towards zero net emissions.

Response 4

Encourage innovation and transition to low and zero carbon technologies

Action

4.1	Engage with the start-up community to promote Zero Emissions Innovation In Action
4.2	Partner with Climate-KIC to harness climate change innovation
4.3	Support the 2017 Global Business Challenge to find innovative renewable energy solutions

What Queenslanders said:

- There are economic opportunities and jobs in new clean industries.
- Explore and promote the potential for exporting technologies, clean energy and knowledge.
- Provide support for innovation through investment and efficient policies and regulations.
- Put a price on carbon to stimulate innovation and commercialisation of low emission industries and technologies.
- Increase awareness, promote the options and develop tools to engage and motivate communities and businesses.
- Improve education and training to help industry transition through knowledge and skills.

The Queensland Government is committed to growing existing key industries and fostering new industry sectors. Existing industries could benefit from a zero net emissions economy, for example, through the revival of energy-intensive manufacturing industries such as aluminium smelting powered by zero-emission electricity.

Queensland also has the potential to deliver renewable energy, such as biofuels, for export markets. The Queensland Government is leading Australia's bio-economic revolution through the Advance Queensland Biofutures 10-Year Roadmap and Action Plan. Queensland also has significant rare earth and mineral deposits which have high value in emerging and green technologies required for a decarbonising world.

The Queensland Government's Advance Queensland initiative supports diversification of the economy by developing new industries and creating the knowledge-based jobs of the future. The various programs within this initiative will support the development and deployment of innovative technologies that will help existing and emerging industries compete and flourish in a low to zero emissions economy.

Over the next two years, the Queensland Government proposes to:

- incorporate the zero net emissions target and interim target into its Advance Queensland agenda
- identify opportunities to actively engage with innovators to promote zero emissions innovation through initiatives such as Climate-KIC and the Global Business Challenge.

> *"All new buildings should be fitted with solar panels and batteries, or connections to neighbourhood solar generation and storage."*

CASE STUDY: ADVANCE QUEENSLAND

Advance Queensland supports projects to help manage climate risk, develop renewable energy solutions, and develop Queensland's solar PV and battery energy storage industries. Projects that have been funded to date include:

Advance Queensland Research Fellowships:

- *Smartphone-based decision support tool*—this project will develop an actionable, research-based approach to cyclone mitigation in Queensland and other cyclone-prone regions of Australia.
- *Maximising renewable energy penetration through smart inverter deployment and control*—a research project to enable higher penetration of renewable energy sources in Queensland.
- *Making solar better: advanced electronics for distributed energy storage*—research to help solve power quality issues in low voltage distribution networks by developing an advanced direct current converter to be used in battery energy storage.

Advance Queensland Ignite Ideas:

- *Optimisation of patented wind turbines*—optimisation of a proprietary wind energy technology using advanced computational fluid dynamics modelling for improved wind energy harnessing.
- *Impact Building Systems*—field trials for a patented low cost solar thermal collector.
- *Elevare Energy*—funding to undertake research and development into technologies that use clean energy from rooftop solar stored in Queensland-made 'smart' batteries to reduce peak demand charges in commercial buildings.

Advance Queensland Innovation Partnerships:

- *Battery and Microgrid Management Systems*—a project to develop and demonstrate two new products for the management of batteries in solar energy systems and the management of microgrid systems.

Advance Queensland Business Development Fund:

- *Tritium: improving our energy future*—funding to assist Tritium (a Queensland-based company) to undertake research and development into electric vehicle technologies.

WHAT IS CLIMATE-KIC?

Climate-KIC (Climate-Knowledge Innovation Community) is Europe's largest public-private innovation partnership, working together to address the challenge of climate change.

The objective of the organisation is to drive innovation in climate change through creative partnerships large and small, local and global—between the private, public and academic sectors.

Building on its success in Europe, Climate-KIC is now establishing in Australia. Partnering with Climate-KIC gives Queensland the opportunity to actively build its innovation eco-system in climate change. For more information on Climate-KIC see: www.climate-kic.org

WHAT IS THE GLOBAL BUSINESS CHALLENGE?

The Global Business Challenge (GBC) was established in 2014 as the G20 Global Business Challenge. The GBC is managed by the Queensland University of Technology (QUT) and supported by two other leading Australian universities—The University of Queensland and Griffith University—as well as the Queensland and Australian Governments. The GBC has seed funding of $500,000 each year for an initial seven years to address real-world solutions such as the global water challenge, food security and healthcare. Building on the success of the inaugural competition in 2014, the Global Business Challenge has quickly established itself as the world's premier innovation competition.

The challenge for the 2017 GBC is to identify novel solutions that lower the cost and/or reduce the risks associated with the transition from fossil-fuel based energy to achieving sustainability and reliability from renewable energy sources.

Proposed solutions may cover any domain within the renewable energy theme, and one or more points within the value chain (generation, distribution and storage). Proposed solutions should include demonstrable new technologies, as well as novel business models that support widespread adoption and successful commercialisation.

> *"The global economy of the future will be based around renewable energy and low carbon initiatives. Put simply, we should aim to be at the forefront of this transition, in order to position Queensland for the benefits of innovation. We are ideally placed to do this."*

The transformation of our transport, buildings, manufacturing, energy, food and agricultural systems all create exciting opportunities for Queensland, but we need to plan to achieve the full benefits of them.

Innovation isn't necessarily about technology and funding - it can also be about innovative leadership, collaboration, and stakeholder engagement.

PATHWAY 3

WORK WITH QUEENSLAND'S REGIONAL COMMUNITIES TO TRANSITION

Response 5

Support Queensland communities to take action

Action

5.1	Build leadership capacity within communities to develop place-based climate transition roadmaps
5.2	Our Transition—provide tools, data and financial support for communities
5.3	Zero net pledges and Talking Transition program
5.4	Decarbonise remote communities
5.5	Work with local governments to build climate transition capacity

What Queenslanders said:

- Queensland should base decisions on scientific evidence and research, and communicate the benefits of a clean energy transition.
- Facilitate behaviour change and engage the community on what they can do regarding sustainable alternatives and low carbon choices through awareness campaigns.
- Improved state, regional and town planning to optimise low-carbon opportunities.
- Develop consumer incentives, ensuring low-carbon options are affordable and accessible to everyone.

One of Queensland's great strengths is its regional communities—and their support is vital to the state's economic transition. Action at a local level will have a significant impact on our state's overall ability to meet the 2050 target, and will extend and complement action being undertaken at national and interstate level.

Those regional communities that will be most impacted by the economic transition are also best placed to identify the opportunities they have in the future. It is in the interests of Queensland to ensure that these communities are empowered to play an active role and that policies, where possible, encourage 'place-based' initiatives.

Climate change action at the sub-national, regional and city level—and specifically place-based emissions reduction initiatives—are already producing significant results internationally and have been identified as making a critical contribution to meeting our obligations under the Paris Agreement.

Cities are at the forefront of climate innovation, with carbon neutrality now a goal for hundreds of cities around the world. Some communities are innovating through a 'precinct' approach where government, industry and community work together to reach zero net emissions in a geographically-defined area.

Many communities across Queensland are already doing a lot to transition to the new economy—for example, by taking up renewables and through active transport and local sourcing of goods and services. Community groups are often led by volunteers who harness the resources of their local community to achieve effective on-the-ground results. The Queensland Government recognises the importance of this kind of community action and proposes to support these initiatives.

> *"I think there is a general lack of understanding of climate change in the population. This means that change is often seen as unnecessary or just another cost. This lack of support understandably makes Governments hesitate as they do not want to choose the less popular pathway."*

> *"You need to be using design to engage communities in meaningful, innovative ways, not gimmicky technology but actually sitting down with people, running workshops, identifying what challenges face particular communities and then designing alternative futures that the community can believe in and work towards."*

> *We need a change in ideas of people before we can expect everyone to just adopt sustainable practices. Knowledge is power.*

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CASE STUDY: REGIONAL COMMUNITIES AND ECO-TOURISM

Lady Elliot Island is a tiny 42ha Coral Cay, the most southern island on the Great Barrier Reef. In the past the island was mined for guano and was heavily degraded, but it has now been transformed to its former state. The island's sole operation is now a small eco resort with 41 cabins. It is renowned as an example of environmental best practice—providing an awesome holiday experience in a natural environment.

Transitioning towards low-emission self-sufficiency, while developing a successful business that manages everything in a sustainable way and preserves the island for future generations, has been a challenging exercise.

The island desalinates almost 30,000 litres of fresh water daily, as rainwater collection is not possible due to the highly populated bird colony. The underground aquifer is critically important to the island's eco-system. Waste water is processed by a waste water treatment plant and re-used to irrigate the airstrip's grass and island vegetation. All other wastes require the same responsible management practice. The island fully recycles, and all food waste and cardboard is composted and used as fertiliser for the nursery.

The island has always made its own power using diesel generators. In the past around 550 litres of diesel fuel was consumed daily. Over the past eight years the resort has converted to a hybrid solar power station with over 400 solar panels—and now burns under 100 litres of diesel per day.

While some doubted the island would achieve even 50% reduction due to the high power requirements for desalinating water and powering the resort's growing operations— over 80% reduction was achieved, saving more than $200,000 each year. The savings were used to invest in a new desalination system, utilising the latest technology which makes the same volume of water as before, but does so in nine hours instead of 15.

The goal for the island is now 100% renewable energy. It is a balance between being financially sustainable and environmentally sound.

