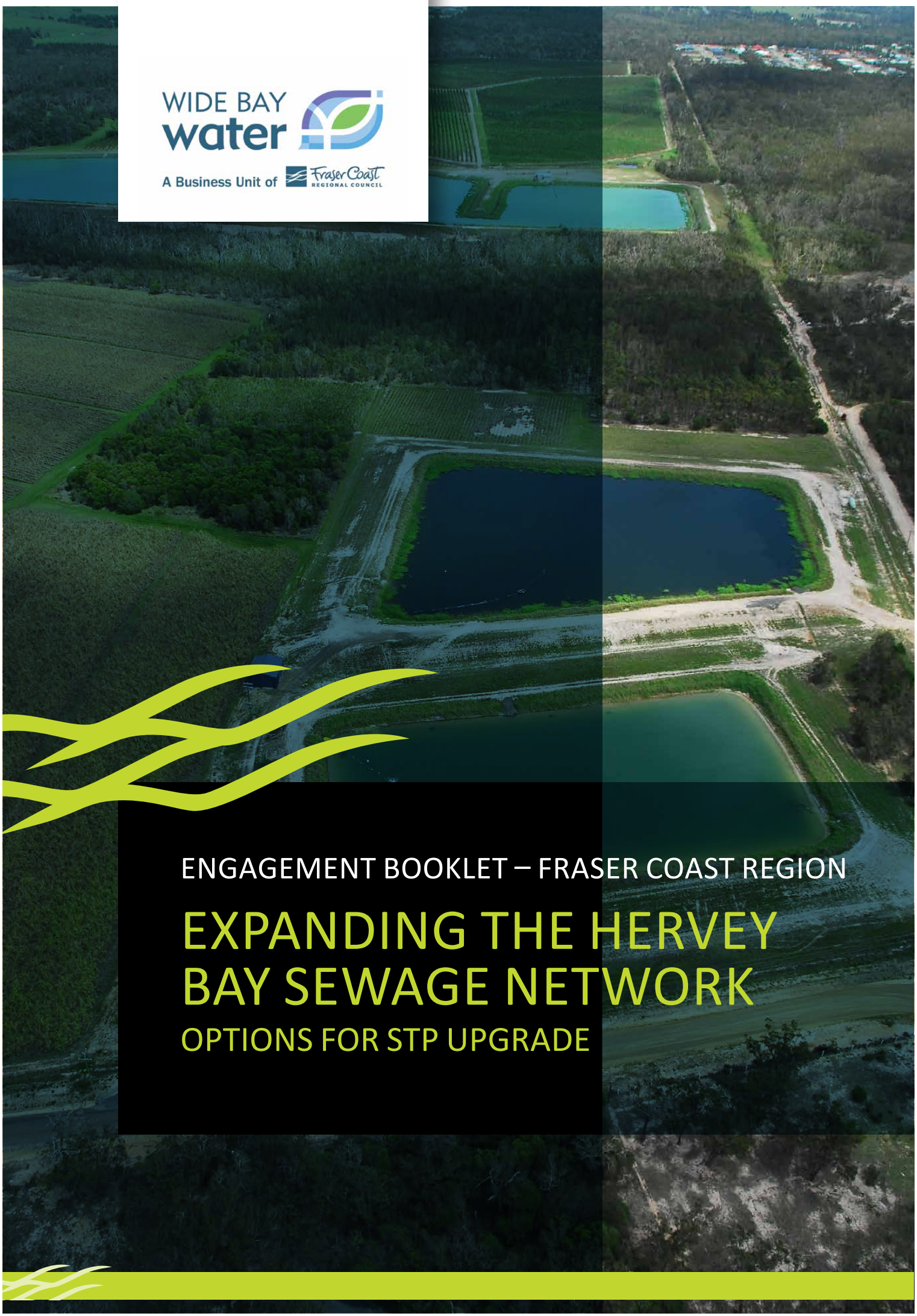


WIDE BAY water

A Business Unit of Fraser Coast Regional Council

ENGAGEMENT BOOKLET – FRASER COAST REGION

EXPANDING THE HERVEY BAY SEWAGE NETWORK

OPTIONS FOR STP UPGRADE

"The Fraser Coast Regional Council is engaging with the community to seek feedback on the two possible sites located at Nikenbah and Pulgul that can be upgraded in order to meet the needs of our growing population.