Feedback from consultation with communities has indicated that the most effective support for local action is to provide small grants, and to promote networking within and across communities so they can inspire each other and share knowledge. The Queensland Government will deliver a small grants program for communities using innovative approaches to reduce emissions locally.

The Government will build capacity within its non-government and not-for-profit sectors to ensure communities have the skills and capacity to facilitate transition conversations.

To provide Indigenous and other remote communities with more reliable and cleaner energy, the Government will accelerate the state's commitment to renewable energy and facilitate the installation of solar photovoltaics, battery storage and smart street lighting in remote areas. This will also support training and jobs for local technicians.

The Government will also assist communities with effective tools, information and data. Regional climate change projection data, information on relevant technologies, and innovative carbon reduction projects will be made publicly available online. These online resources will enable communities across Queensland to communicate and network on carbon projects, as well as providing a range of general resources, tips, how-to guides, and other tools. Communities can also share their carbon transition stories so other groups can learn and be inspired.

Local governments have an important role to play in facilitating and supporting progress towards zero net emissions goal. The Queensland Government will support local governments to integrate climate change initiatives across their functions and provide leadership within the local community and through the existing Queensland Climate Resilient Councils program.

The Government's support for Queensland communities taking action will be underpinned by a strategic communications and engagement strategy for sharing climate transition knowledge and showcasing community and industry leadership. This will be complemented by a zero net 'pledge' program to engage individuals, community organisations and business to make a public commitment to reducing carbon pollution and transitioning towards a low carbon future.

CASE STUDY: ZERO EMISSIONS NOOSA

Zero Emissions Noosa (ZEN) was launched in 2016 with the goal of achieving zero net carbon emissions in the Noosa Shire community by 2026. The group is an alliance of 15 business, environment and tourism organisations, together with Noosa Council, CQUniversity and Sunshine Coast University.

The strength of the group lies in the unique alliance from organisations across the business and environment spectrum. With assistance from Noosa Council and Beyond Zero Emissions, ZEN has established the key contributors and quantities of its greenhouse emissions.

ZEN has established five working groups to tackle key emissions sectors: electricity, buildings, waste, land use and transport. Each of these groups has been working to identify strategic initiatives for the region.

The electricity group is developing case studies for the tourism industry demonstrating the payback for installing solar panels. The transport group knows that reducing the dependence on the private motor vehicle is a major task, and will engage with the community to explore opportunities such as using electric bicycles as an alternative to commuter travel. The land use group is developing a major strategic plan focussing on hinterland food production and revegetation opportunities.

Response 6

Skill Queenslanders for new economy jobs

Action

6.1	Work with local governments and key stakeholders to develop local and regional jobs plans
6.2	Work with Queensland industries and communities to develop a Workforce Development and Skills Plan for low and zero emissions jobs

What Queenslanders said:

- Recognise and advocate for industries important to Queensland's economy, such as tourism and agriculture, and help them transition.
- Opportunities exist for new low-carbon industry and jobs, and a " future proofed economy".
- Retrain workers and guarantee jobs in cleaner energy to support workers to transition.

Some of the jobs of today will not be the jobs of tomorrow.

As the world shifts towards zero net emissions there will be growth in clean energy and technology industries, and opportunities for Queensland businesses and workers to take advantage of these emerging industries.

The Queensland Government will use the economic risks and opportunities analysis—outlined in *Response 3: Understand the risks and opportunities that a zero emissions future presents for Queensland*—to understand where and how Queensland will be most affected by global economic shifts, and work with affected communities to provide them with the information and support they need to develop localised plans.

These strategies will identify industries that can be supported and expanded to ensure a sustainable economy into the future for these communities. Working in partnership with workers, communities and industry, the Government will consider what support is needed for workforce planning to meet the needs of individual communities and workforces.

Coupled with the Government's engagement with the start-up community to promote *Zero Emissions Innovation in Action* (Response 4), the Government will analyse the risks and opportunities of a zero net emission future (Response 3) to help better understand the potential for new and expanded industries of the future. This analysis will be critical to inform workforce and skills planning for new economy jobs in Queensland to ensure that no Queenslanders is left behind as we transition.

WHAT TYPES OF SKILLS WILL WE NEED IN THE FUTURE?

Creating new industries and using new technologies means workers with the necessary skills will be required. Many skills will be transferable but it will be important to ensure that workers—now and in the future—have access to the training needed for developing the skills required for new economy jobs. Skills needed in the new economy include:

- Engineering and construction skills for designing, siting, and building renewable energy and bio-industrial plants. For example: siting and erecting the wind turbines; designing appropriately-sized and safe biogas capture systems; and developing new processing equipment for unconventional bio-industrial feedstocks like weeds and waste.
- Electrical skills in renewables, energy efficiency, battery storage and electric vehicles to service and install these systems in residential, commercial, and industrial applications. With increased electrification of vehicles, servicing and repair of vehicles will require more auto-electrical skills.
- IT and communications to support the growth of the 'Internet of Things', increasing demand for IT infrastructure design and servicing skills.
- Carbon farming and land management to make the most of carbon export markets, rehabilitate degraded land, and produce food and fibre in low carbon and climate resilient ways.

It is important to understand the drivers for skills demand, training needs, projected workforce profiles, and critical skills and occupations for the renewable energy and zero net emissions technology industries.

Low and zero emissions industries require planning that links economic, industry and workforce objectives. Once the risks and opportunities associated with Queensland's transition are better understood, the Queensland Government will work with industries and communities to develop a Workforce Development and Skills Plan for low and zero carbon jobs to maximise opportunities for the state's workforce and jobseekers to secure jobs in low or zero emissions industries by:

- better understanding industry needs
- building the workforce in targeted communities
- increasing workforce participation
- maximising skills development and training provision in renewable energy construction.

> *"The opportunity for long term job creation in regional areas is incredible, jobs that will not end like those of the mining boom. We have the opportunity to bring employment and wealth back to suffering regional communities for the future and long term."*

> *"Queensland climate plan needs to go beyond energy. It's critical that the State Government invests in retraining of workers, encourages investment in places of industrial change and sets clear plans and targets for industry to mitigate against the risk of unplanned closure."*

Climate Change

#31267

APPENDIX F

MASTER PLAN PROJECT INDEX

PREPARED BY CARDNO


Resilient Queensland 2018-21

Delivering the Queensland Strategy for Disaster Resilience

May 2018

Queensland Government

Disaster Resilience in Queensland

Our shared vision – making Queensland the most disaster resilient state in Australia

Queensland is the most disaster impacted state in Australia. While Queenslanders have an ability to adapt and recover in a short amount of time, it's important we continue to build our resilience before, during and after disasters. The *Queensland Strategy for Disaster Resilience 2017* (the Strategy) guides our shared vision and sets out broad roles and responsibilities for all Queenslanders in building disaster resilience.

Resilient Queensland - Delivering the Queensland Strategy for Disaster Resilience 2018-2021 (Resilient Queensland) is a detailed blueprint for use across government, the community, non-for-profit sector, business and industry, to ensure outcomes are delivered against the objectives of the Strategy.

Risks facing Queenslanders

In Queensland, building disaster resilience is based on a thorough understanding of risk. It requires a comprehensive process of continuous improvement to reduce our vulnerability and manage uncertainty into the future.

The *Queensland State Natural Hazard Risk Assessment 2017* identifies a range of disaster risks for the state including tropical cyclones, riverine flooding, bushfires, severe weather, earthquakes, heatwaves and coastal inundation. The impacts of tropical cyclones and riverine flooding remain the greatest risk to Queensland. It is this understanding that helps us to focus our efforts where they are most needed.

Resilience – the Queensland experience

Resilience can be thought of as our collective ability to understand, anticipate and quickly 'bounce back better' from disaster events.

It means individuals, communities and businesses taking greater responsibility to be safe and to minimise personal and property impact.

It is about a 'safety net' of government and not-for-profit services including disaster response, communications, funding, and other resources to make sure no one is left behind.

It relies upon networks of people working together and championing resilience activities and efforts to ensure it is always front of mind.

We all have a role to play

Resilient Queensland is a shared responsibility and success will depend on the collective effort of:

- individuals
- community groups and organisations
- local governments
- businesses
- tertiary sector
- Queensland Government
- Australian Government.

As Queenslanders, we are disaster resilient when:

1. we understand the potential disaster risks we face
2. we work together to better manage disaster risk
3. we seek new opportunities to reduce disaster risk
4. we continually improve how we prepare for, respond to and recover from disasters

Resilient Queensland

Guiding principles for statewide collaboration

A disaster resilient community is one that works together to understand and manage the risks it faces. As part of Resilient Queensland, a comprehensive engagement process will be undertaken to identify opportunities and priorities to better coordinate our resilience efforts across the state.

The Strategy advocates for tailored solutions that are developed by local people for local needs. Resilient Queensland will ensure local, regional and state level disaster resilience planning, priorities and projects are integrated and align with the objectives and commitments of the Strategy.

An example of our guiding principles in action

Burnett Catchment Flood Resilience Strategy – pilot project

The Queensland Government is partnering with Bundaberg Regional Council, Cherbourg Aboriginal Shire Council, North Burnett Regional Council and South Burnett Regional Council to deliver the Burnett Catchment Flood Resilience Strategy. This pilot project is scheduled for completion in mid-2018 and will inform the development of further catchment-scale risk reduction strategies for the state, and the adoption of successful activities into day to day practices.