FRASER COAST REGION

EXPANDING THE HERVEY BAY SEWAGE NETWORK

OPTIONS FOR STP UPGRADE

As one of Australia's fastest growing regions Hervey Bay, and the Fraser Coast, faces significant future population and tourism growth. This creates opportunities as well as puts pressure on current infrastructure to cater for future needs.

Wide Bay Water (WBW), a business unit of the Fraser Coast Regional Council, is responsible for the water supply and sewage management for Hervey Bay. With the current sewage and recycled water management system reaching its limit to support the increasing population, dwellings and the associated sewage loading, WBW is investigating solutions to service the projected increase in load on the sewage system.

Fraser Coast Regional Council is one of Australia's leading Water Service Providers in maximising their recycled water use and, as a result, minimising the outflow of nutrients from being discharged into the Great Sandy Strait.

WHAT'S HAPPENED SO FAR?

To service the projected increase in sewage loading, significant work was undertaken as part of a site selection process for a major Sewage Treatment Plant (STP) capacity increase project. WBW commissioned a site selection study to evaluate options to achieve the capacity increase.

The study completed by Kellogg, Brown and Root (KBR) sought "to assess the Hervey Bay sewerage and recycled waste management system to identify a recommended site for the augmentation to cater for the expected increase in connections".

The options assessed involved the two STPs at Pulgul and Nikenbah, and how to manage the increase in recycled water. A copy of the study can be found at /www.frasercoast.qld.gov.au/major-sewagetreatment-plant-capacity-increase-for-hervey-bay-site-selection

WHAT HAPPENS NEXT?

The Fraser Coast Regional Council is engaging with the community to seek feedback on the two possible sites located at Nikenbah and Pulgul that can be upgraded in order to meet the needs of our growing population.

When looking at the three proposed options in this document, it will be important to consider the options for recycled water reuse expansion, opportunities for a relocated outfall, impacts of reuse expansion from an environmental and social impact, and the costs associated with each option.

HOW CAN YOU BE INVOLVED?

The main purpose of this consultation is to seek community feedback on each of the three options so Council can make a considered decision in balancing the technical assessments made and the views of the community.

To help you to understand this complex and technical network, we have provided:

> 'What happens when I flush: know your Hervey Bay Sewage Network' booklet;
> This booklet which details the three proposed options to address our future needs; and
> Feedback form for you to share your views on these three proposed options.

As you read through these documents, please use the glossary at the end of this booklet to explain some of the terms used.

Copies of these documents are available online, at Council's Customer Service Centres or branch libraries at Maryborough or Hervey Bay.

There are a number of engagement activities planned in September where you can participate and seek more detailed information. To be a part of this important decision for Hervey Bay:

> Join us for the community information stalls, site visits and community workshops
> Fill out the Feedback Form or our online survey
> Find the Council's Community Hub website at frasercoast.engagementhub.com.au and click on the link for the 'Major Sewage Treatment Plant Capacity Increase for Hervey Bay Site Selection project'.

Feedback on the proposed upgrade options closes at 5pm on Tuesday 8 October 2019.

WHAT ARE THE OPTIONS FOR THE PROPOSED UPGRADE?

The proposed upgrade of this current sewage and recycled water management system involves options to upgrade the capacity of two existing STPs plus options for additional infrastructure to manage the increase in recycled water.

The Hervey Bay Recycled Water Scheme (scheme) provides recycled water that can be reused at irrigation sites or released to the environment. The three proposed options include expanding the reuse scheme, or building a new outfall, or a combination of these two proposals.