The purpose of this project is to develop a consistent and coordinated approach to managing disaster risk across four of the councils located within the Burnett River Catchment.

The Queensland Government and local councils are sharing local knowledge to develop a catchment-scale plan for managing the impact of future disasters and enhancing community safety and resilience.

The pilot project will examine the benefits and challenges experienced in the implementation of a catchment-scale governance approach to identify lessons learnt for regional resilience service delivery across the state.

This pilot project is a good demonstration of how the Queensland Government will work with local governments and other stakeholders to deliver regional resilience plans across the state.

Local leadership – is being driven by local knowledge through state facilitated processes.

Shared responsibility and collaboration – a range of professionals from a number of disciplines are working together.

Prioritisation – riverine flooding is the number one natural hazard facing this community and regional coordination is needed to ensure community safety.

Flexibility and adaption – the project builds on work already delivered through the *Bundaberg 10 Year Action Plan* and other relevant local plans and activities.

Resilience becomes business as usual – the systems, processes and relationships established through this project will be embedded into business as usual activities beyond disaster management.

Resilient Queensland

1 we understand the potential disaster risks we face

2 we work together to better manage disaster risk

Describing success

Having a clearer understanding of potential risks empowers us to make informed decisions so that we can better prepare and respond.

We are resilient when:

- we have access to real-time information about disaster impacts
- we find ways to engage with hard-to-reach and vulnerable people such as those from non-English speaking backgrounds
- our community understands and is involved in disaster risk management.

By understanding what people value most we can better coordinate and concentrate our efforts.

We are resilient when:

- our community is involved in disaster preparedness activities that meet local needs
- evidence of local vulnerability and risk is used to inform our decision making
- everyone understands the role they play in contributing to the resilience of our community.

Strategy commitments

C1.1 drive attitudinal, cultural and behavioural change across the state, enabling Queenslanders to anticipate, respond and adapt to disaster impacts

C1.2 understand the risks associated with a warming climate with improved coastal management

C1.3 increase community awareness and preparedness for all hazards through community engagement

C1.4 initiate research and evaluation projects to promote the positive trajectory of building resilience in Queensland.

C2.1 build partnerships across community, industry, research organisations and government to improve the health of waterways and marine areas

C2.2 provide opportunities for community-based solutions to the impacts of disasters

C2.3 develop and implement a strategic framework for flood risk management.

How we are delivering

- ✓ Queensland Emergency Risk Management Framework
- ✓ Queensland State Natural Hazard Risk Assessment 2017
- ✓ Queensland Climate Adaptation Strategy 2017-30
- ✓ Queensland Climate Transition Strategy
- ✓ Get Ready Queensland
- ✓ Preparing Your Business for Natural Disasters 2016
- ✓ Cohesive communities: an action plan for Queensland 2016-18.

- ✓ Queensland Regional Natural Resource Management Investment Program 2013-2018
- ✓ Strategic Policy Framework for Riverine Flood Risk Management and Community Resilience 2017
- ✓ Indigenous Land and Sea Ranger Program 2017
- ✓ Queensland Recovery Plan.

Future actions

- evaluation and improvement of Get Ready Queensland program
- statewide capture of resilience activities, strategies and plans.

- resilience activity analysis to identify opportunities and priorities
- establish a resilience community of practice
- establish a Queensland Critical Infrastructure Working Group.

Strengthening disaster resilience

3 we seek new opportunities to reduce disaster risk

4 we continually improve how we prepare for, respond to and recover from disasters

Describing success

Having a big picture view will help us identify opportunities for making our communities, infrastructure and environment stronger and more adaptable to future stresses.

We are resilient when:

- we incorporate resilience into everyday activities
- we take a proactive approach to resilience building, rather than a reactive one
- we understand how to link policy and funding to prioritised actions
- we focus on long-term risk reduction and resilience to plan for future generations, the economy and the environment.

Understanding our current and future disaster risks enables us to make informed decisions for current and future generations.

We are resilient when:

- our disaster management systems are scalable to accommodate future changes
- we are on a journey of continuous improvement
- we work across disciplines and organisations for resilience planning
- we embrace a culture of ongoing improvement through regular monitoring and information sharing.

Strategy Commitments

C3.1 deliver more resilient infrastructure and transport systems

C3.2 support the ability of our natural assets to serve as protective buffers against disaster impacts

C3.3 promote the incorporation of risk reduction in all planning and development

C3.4 encourage innovation in urban area design for living with the impacts of floods and droughts

C3.5 further the understanding and management of natural landscapes to reduce the impacts and effects of floods and bushfires

C3.6 build greater business resilience and preparedness

C3.7 minimise disaster impacts through flexible and adaptive planning.

C4.1 identify adaptation opportunities following disasters and in anticipation of climate change

C4.2 drive continuous improvement in disaster management in Queensland via assurance frameworks and accompanying performance measures.

The Office of the Inspector-General Emergency Management will contribute to disaster resilience outcomes by working closely with disaster management agencies to identify good practice and opportunities for improvement.

How we are delivering

- ✓ Queensland Betterment Fund 2013, 2015 and 2017
- ✓ QCoast2100 – Queensland Local Government Coastal Hazard Adaptation Program
- ✓ State Planning Policy 2017
- ✓ Prevention, Preparedness, Response and Recovery Disaster Management Guidelines
- ✓ State Disaster Management Plan
- ✓ Flood Warning Gauge Network Review.

- ✓ Emergency Management Assurance Framework
- ✓ Disaster Management Research Framework
- ✓ The Cyclone Debbie Review: Lessons for delivering value and confidence through trust and empowerment.
- ✓ Queensland Climate Adaptation Strategy 2017 – 2030
- ✓ Emergency Management Prioritisation Tool.

Future actions

- establish a Queensland Resilience Coordination Committee
- deliver the Burnett Catchment Flood Resilience Strategy pilot project
- pilot and evaluate regional resilience models across a range of communities
- statewide delivery of co-developed regional resilience models.

- co-develop Queensland specific resilience measures and toolkits for inclusion in regional resilience models
- regular reporting on the 16 Strategy commitments via Functional Recovery Groups
- monitoring and reporting on Resilient Queensland.

Resilient Queensland

2018

ENGAGEMENT

Identifying best practice, opportunities and priorities

201

ENGAGE

Piloting and evaluating regio

Statewide capture of resilience activities, strategies and plans

Resilience activity analysis to identify opportunities and priorities

Ongoing capture and sharing of res

Establish a Queensland Resilience Coordination Committee

Establish a Critical Infrastructure Working Group

Queensland Resilience Coordinatio Group to review principles, practice

Establish a Resilience Community of Practice

Resilience Community of Practice to

Burnett Catchment Flood Resilience Strategy –pilot project

Pilot further regional resilience models across a range of communities including urban, rural, remote and coastal

Co-develop Queensland specific resilience measures and a resilience toolkit for regional resilience pilot models

Deliver the Get Ready Queensland program to strengthen community resilience, including ongoing evaluat

Regular reporting on the commitments of the QSDR via Functional Recovery Groups

Evaluation, monitoring and reporting

Evaluation, monitoring and reporting

Making Queensland the most disaster resilient state in Australia.

9 | 2020-21

MENT | IMPLEMENTATION

nal resilience models | Statewide delivery of resilience models

ilience activities across the state

n Committee to oversee delivery of Resilient Queensland and the Critical Infrastructure Working
s and solutions relating to critical infrastructure protection and recovery from disasters

drive innovation in resilience policy and practice

Evaluate the regional resilience pilot models

Statewide delivery of co-developed regional resilience models and implementation of resilience action plans

ion and improvements

Evaluation, monitoring and reporting

Evaluation, monitoring and reporting

Get involved

As Queenslanders, we all have a role to play to achieve our goal of making Queensland the most disaster resilient state in Australia. Resilience is not an end state – it is a continuum of adaptation, assessment, learning, adjustment and transformation. The Queensland Government is working closely with the public and private sectors to strengthen our resilience to future disasters.

Every community can deliver on Resilient Queensland according to their community's needs. There are many ways to achieve our vision.

All Queenslanders can strengthen our resilience through better planning:

- be prepared - have your own food, water and other supplies to last for at least 72 hours
- visit Get Ready Queensland at **www.getready.qld.gov.au** for information on preparing for disasters
- talk to your **local council** to find out about Get Ready Queensland initiatives.

Community groups and organisations can strengthen our resilience through improved social networks:

- organise or participate in activities to get ready for disasters
- engage with local governments to collaborate on preparedness activities and events.

Local governments can strengthen our resilience by leading, driving and coordinating local activities through Local Disaster Management Groups and District Disaster Management Groups:

- contribute to the development of local and regional resilience and recovery plans
- talk to the Queensland Government about developing a community resilience assessment and a prioritised resilience action plan.

Businesses can strengthen our resilience through business continuity planning:

- be prepared with a business continuity plan to identify and prevent risks where possible and identify how to respond and recover if disaster occurs
- visit Get Ready Queensland at **www.getready.qld.gov.au** for information on preparing a business continuity plan.

Tertiary sectors can strengthen our resilience by making research accessible to the community:

- undertake relevant research that is accessible to the community
- collaborate with the Queensland Government and contribute to our ongoing cycle of learning.

Queensland Government departments and agencies can strengthen our resilience by managing uncertainty and stepping in when local capacity has been reached:

- provide assistance to local governments through Local and District Disaster Management Groups to co-design and co-deliver local and regional resilience plans that address risk, capability and local priorities
- assist local governments with resilience policy and delivery of frontline services
- talk to the Queensland Reconstruction Authority about ways your department can be part of Resilient Queensland.