OPTION 1 – Nikenbah STP	OPTION 2 – Pulgul STP	OPTION 3 – Pulgul STP
Upgrade Nikenbah STP	Upgrade Pulgul STP	Upgrade Pulgul STP
All flows at Nikenbah go into the expanded recycled water scheme	Existing recycled water scheme continues to operate	Recycled water scheme will be progressively expanded
	New outfall offset from the marina	New outfall offset from the marina

OPTION 1 - NIKENBAH STP – 100 per cent reuse scheme

- Nikenbah STP is upgraded.
- Nikenbah does not have access to an outfall and no safe option for emergency releases should the storage system be at capacity due to wet weather.
- All flows into Nikenbah must be reused.
- This requires significant expansion of the reuse scheme.
- Modelling estimates indicate an additional 1050ha of plantation area and 2000ML of storage are required in the next 20 years.
- Constructing a pipeline to Cassava and using WBW owned land there provides an additional 319ha of plantation.
- Additional potential for private use of recycled water along the Cassava pipeline.
- Cane farms along Vanderwolf Road could use the recycled water should a pipeline be constructed to provide them access.
- Approximately an additional 700ha of plantation is still required to provide sufficient irrigation area.
- One possible location for this additional plantation area is north west of Cassava.
- Construction of a pipeline to this area and purchase of land to set up 731ha of plantation has been included in the cost estimate.

BENEFITS

> This option prevents nutrients from being release into water bodies.
> Guarantees the majority of additional recycled water (due to growth) produced at STP is reused in one form or another.
> This is a beneficial use of a valuable resource.
> Expansion of the reuse system into areas where new large consumers may exist.
> This option maximises the amount of carbon dioxide absorbed out of the atmosphere.

CHALLENGES

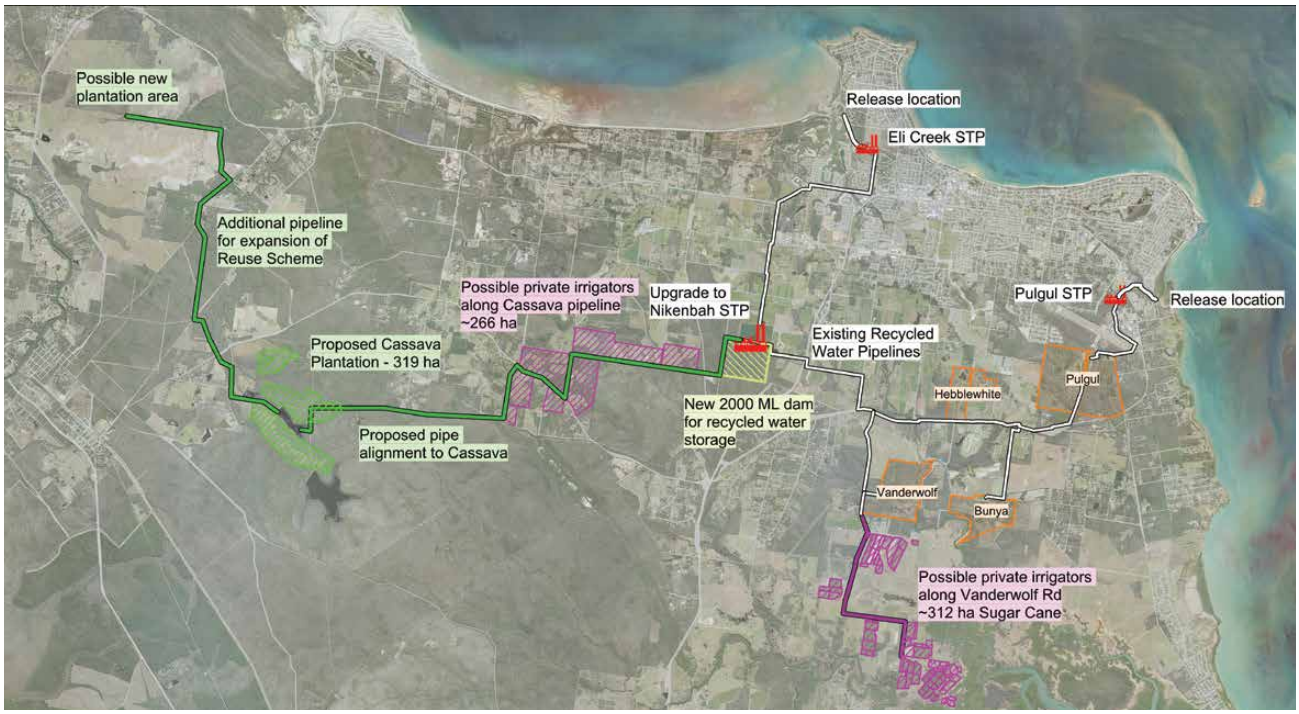
> With no access to an outfall it has no safe option for emergency releases should the storage system be at capacity due to wet weather.
> The potential 319 ha plantation at Cassava alone is not enough to reuse all of the recycled water that would be produced at Nikenbah during high wet weather periods.
> Reuse scheme would require significant investment in the near future to comply with license conditions should the region experience a high rainfall year. This means the Cassava plantation and pipeline will need to be constructed regardless of whether or not WBW can obtain subsidies for it.
> Purchase of land for reuse scheme expansion would be heavily dependent on negotiations with the landowners and their willingness to sell at an affordable price.
> This is the most expensive option.
> Climatic changes may mean more wetter years where this option would struggle to achieve reuse and release license requirements.

Estimated cost - $88.5 million

For more information about recycled water expansion, please keep reading to the section titled 'How do we use recycled water'.

LEGEND:

> Existing reuse pipework – White
> Existing Plantations – Orange
> Reuse expansion for plantations – Green
> Potential new private irrigators – Pink
> New outfall - Blue



OPTION2 – PULGUL STP - Outfall

- Pulgul STP is upgraded.
- Construction of a new outfall to offshore from the marina
- Distance from the marina is likely to be around 500-700m.
- The reuse scheme will not be expanded until another major STP capacity increase is required.
- The existing reuse scheme will continue current operations with recycled water available to all existing customers.

BENEFITS

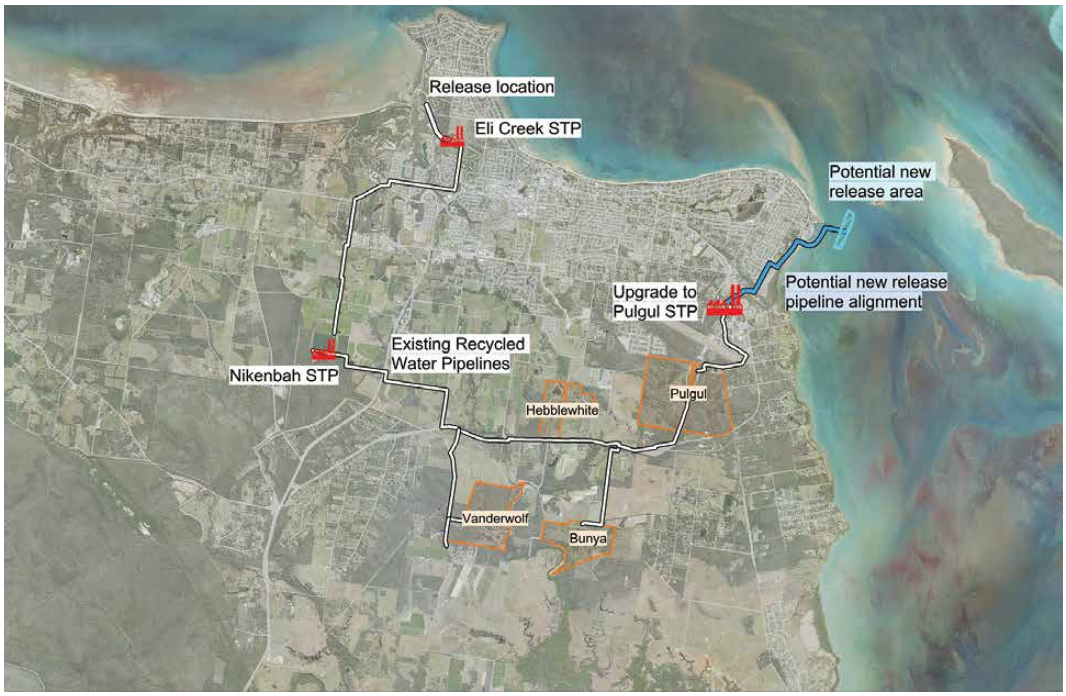
- This is the least expensive option with no expansion of the reuse scheme.
- Improves overall environmental impact of discharges (when they occur) due to:
  - improved dispersion of nutrients over a greater area; and
  - Safer location for the environment for emergency release of recycled water.
- Provides a solution that can be used regardless of weather conditions.