The **Australian Government** can strengthen our resilience by working to the roles and responsibilities as outlined in the National Strategy for Disaster Resilience:

- work with all partners to develop resilience policy informed by research priorities
- provide a safety-net for impacted Queensland communities through the Natural Disaster Relief and Recovery Arrangements
- provide funding through the Natural Disaster Resilience Program and other resilience related funding.

More information

Visit **www.qldra.org.au/ResilientQueensland**

Contact the **Queensland Reconstruction Authority** on 1800 110 841

Do you need an interpreter?
If you need an interpreter to assist you in understanding this document, please call **13 QGOV (13 74 68)**.

0011 A

APPENDIX G

PORMPURAAW MASTER PLAN

PREPARED BY CARDNO

PORMPURAAW MASTER PLAN

North

OT3
OT1
HISTORICAL CEMETERY
RS5
HISTORICAL CEMETERY
RS1
NORTHERN CEMETERY
PITTMAN STREET
MANCHKUNCHAN STREET
YAU STREET
MANTH STREET
RS2
OT4
LANDFILL
POWER STATION
CF7
ID1
OS2
RS3
MANUREA STREET
PORMPURAAW STREET
SCHOOL
CT1
CF2
OT2
OS1
CF4
CF3
CF5
CF6
KORKA STREET
HOSPITAL
AIRSTRIP
POLICE STATION
WIRRAN STREET
CT2
WANGKINKANTHAR STREET
NGURRIN STREET
RAAN STREET
BORE TO BE MAINTAINED
PUPWARRANGAN STREET
RS4
CF1
SOUTHERN CEMETERY
CEMETERY
RS6

LEGEND

- PROPOSED RESIDENTIAL DEVELOPMENT
- PROPOSED INDUSTRIAL DEVELOPMENT
- PROPOSED OTHER DEVELOPMENT
- PROPOSED COMMUNITY FACILITIES
- PROPOSED OPEN SPACE / DRAINAGE RESERVE
- PROPOSED COMMERCIAL / TOURISM DEVELOPMENT
- PROPOSED ROAD

KEY:
RS = RESIDENTIAL
CT = COMMERCIAL / TOURISM
CF = COMMUNITY FACILITIES
ID = INDUSTRIAL
OT = OTHER
OS = OPEN SPACE

RESIDENTIAL LOT TYPE	# OF LOTS
LOW DENSITY RESIDENTIAL	164

RESIDENTIAL:

- RS1 RESIDENTIAL EXPANSION AREA (NORTH)
- RS2 RESIDENTIAL EXPANSION AREA (NORTH - EAST)
- RS3 RESIDENTIAL EXPANSION AREA (SOUTH - EAST)
- RS4 RESIDENTIAL EXPANSION AREA (SOUTH)
- RS5 RESIDENTIAL INVESTIGATION AREA (NORTH)
- RS6 RESIDENTIAL INVESTIGATION AREA (SOUTH)

RECREATION & OPEN SPACE:

- OS1 FUTURE SPLASH PARK & OUTDOOR GYM
- OS2 FUTURE SPORTING FIELDS

INDUSTRIAL:

- ID1 FUTURE INDUSTRIAL ESTATE

OTHER DEVELOPMENT:

- OT1 RELOCATED TELECOMMUNICATIONS INFRASTRUCTURE
- OT2 TOWN CENTRE
- OT3 SEWERAGE TREATMENT PLANT UPGRADE
- OT4 SOLAR FARM

COMMUNITY FACILITIES:

- CF1 CEMETERY (SOUTH) INVESTIGATION AREA
- CF2 FUTURE YOUTH CENTRE
- CF3 CYCLONE SHELTER
- CF4 TEACHER'S HOUSING
- CF5 INDEPENDENT LIVING
- CF6 WOMEN'S SHELTER
- CF7 MEN'S SHED

COMMERCIAL / TOURISM:

- CT1 CBD EXPANSION AREA (NORTH)
- CT2 CBD EXPANSION AREA (SOUTH)

0 100m 200m 300m 400m 500m 600m

SCALE 1:8,000 @ A3

Cardno®
Tel: (07) 4034 0500

Date: 3rd September 2019
Scale: 1 : 8,000 @ A3
Drawn: MC
Job No.: Q174180
Plan No.: Q174180-MP-P-01 C

This plan is conceptual and for discussion purposes only. All areas, dimensions and land uses are preliminary, subject to investigation, survey, engineering, and Local Authority and Agency approvals.

APPENDIX H

MASTER PLAN PROJECT INDEX

PREPARED BY CARDNO

MASTER PLAN PROJECT INDEX

Project ID	Project Name	New Lots	Lot Size	Associated Projects	Priority	Infrastructure Costs
RS1	Residential Expansion Area (North)	**33** Residential	838m^2 to 1,679m^2	RS5	Short Term	$4,896,941
RS2	Residential Expansion Area (North - East)	**10** Residential **1** Balance Parcel	988m^2 to 1,118m^2 9,955m^2 (balance parcel)	OT1	Long Term	$2,692,499
RS3	Residential Expansion Area (South - East)	**20** Residential	1,000m^2 to 1,088m^2	OS2	Long Term	$5,749,685
RS4	Residential Expansion Area (South)	**101** Residential **2** Open Space / Drainage	577m^2 to 1,141m^2	RS3 RS6	Medium Term	$21,927,685
RS5	Residential Investigation Area (North)	Subject to Design	Subject to Design	RS1 OT3	Long Term	Not Costed – subject to concept design
RS6	Residential Investigation Area (South)	Subject to Design	Subject to Design	RS4	Long Term	Not Costed – subject to concept design
ID1	Future Industrial Estate	Subject to Design	Subject to Design	Not Applicable	Medium Term	$5,147,708
CT1	CBD Expansion Area (North)	Not Applicable	Not Applicable	CT2 OS1 CF2 OT2	Medium Term	Not Costed
CT2	CBD Expansion Area (South)	Not Applicable	Not Applicable	CT1 OS1 CF2 OT2	Medium Term	Not Costed
CF1	Cemetery (South) Investigation Area	**1** Community Facility	3,379m^2	Not Applicable	Long Term	$1,563,204
CF2	Future Youth Centre	Not Applicable	589m^2	CT1 CT2 CF6	Short Term	Not Costed – serviced by existing infrastructure
CF3	Cyclone Shelter	**1** Community Facility	3,742m^2	CF4 CF5	Short Term	$479,582
CF4	Teacher's Housing	**1** Community Facility	2,357m^2	CF3 CF5	Short Term	$256,846

MASTER PLAN PROJECT INDEX

Project ID	Project Name	New Lots	Lot Size	Associated Projects	Priority	Infrastructure Costs
CF5	Independent Living	1 Community Facility	4,758m^2	CF3 CF4	Short Term	$283,274
CF6	Women's Shelter	1 Community Facility	1,257m^2	CF5 CF2	Short Term	$93,103
CF7	Men's Shed	1 Community Facility	1,000m^2	Not Applicable	Medium Term	Not Costed
OS1	Future Splash Park & Outdoor Gym	1 Recreation / Open Space	1,477 m^2	CT1 CT2 OT2	Medium Term	Not Costed
OS2	Future Sporting Fields	1 Recreation / Open Space	28,643m^2	RS3	Medium Term	Not Costed
OT1	Relocated Telecommunications Infrastructure			RS2	Long Term	Not Costed
OT2	Town Centre			CT1 CT2 OS1	Medium Term	Not Costed
OT3	Sewerage Treatment Plant Upgrade			RS5	Medium Term	Not Costed
OT4	Solar Farm			Not Applicable	Medium Term	Not Costed