CHALLENGES

- This option discharges more nutrients into the ocean.
- Fraser Coast Regional Council could not expand the reuse scheme.
- Potential risk of negative environmental impacts: This risk is extremely low if the outfall is designed and managed correctly.
- Potential risk to public health from discharges at the new outfall: This risk is extremely low under standard operating conditions. With the STP closer to community residences odour may be a potential risk.
- Negative community perception of outfalls.

Estimated cost - $47.9 million

For more information about the potential new outfall, please keep reading to the section titled 'Why move the outfall'.



OPTION 3 – PULGUL STP – Outfall and continue to expand reuse scheme

- Pulgul STP is upgraded.
- Construction of a new outfall to offshore from the marina.
- Distance from the marina is likely to be around 500-700m.
- The reuse scheme will continue to be expanded when beneficial opportunities arise.
- Cassava and Vanderwolf Road expansions will remain in the capital works program until adequate funding can be obtained for these expansions from either government or private investors.

BENEFITS

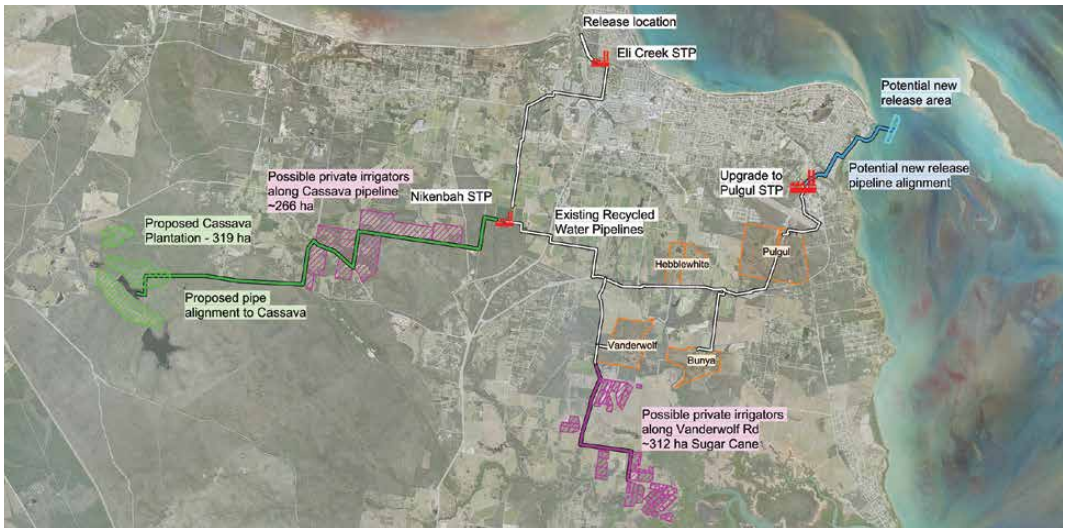
- Improves overall environmental impact of discharges (when they occur) due to:
  - improved dispersion of nutrients over a greater area; and
  - Safer location for the environment for emergency release of recycled water.
- Expansion of reuse scheme results in lower discharge of nutrients to water bodies than option 2.
- This option will ultimately involve an upgrade to the Cassava plantation and pipeline.
- By being able to release additional recycled water to water bodies, greater flexibility is provided to the operation of the reuse scheme.
- Increased flexibility allows WBW to wait until grants or economically viable options to expand the reuse scheme, at a lower cost to the community, can be obtained.
- Increases the amount of carbon dioxide absorbed out of the atmosphere.