APPENDIX

I

INDICATIVE DEVELOPMENT COSTS

PREPARED BY CARDNO

PORMPURAAW MASTER PLAN

For: Department of Aboriginal and Torres Strait Islander Partnerships

Last Update: 20-Aug-19

Cardno Shaping the Future

Stage No			RS1		RS2		RS3		RS4		CF1		CF2		CF3	
Yield (Number of Lots)			33		10		20		101		Cemetery Expansion		Youth Centre		Cyclone Sheltr	
Item	Unit	Rate	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount
HEADWORKS INFRASTRUCTURE UPGRADES (2010 Report)																
Sewage Treatment Plant Upgrade	Item															
Water Treatment Plant Upgrade	Item															
Delivery Pumps Upgrade	Item			Headworks infrastructure upgrade requirements have not been assessed or costed												
Reservoirs Upgrade	Item															
DEVELOPED RESIDENTIAL ALLOTMENTS																
Earthworks																
Site clearing and disposal of material	Ha	$ 7,000	4.10	$ 28,700	2.2	$ 15,400	3.9	$ 27,300	11.75	$ 82,250	2.1	$ 14,700	0	$ -	0	$ -
Erosion and sediment control	m	$ 20	735	$ 14,700	340	$ 6,800	500	$ 10,000	870	$ 17,400	325	$ 6,500	0	$ -	200	$ 4,000
Strip topsoil and respread	m^3	$ 10	3,025	$ 30,250	1,660	$ 16,600	2900	$ 29,000	8700	$ 87,000	500	$ 5,000	0	$ -	0	$ -
Cut to fill on lots	m^3	$ 15	1,550	$ 23,250	700	$ 10,500	800	$ 12,000	4600	$ 69,000	1000	$ 15,000	0	$ -	0	$ -
Cut in open drains to fill on lots	m^3	$ 15	0	$ -	0	$ -	0	$ -	1800	$ 27,000	0	$ -	0	$ -	0	$ -
Cut in roads and table drains to fill on lots	m^3	$ 15	3,150	$ 47,250	950	$ 14,250	2850	$ 42,750	7500	$ 112,500	650	$ 9,750	0	$ -	250	$ 3,750
Roadworks																
Gravel paved hot bitumen surfaced (6 m wide)	m	$ 825	660	$ 544,500	340	$ 140,250	500	$ 412,500	2380	$ 1,963,500	260	$ 214,500	0	$ -	70	$ 57,750
Stormwater Drainage																
Concrete edge strips/K & C to road pavement	m	$ 200	1,120	$ 224,000	340	$ 68,000	1000	$ 200,000	4000	$ 800,000	520	$ 104,000	0	$ -	150	$ 30,000
Concrete invert to table drain	m	$ 750	600	$ 450,000	340	$ 255,000	930	$ 697,500	4000	$ 3,000,000	520	$ 390,000	0	$ -	140	$ 105,000
1200 x 450 RCBC incl conc base/invert crossings	m	$ 1,500	45	$ 67,500	0	$ -	75	$ 112,500	240	$ 360,000	45	$ 67,500	0	$ -	0	$ -
Headwalls, Wingwalls and Aprons	m^3	$ 1,800	12.5	$ 22,500	0	$ -	12	$ 21,600	48	$ 86,400	7.25	$ 13,050	0	$ -	0	$ -
Bio-Basins/Treatment	m^2	$ 450	1,000	$ 450,000	550	$ 247,500	1225	$ 551,250	2900	$ 1,305,000	0	$ -	0	$ -	0	$ -
Bio basin concrete spillway	m^2	$ 350	150	$ 52,500	150	$ 52,500	150	$ 52,500	375	$ 131,250	0	$ -	0	$ -	0	$ -
Water Reticulation																
100 dia, PVC pipe	m	$ 165	460	$ 75,900	400	$ 66,000	900	$ 148,500	2100	$ 346,500	260	$ 42,900	0	$ -	70	$ 11,550
150 dia. PVC pipe	m	$ 210	200	$ 42,000	0	$ -	350	$ 73,500	500	$ 105,000	0	$ -	0	$ -	0	$ -
200 dia PVC pipe	m	$ 280	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
SV's	No	$ 1,500	9	$ 13,500	4	$ 6,000	10	$ 15,000	46	$ 69,000	2	$ 3,000	0	$ -	1	$ 1,500
Hydrants	No	$ 2,275	8	$ 18,200	5	$ 11,375	11	$ 25,025	30	$ 68,250	2	$ 4,550	0	$ -	1	$ 2,275
Single house connections	No	$ 1,000	33	$ 33,000	11	$ 11,000	20	$ 20,000	101	$ 101,000	1	$ 3,000	0	$ -	1	$ 3,000
Connect to existing main	No	$ 3,000	3	$ 9,000	2	$ 6,000	2	$ 6,000	3	$ 9,000	2	$ 6,000	0	$ -	1	$ 3,000
VSD Pump Building	Item	$ 150,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Variable speed drive pump set	Item	$ 80,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Standby generator	Item	$ 40,000	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -

Stage No			RS1		RS2		RS3		RS4		CF1		CF2		CF3	
Yield (Number of Lots)			33		10		20		101		Cemetery Expansion		Youith Centre		Cyclone Shelter	
Item	Unit	Rate	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount
Sewerage Reticulation																
150 dia. PVC	m	$ 300	690	$ 207,000	290	$ 87,000	600	$ 180,000	1800	$ 540,000	0	$ -	0	$ -	70	$ 21,000
Manholes	No	$ 9,000	13	$ 117,000	7	$ 63,000	11	$ 99,000	36	$ 324,000	0	$ -	0	$ -	2	$ 18,000
Lot connections	No	$ 650	33	$ 21,450	11	$ 7,150	20	$ 13,000	101	$ 65,650	0	$ -	0	$ -	3	$ 1,950
FRP Pump Station	Item	$ 600,000	0	$ -	0.5	$ 300,000	0.5	$ 300,000	1	$ 600,000	0	$ -	0	$ -	0	$ -
Standby Generator	Item	$ 40,000	0	$ -	0.5	$ 20,000	0.5	$ 20,000	1	$ 40,000	0	$ -	0	$ -	0	$ -
90 OD polyethylene pressure main	m	$ 160	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
110 OD polyethylene pressure main	m	$ 275	0	$ -	400	$ 55,000	400	$ 55,000	750	$ 206,250	0	$ -	0	$ -	0	$ -
140 OD polyethylene pressure main	m	$ 300	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -	0	$ -
Electricity Supply																
Conduits, pits and pole bases	Lots	$ 5,600	33	$ 184,800	11	$ 61,600	20	$ 112,000	101	$ 1,131,200	1	$ 16,800	0	$ -	1	$ 11,200
Cabling and street lights	Lots	$ 6,600	33	$ 217,800	11	$ 72,600	20	$ 132,000	101	$ 1,333,200	1	$ 19,800	0	$ -	1	$ 13,200
Transformer	No	$ 75,000	0.5	$ 37,500	0.25	$ 18,750	1	$ 75,000	2	$ 150,000	0	$ -	0	$ -	0	$ -
Sub Totals				$ 2,932,300		$ 1,612,275		$ 3,442,925		$ 13,130,350		$ 936,050		$ -		$ 287,175
Contingencies	Item	30%		$ 879,690		$ 483,683		$ 1,032,878		$ 3,939,105		$ 280,815		$ -		$ 86,153
Preliminaries																
Establishment, insurance, As-constructed	Item	22%		$ 645,106		$ 354,701		$ 757,444		$ 2,888,677		$ 205,931		$ -		$ 63,179
Project Management																
Survey, design, and construction administration	Item	15%		$ 439,845		$ 241,841		$ 516,439		$ 1,969,553		$ 140,408		$ -		$ 43,076
TOTALS				**$ 4,896,941**		**$ 2,692,499**		**$ 5,749,685**		**$ 21,927,685**		**$ 1,563,204**		**$ -**		**$ 479,582**
Cost per Residential Lot				**$ 148,392**		**$ 269,249.93**		**$ 287,484**		**$ 235,782**						

PORMPURAAW MASTER PLAN

For: Department of Aboriginal and Torres Strait Islander Partnerships

Last Update: 22-Aug-19

Stage No			CF4		CF5		CF6		ID1							
Yield (Number of Lots)			Teachers Housing		Seniors Units		Womens Shelter		Industrial Estate							
Item	Unit	Rate	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount
HEADWORKS INFRASTRUCTURE UPGRADES																
Sewage Treatment Plant	Item															
Water Treatment Plant Upgrade	Item															
Delivery Pumps Upgrade	Item			Headworks infrastructure upgrade requirements have not been assessed or costed												
Reservoirs Upgrade	Item															
DEVELOPED RESIDENTIAL ALLOTMENTS																
Earthworks																
Site clearing	Ha	$ 7,000	0.3	$ 2,100	0.6	$ 4,200	0.2	$ 1,400	7	$ 49,000		$ -		$ -		$ -
Erosion and sediment control	m	$ 20	90	$ 1,800	200	$ 4,000	90	$ 1,800	650	$ 13,000		$ -		$ -		$ -
Strip topsoil, stockpile, and respread	m^3	$ 10	0	$ -	0	$ -	0	$ -	3500	$ 35,000		$ -		$ -		$ -
Cut to fill on lots	m^3	$ 15	0	$ -	0	$ -	0	$ -	1500	$ 22,500		$ -		$ -		$ -
Cut in open drains to fill on lots	m^3	$ 15	0	$ -	0	$ -	0	$ -	850	$ 12,750		$ -		$ -		$ -
Cut in roads and table drains to fill on lots	m^3	$ 15	100	$ 1,500	250	$ 3,750	0	$ -	1500	$ 22,500		$ -		$ -		$ -
Roadworks																
Gravel paved hot bitumen surfaced (7 m)	m	$ 825	0	$ -	50	$ 41,250	0	$ -	300	$ 247,500		$ -		$ -		$ -
Stormwater Drainage																
Concrete edge strips to road pavement	m	$ 200	0	$ -	0	$ -	0	$ -	550	$ 110,000		$ -		$ -		$ -
Concrete invert to table drain	m	$ 750	90	$ 67,500	0	$ -	0	$ -	550	$ 412,500		$ -		$ -		$ -
1200 x 450 RCBC incl conc base	m	$ 1,500	0	$ -	0	$ -	0	$ -	25	$ 37,500		$ -		$ -		$ -
Headwalls, Wingwalls and Aprons	m^3	$ 1,800	0	$ -	0	$ -	0	$ -	55.5	$ 99,900		$ -		$ -		$ -
Bio-Basins	m^2	$ 450	0	$ -	0	$ -	0	$ -	1750	$ 787,500		$ -		$ -		$ -
Bio basin concrete spillway	m^2	$ 350	0	$ -	0	$ -	0	$ -	75	$ 26,250		$ -		$ -		$ -
Water Reticulation																
100 dia, PVC pipe	m	$ 165	0	$ -	50	$ 8,250	0	$ -	325	$ 53,625		$ -		$ -		$ -
150 dia. PVC pipe	m	$ 210	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -
200 dia PVC pipe	m	$ 280	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -
SV's	No	$ 1,500	0	$ -	0	$ -	0	$ -	2	$ 3,000		$ -		$ -		$ -
Hydrants	No	$ 2,275	0	$ -	1	$ 2,275	0	$ -	5	$ 11,375		$ -		$ -		$ -
Single house connections	No	$ 1,000	4	$ 4,000	1	$ 5,000	1	$ 2,000	14	$ 28,000		$ -		$ -		$ -
Connect to existing main	No	$ 3,000	0	$ -	0	$ -	0	$ -	1	$ 3,000		$ -		$ -		$ -
VSD Pump Building	Item	$ 150,000	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -
Variable speed drive pump set	Item	$ 80,000	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -
Standby generator	Item	$ 40,000	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -

Stage No			CF4		CF5		CF6		ID1							
Yield (Number of Lots)			Teachers Housing		Seniors Units		Womens Shelter		Industrial Estate							
Item	Unit	Rate	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount	Qty	Amount
Sewerage Reticulation																
150 dia. PVC	m	$ 300	55	$ 16,500	90	$ 27,000	55	$ 16,500	675	$ 202,500		$ -		$ -		$ -
Manholes	No	$ 9,000	1	$ 9,000	1	$ 9,000	1	$ 9,000	15	$ 135,000		$ -		$ -		$ -
Lot connections	No	$ 650	4	$ 2,600	6	$ 3,900	1	$ 650	14	$ 9,100		$ -		$ -		$ -
FRP Pump Station	Item	$ 475,000	0	$ -	0	$ -	0	$ -	1	$ 475,000		$ -		$ -		$ -
Standby Generator	Item	$ 40,000	0	$ -	0	$ -	0	$ -	1	$ 40,000		$ -		$ -		$ -
90 OD polyethylene pressure main	m	$ 160	0	$ -	0	$ -	0	$ -	1	$ 160		$ -		$ -		$ -
110 OD polyethylene pressure main	m	$ 275	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -
140 OD polyethylene pressure main	m	$ 300	0	$ -	0	$ -	0	$ -	0	$ -		$ -		$ -		$ -
Electricity Supply																
Conduits, pits and pole bases	Lots	$ 5,600	4	$ 22,400	1	$ 28,000	1	$ 11,200	14	$ 78,400		$ -		$ -		$ -
Cabling and street lights	Lots	$ 6,600	4	$ 26,400	1	$ 33,000	1	$ 13,200	14	$ 92,400		$ -		$ -		$ -
Transformer	No	$ 75,000	0	$ -	0	$ -	0	$ -	1	$ 75,000		$ -		$ -		$ -
Sub Totals				$ 153,800		$ 169,625		$ 55,750		$ 3,082,460		$ -		$ -		$ -
Contingencies	Item	30%		$ 46,140		$ 50,888		$ 16,725		$ 924,738		$ -		$ -		$ -
Preliminaries																
Establishment, insurance, As-constructed	Item	22%		$ 33,836		$ 37,318		$ 12,265		$ 678,141		$ -		$ -		$ -
Project Management																
Survey, design, and construction administration	Item	15%		$ 23,070		$ 25,444		$ 8,363		$ 462,369		$ -		$ -		$ -
TOTALS				**$ 256,846**		**$ 283,274**		**$ 93,103**		**$ 5,147,708**		**$ -**		**$ -**		**$ -**

APPENDIX

J

TOWN CENTRE MASTERPLAN

PREPARED BY LANDPLAN

PORMPURAAW TOWN CENTRE MASTERPLAN

Prepared for: DATSIP February 2019

Queensland Government

Cardno

LANDPLAN
LANDSCAPE ARCHITECTURE

N

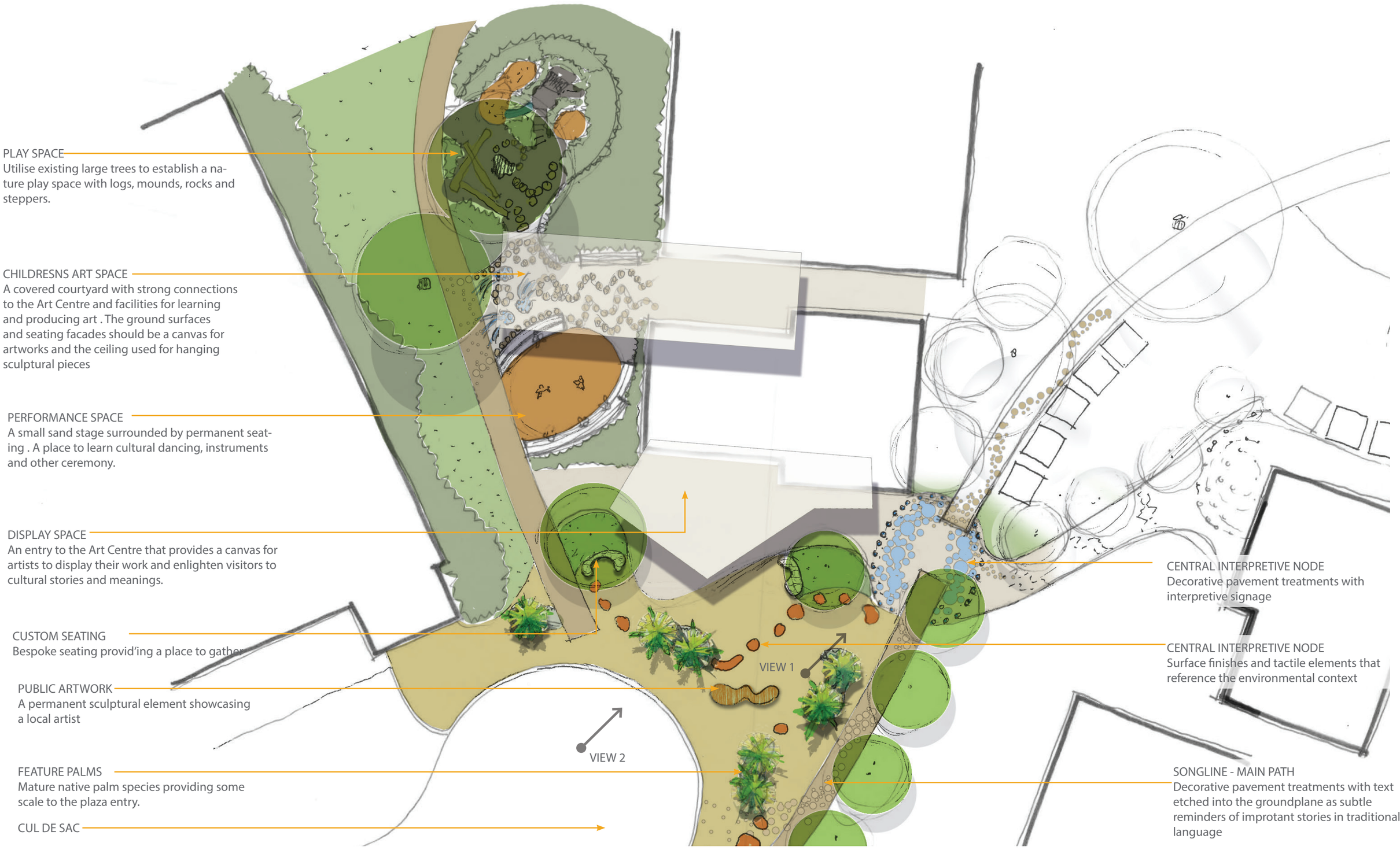
PORMPURAAW TOWN CENTRE

Landscape Concept Plan| L1.01 Rev 1

Scale 1:600 @ A3

LANDPLAN
LANDSCAPE ARCHITECTURE

a PO Box 781 Bungalow 4870 | m 0439 005 294 | e simon@landplanla.com.au



N

PORMPURAAW TOWN CENTRE

Landscape Concept Plan| L2.01 Rev 1

Scale 1:300 @ A3

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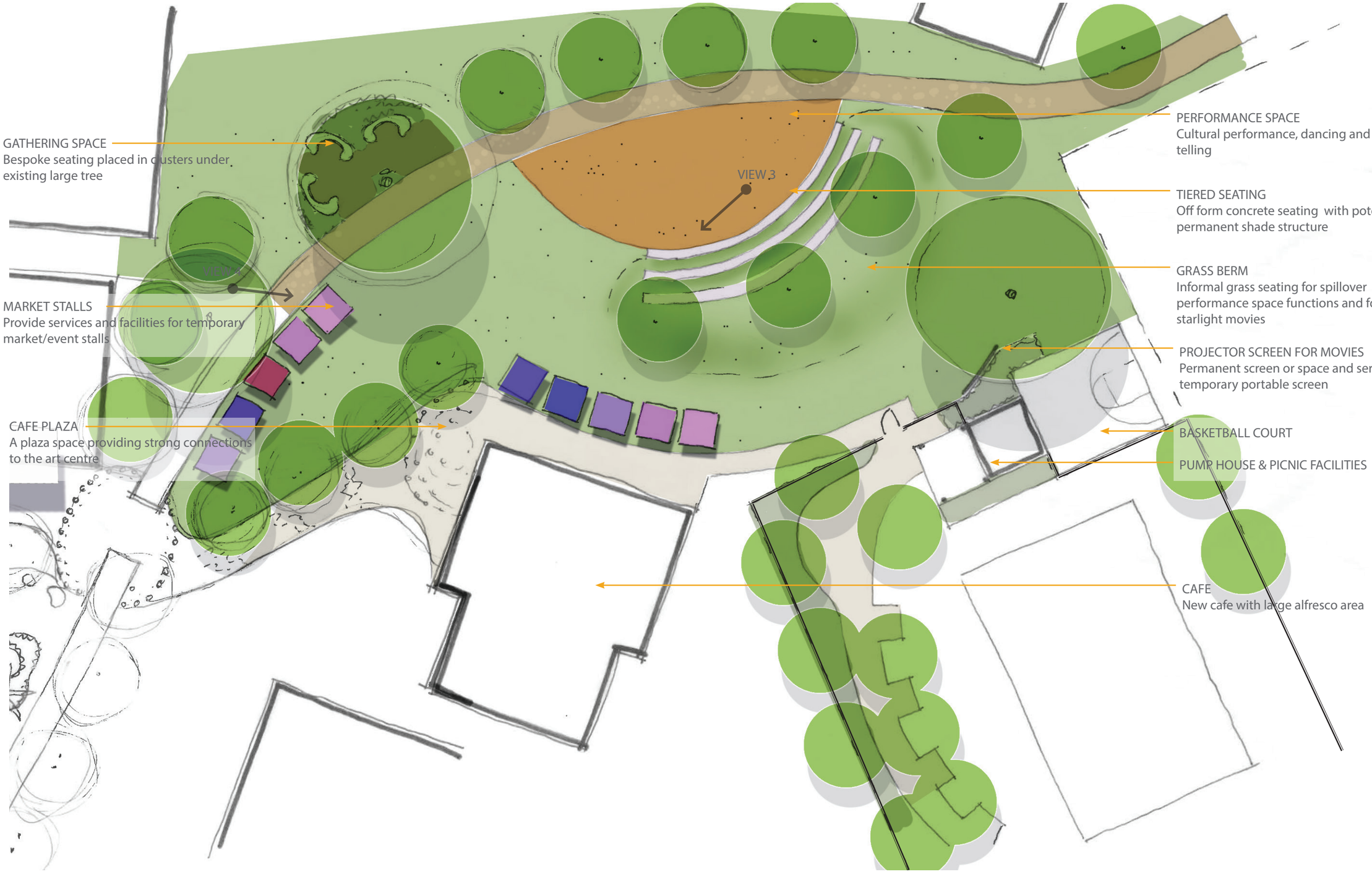

PORMPURAAW TOWN CENTRE

Landscape Concept Plan| L2.02 Rev 1

Scale 1:300 @ A3

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VIEW 1

VIEW 2

VIEW 3

VIEW 4

PORMPURAAW TOWN CENTRE

Landscape Perspectives| L3.01 Rev 1

Scale 1:300 @ A3

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APPENDIX K

WATER SUPPLY TECHNICAL MEMORANDUM

PREPARED BY CARDNO

PORMPURAAW ABORIGINAL SHIRE COUNCIL

WATER SUPPLY INFRASTRUCTURE

DEFICIENCIES AND FUTURE CAPACITY REQUIREMENTS

Last Update: 18 September 2019

The following desk-top review of water supply infrastructure, future demand, and likely infrastructure upgrade requirements has been prepared for submission to the Department of Natural Resources, Mining and Energy (DNRME) for input into the Cape Communities Water Project.

1. Existing Infrastructure Reports

This report is based on a desk-top assessment of the following reports:

- Drinking Water Quality Management Plan – 2018. Pormpuraaw Aboriginal Shire Council;
- Drinking Water Quality Management Plan report 2017-2018. Pormpuraaw Aboriginal Shire Council;
- Pormpuraaw Community Total Management Plan 2000-2010. GHD 20 Dec 2001;
- Pormpuraaw Strategic Asset Management Plan. Connell Wagner, 16 Nov 2004;
- Pormpuraaw Water Asset Condition Reports. Hunter water Australia Pty Ltd Sept. 2006.

The above reports, particularly the 2018 Drinking Water Quality Management Plan highlight the status of the existing water supply infrastructure.

2. Recent Capital Works Upgrades.

The water supply infrastructure has been recently upgraded to replace all old AC and undersized mains. Distribution pressure within the water supply network has been improved though the installation of variable speed drive pumps supplied from the existing two header tanks located on stands.

3. Existing System Deficiencies

System deficiencies identified from the various reports include:

- As demand increases on the reticulation network consideration should be given to rehabilitate and connect to the raw water supply either or both of bores 3 or 4 to meet minimum Water Supply Guideline parameters of supplying Mean Day Maximum Month Demand (MDMM) in twenty (20) hours to the treatment plant and storage;
- Consideration should be given to complete installing fixed standby generators to supply back up power to all components of the water supply system including the treatment plant, each supply bore, and the variable speed drive pumps to ensure reliability of water supply, particularly during cyclones and severe storms when overhead electricity reticulation is subject to shut down and possible severe damage;
- Consideration should be given to installing water meters to each service point to assist with demand management;
- Consideration should be given to providing pH correction at the treatment plant to reduce the acidity of the bore water;
- The existing two header tank on stands should be removed at the end of the their useful life and the variable speed drive pumps upgraded, as ground level storage is more appropriate, and as the existing header tanks are a potential self-harm hazard.

4. Existing Water Supply

Bulk water is drawn by two sub-artesian bores from the deep Wyaaba bed porous limestone aquifer. Raw water is pumped to a 500 kL and 2.0 ML ground level concrete reservoirs. Water is then pumped to the two header tanks.

Bore 1 (RN92960 drilled in 1973) is located adjacent to the low level storage reservoir, and bore 2 (RN92959) is located approximately 1.5 Km east of the community centre.

Two further bores, bore 3 (RN45010) and bore 4 RN45011) provide a back-up to the primary water supply. These bore are not directly connected to the water supply.

Bore Number	Bore ID	Location	Year Drilled	Size (mm)	Pump Rate (l/s)	Bore Depth (m)	Pump Depth (m)
1	RN 92960	Supply Bore	1973	200	10	226.8	40
2	RN 92959	Supply Bore	1973	200	15	76.2	40
3	RN 45010	School Bore	1975	117	7	75	
4	RN 45011	School Bore	1975	117	7	59	

Further bores are located south of the township, which service the crocodile farming. One bore tops up a series of lagoons in swamp land parallel to the beach and the other supplies water to the hatchery and nursery pens. These bores are not connected to the community reticulation system.

Bulk water meters are installed on bores 1 and 2. Residential water meters have not been installed.

The bore water is considered to be moderately acidic but the treated water is within Australian Drinking Water Guidelines, however the water is corrosive to galvanised fittings.

Consideration could be given to install treatment to reduce the hardness and the acidity of the water to reduce corrosion on fittings.

- ***Average Day Demand (litres per capita per day).***
- The 2018 Pormpuraaw Drinking Water Management Plan indicates an average day demand of 1.1 ML per day. Based on the Pormpuraaw Council's estimated population of 780 persons, this indicates an average day demand of 1410 litres per person.
- A review of water consumption in coastal regional communities included in the Hope Vale Drought Management Plan (DMP) prepared by Cardno indicated an average day demand ranging between 470 and 1250 litres per person.
- The average day demand in Pormpuraaw is at the high end of the above range.
- Demand for future upgrades to the water supply system, could therefore be delayed through the introduction of consumer education and demand management.
- ***Bore Field Capacity***

  Bore 1: 8.6 l/s

  Bore 2: 12.6 l/s

  Total delivery capacity of 21.2 l/s to the treatment plant.

  Off-line bores located at the school not connected to the water supply system:

  Bore 3: 7 l/s

  Bore 4: 7 l/s

- ***Water Treatment Plant Capacity***

  Pumping rates between the raw water supply bores (21.2 l/s), and the treated water delivery pumps to the high level tanks (19 l/s) would indicated that the current treatment facility of gaseous chlorination may only be just meeting current demand.

  The 2018 Drinking Water Quality Management Plan prepared by the Council indicates that the bore water is slightly acidic (corrosive to fittings) although within the Drinking Water Guidelines and is hard.

- ***Reservoir Capacity***

  There is currently a single 0.5 ML and single 2.0 ML ground level concrete reservoirs servicing the Pormpuraaw community. These reservoirs are located approximately one kilometre east of the community. There is sufficient area at the reservoirs to install a third reservoir when required.

  Treated water is pumped from the concrete reservoirs to two 120 kL tanks located on stands within the community. These tanks deliver water to variable speed drive pumps to pressurise the reticulation system within a range of 150 kPa to 250 kPa.

5. FUTURE DEMAND

Average per capita consumption figures are difficult to establish due to the variability in population estimations. It is generally recognised that the Australian Bureau of Statistics (ABS) Census data for remote Indigenous communities under report actual community population making in difficult to determine actual per capita consumption.

Council's estimation of the Pormpuraaw population in 2018 is 780 persons, upon which this demand analysis is based.

Population growth is extrapolated at an annual growth rate of 1.19% p.a. for a range of average day per capita demands over the next twenty years are included in the appended Excel spreadsheets.

The timing of water supply infrastructure upgrades is highly dependent on the ability of Council to manage per capita demand. The following table indicates likely demand variation based on four (4) different per capita daily demands varying between a minimum design criteria of 400 l/c/d (lowest demand) to the current Pormpuraaw per capita demand of 1410 l/c/d.