CHALLENGES

- This option discharges more nutrients into the ocean.
- Potential risk of negative environmental impacts: This risk is extremely low if the outfall is designed and managed correctly.
- Potential risk to public health from discharges at the new outfall: This risk is extremely low under standard operating conditions.
- With the STP closer to community residences odour may be a potential risk.
- Results in additional expenditure than option 2.

Estimated cost - $57.0 million

For more information about the potential new outfall, please keep reading to the section titled 'Why move the outfall'. For more information about recycled water expansion, please keep reading to the section titled 'How do we use recycled water'.



WHAT IS AN OUTFALL?

An outfall is where recycled water exits a recycled water management network into a waterway e.g. creek, river or ocean, also commonly called a 'discharge' or 'release' location.

In choosing an outfall location the site should be able to disperse the recycled water effectively so that it does not have a negative impact on the environment. Commonly, hydrodynamic modelling is used to demonstrate the impact of an outfall on the water where it is released.

In Hervey Bay, the Eli Creek and Pulgul STPs both have licenced outfalls for the release of recycled water to waterways.

WHY MOVE THE OUTFALL (OPTION 2 AND OPTION 3 – PULGUL STP)?

To address concerns around the existing outfall location at Pulgul Creek, a new outfall could be designed and constructed to maximise dilution and dispersion of the discharged recycled water. This would substantially reduce the concentration of contaminants within the receiving waterway (including nutrients). In turn, this would reduce the risk to the environment and humans. Such an outfall would be located in deeper water with high tidal currents that will assist in maximising both dilution and dispersion.

Initial investigations into moving the release point have identified a prospective new area that could allow for significantly more dilution and dispersion of the recycled water. Located offshore from the Urangan Boat Harbour this area features substantially more water depth as well as stronger currents flowing to the north into Hervey Bay. If combined with a multiple diffuser to aid mixing, relocating the releases to this site could potentially allow for a significant reduction in overall environmental impact from the Pulgul STP. The risk of negative impacts on the ecologically sensitive areas of Hervey Bay and nearby waters is also expected to be greatly reduced.

Potential new outfall location offshore from the marina and a potential route for the underground pipeline from Pulgul STP

> “Located offshore from the Urangan Boat Harbour this area features substantially more water depth as well as stronger currents flowing to the north into Hervey Bay.”

WHAT’S DIFFERENT IN IMPACTS BETWEEN THE PULGUL CREEK OUTFALL AND THE POTENTIAL OFFSHORE MARINA OUTFALL?

The following two figures show hydrodynamic modelling of nutrient accumulation in coastal waters for the exact same release conditions- including flow, quantity and time periods- for direct comparison between the current Pulgul Creek outfall and the potential offshore marina outfall.

The model for each scenario has been run for 30 days consecutively. The figures show the maximum nutrient levels that are expected for each scenario. This is indicated by varying degrees of shading showing nutrient accumulation levels – light to darker shows minimal to higher levels.

FIGURE 1
EXISTING CREEK RELEASE POINT INTO PULGUL CREEK

This figure represents the release of recycled water at 6ML/day. The release is spread over a 24 hour period because the capacity of the existing infrastructure does not allow faster release of recycled water.

Pulgul Creek is represented in this scenario during typical dry weather conditions with minimal flow in the creek. Because releases at the modelled rate would only occur during wet weather periods (when the creek has significantly greater flowrates) this scenario does not represent typical operational practice. In reality, higher creek flows provide better dispersion of nutrients from the recycled water than what is shown in the following figure.

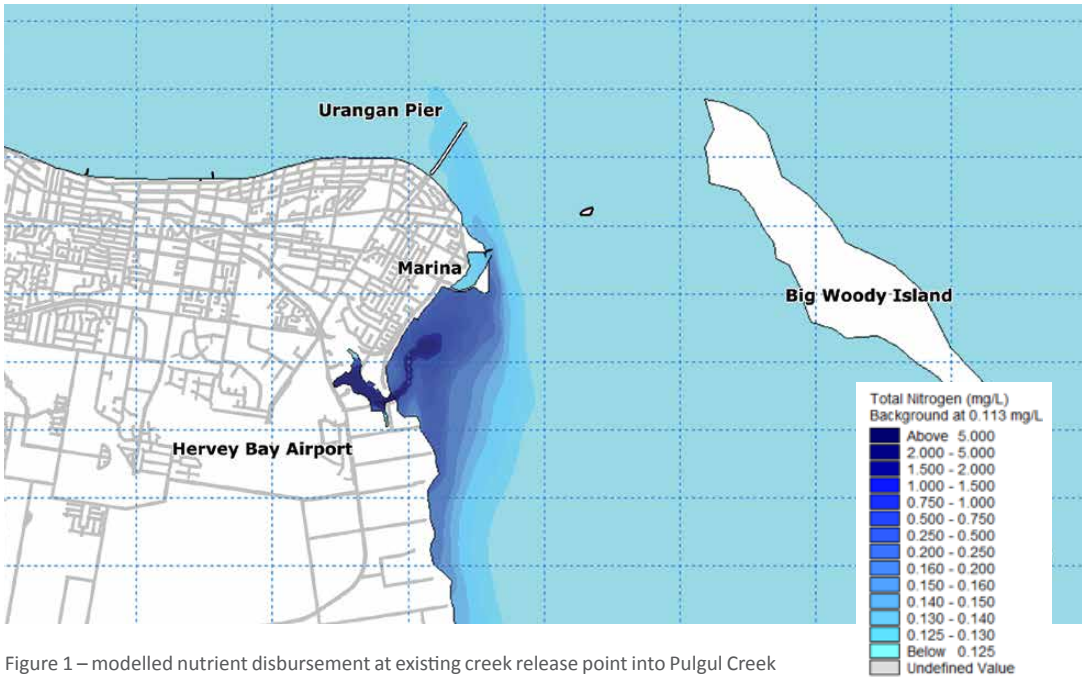


Figure 1 – modelled nutrient disbursement at existing creek release point into Pulgul Creek

FIGURE 2

POTENTIAL NEW OUTFALL OFFSHORE OF URANGAN BOAT HARBOUR

With an identical set of release conditions as figure 1, the results show a distinct improvement on dispersion compared with figure 1. This indicates that there would most likely to be environmental benefits to moving the release location to the deeper, faster flowing water body.