Design Parameter	**Demand**			
Average Day Demand (l/c/d)	400	600	900	1410
Average Day demand (ML)	0.312	0.468	0.702	1.1
Mean day Maximum Month (ML) (1.5 x average day)	0.5	0.7	1.1	1.65
Peak Day (ML) (2.25 x average day)	0.70	1.05	1.58	2.47
Peak Hour (ML) (1/12 Peak Day)	0.059	0.088	0.132	0.206
Delivery to Reservoirs (ML/Hr) (MDMM in 20 hrs)	0.023	0.035	0.053	0.082
Treatment Capacity and Delivery to Reservoir (l/s)	6.5	9.75	14.63	22.91
Minimum Reservoir Storage Capacity (ML)	0.81	1.16	1.69	2.58

The timing of water supply infrastructure upgrades is highly dependent on the ability of Council to manage per capita demand. The table above indicates likely demand based on four (4) different per capita daily demands varying between a low demand of 400 l/c/d to the current Pormpuraaw per capita demand of 1410 l/c/d. The current water supply infrastructure is just meeting current demand at 1410 litres per capita per day.

Refer to attached spreadsheet for the progressive timing of water supply upgrade requirements based on a range of per capita demands and population growth.

PORMPURAAW ABORIGINAL SHIRE COUNCIL

PORMPURAAW COMMUNITY MASTER PLANNING

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Current Water Supply Infrastructure Capacity Last Update: 18 September 2019

Description	No	Capacity	Remarks
Raw Water Supply			
Bore 1	1	8.6 l/s	Constructed in 1973. 200 mm dia PVC casing drilled to 226.8 m, pump depth 40 m
Bore 2	1	12.6 l/s	Constructed in 1973. 200 mm dia PVC casing drilled to 76.2 m, pump depth 40 m
Total Bore Capacity		**21.2 l/s**	
Delivery Mains to Ground Level Reservoirs			
Bore 1	1	100 ND	Source RPS ISIP Infgrastruxcture Plans
Bore 2	1	100 ND	Source RPS ISIP Infgrastruxcture Plans
Ground Level Reservoirs			
Concrete	1	0.5 ML	
Concrete	1	2.0 ML	
Treatment Plant			
Gaseous Chlorination Treatment	1		Prior to discharge to 0.5 ML reservoir
Delivery Mains to Elevated Storage Tanks			
To Elevated Tanks	1	150 ND	Delivery pumps 19 l/s
Elevated Header Tanks			
	2	120 kL each	Steel on stands
Variable Speed Drive Booster Pumps			4 Stage Grunfos Variable Sped Drive set 150 kPa - 250 kPa.
Reticulation			
Reticulation network comprises of $_u$PVC pipes			All of the old reticulation has been replaced

PORMPURAAW ABORIGINAL SHIRE COUNCIL
PORMPURAAW COMMUNITY MASTER PLANNING

Last update: 18 September 2019

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Current and Future Projected Water Supply Demand and Infrastructure Upgrade Requirements

Description	Population Estimations																				
Design Parameter (Year)	**Base Year 2018**	**2018**				**2023 (1.19% growth rate)**				**2028 (1.19% growth rate)**				**2033 (1.19% growth rate)**				**2038 (1.19% growth rate)**			
Estimated Population (1)	**780**	**780**				**832**				**885**				**937**				**989**			
Estimated Number of Dwellings and Population Density	**254 (3.1)**	**254 (3.1)**				**268 (3.1)**				**285 (3.1)**				**302 (3.1)**				**319 (3.1)**			
Average Day Demand (l/c/d) (2)	1410	400	600	900	1410	400	600	900	1410	400	600	900	1410	400	600	900	1410	400	600	900	1410
Total Annual Demand (ML)	361	114	171	256	401	121	182	273	428	129	194	291	455	137	205	308	482	144	217	325	509
Average Day demand (ML)	1.1 (2)	0.312	0.468	0.702	1.100	0.333	0.499	0.749	1.173	0.354	0.531	0.797	1.248	0.375	0.562	0.843	1.321	0.396	0.593	0.890	1.394
Mean Day Maximum Month (ML) 1.5 x AD	1.65	0.47	0.70	1.05	1.65	0.50	0.75	1.12	1.76	0.53	0.80	1.19	1.87	0.56	0.84	1.26	1.98	0.59	0.89	1.34	2.09
Peak Day (ML) [2.25 x Average Day]	2.475	0.70	1.05	1.58	2.475	0.75	1.12	1.68	2.64	0.80	1.19	1.79	2.81	0.84	1.26	1.90	2.97	0.89	1.34	2.00	3.14
Peak Hour (ML) [1/12 X Peak Day]	0.206	0.059	0.088	0.132	0.206	0.062	0.094	0.140	0.220	0.066	0.100	0.149	0.234	0.070	0.105	0.158	0.248	0.074	0.111	0.167	0.261
Required Delivery to Reservoirs (ML/hr) [MDMM in 20 Hrs]	0.083	0.023	0.035	0.053	0.082	0.025	0.037	0.056	0.088	0.027	0.040	0.060	0.094	0.028	0.042	0.063	0.099	0.030	0.045	0.067	0.105
Required treatment/delivery to reservoirs (MDMM in 20 hrs) (l/s)	22.92	6.50	9.75	14.63	22.91	6.93	10.40	15.60	24.44	7.38	11.06	16.59	26.00	7.81	11.71	17.57	27.52	8.24	12.36	18.54	29.05
Minimum Storage Requirement (ML) [3(PD-MDMM)/1000000 + 15 l/s for 2 Hrs]	2.58	0.81	1.16	1.69	2.58	0.86	1.23	1.79	2.75	0.90	1.30	1.90	2.92	0.95	1.37	2.01	3.08	1.00	1.44	2.11	3.25
Reservoir upgrade (1 x 1ML)																					
Delivery pumps - upgrades																					
Treatment plant upgrade																					
Remove High Level Tanks																					
Augment Variable Sped Drive Pumps																					
Additional Raw Water Supply																					

Explanatory Notes:

(1) Based on Council's 2018 population estimation extrapolated at 1.19% growth rate.

(2) Based on Drinking Water Quality Management Plan 2018

Exceeds current ground level storage capacity at per capita consumption

Additional ground level storage required unless per capita demand is reduced

Additional raw water supply and delivery pump upgrade required unless per capita demand is reduced

High level tanks removed at end of useful life and variable speed drive pumps upgraded

PORMPURAAW ABORIGINAL SHIRE COUNCIL
PORMPURAAW COMMUNITY MASTER PLANNING

Last update: 18 September 2019

Current and Future Projected Water Supply Demand and Infrastructure Upgrade Requirements

Description	Population Estimations																				
Design Parameter (Year)	**Base Year 2018**	**2018**				**2023 (1.19% growth rate)**				**2028 (1.19% growth rate)**				**2033 (1.19% growth rate)**				**2038 (1.19% growth rate)**			
Estimated Population (1)	**780**	**780**				**832**				**885**				**937**				**989**			
Estimated Number of Dwellings and Population Density	**254 (3.1)**	**254 (3.1)**				**268 (3.1)**				**285 (3.1)**				**302 (3.1)**				**319 (3.1)**			
Average Day Demand (l/c/d) (2)	1410	400	600	900	1410	400	600	900	1410	400	600	900	1410	400	600	900	1410	400	600	900	1410
Average Day demand (ML)	1.1 (2)	0.312	0.468	0.702	1.100	0.333	0.499	0.749	1.173	0.354	0.531	0.797	1.248	0.375	0.562	0.843	1.321	0.396	0.593	0.890	1.394
Mean Day Maximum Month (ML) 1.5 x AD	1.65	0.47	0.70	1.05	1.65	0.50	0.75	1.12	1.76	0.53	0.80	1.19	1.87	0.56	0.84	1.26	1.98	0.59	0.89	1.34	2.09
Peak Day (ML) [2.25 x Average Day]	2.475	0.70	1.05	1.58	2.475	0.75	1.12	1.68	2.64	0.80	1.19	1.79	2.81	0.84	1.26	1.90	2.97	0.89	1.34	2.00	3.14
Peak Hour (ML) [1/12 X Peak Day]	0.206	0.059	0.088	0.132	0.206	0.062	0.094	0.140	0.220	0.066	0.100	0.149	0.234	0.070	0.105	0.158	0.248	0.074	0.111	0.167	0.261
Required treatment/delivery to reservoirs (MDMM in 20 hrs) (l/s)	22.92	6.50	9.75	14.63	22.91	6.93	10.40	15.60	24.44	7.38	11.06	16.59	26.00	7.81	11.71	17.57	27.52	8.24	12.36	18.54	29.05
Minimum Storage Requirement (ML) [3(PD-MDMM)/1000000 + 15 l/s for 2 Hrs]	2.58	0.81	1.16	1.69	2.58	0.86	1.23	1.79	2.75	0.90	1.30	1.90	2.92	0.95	1.37	2.01	3.08	1.00	1.44	2.11	3.25
Reservoir upgrade (1 x 1ML)									$1.5 m												
Delivery pumps - upgrades					$60 k																
Treatment plant upgrade									$40 k												
Remove High Level Tanks									$50 k												
Augment Variable Sped Drive Pumps									$60 k												
Additional Raw Water Supply					$300 k																

Explanatory Notes:

(1) Based on Council's 2018 population estimation extrapolated at 1.19% growth rate.

(2) Based on Drinking Water Quality Management Plan 2018

Exceeds current ground level storage capacity at per capita consumption

Additional ground level storage required unless per capita demand is reduced

Additional raw water supply and delivery pump upgrade required unless per capita demand is reduced

High level tanks removed at end of useful life and variable speed drive pumps upgraded