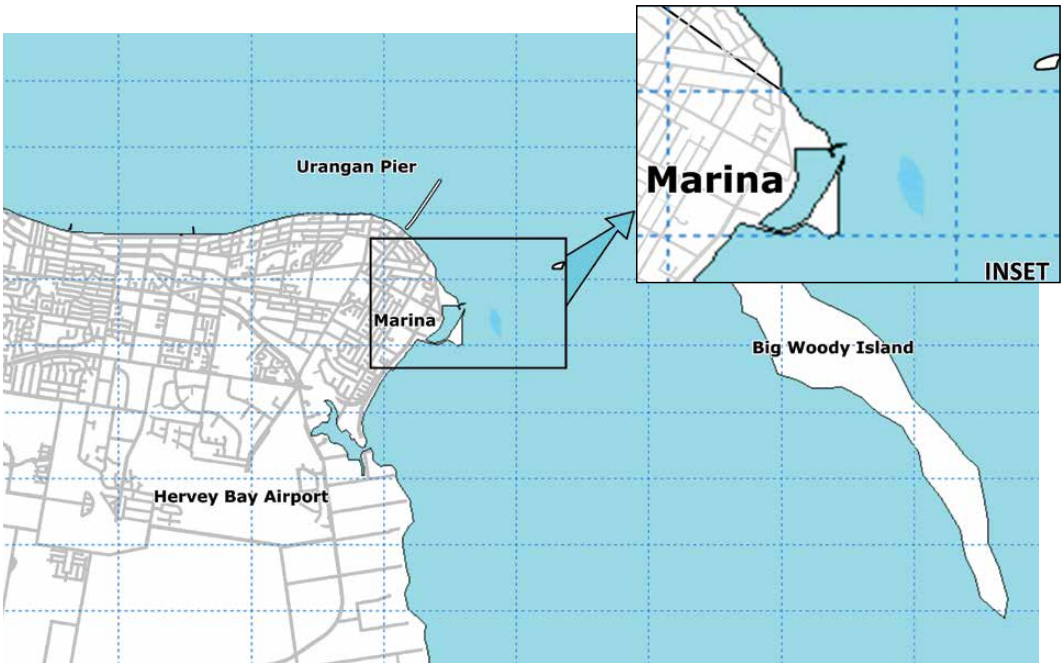
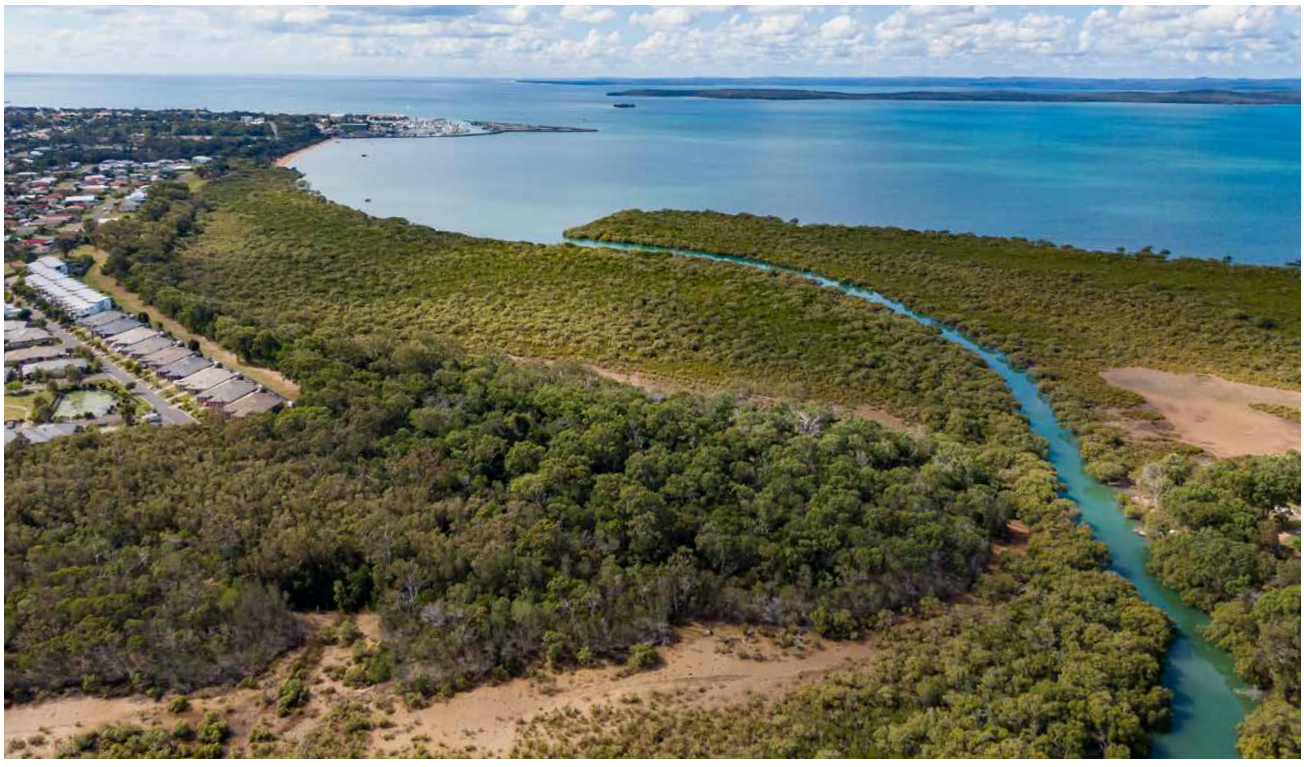


Figure 2 – modelled nutrient disbursement at potential new outfall offshore of Urangan Boat Harbour



Pulgul Creek

HOW DO WE USE RECYCLED WATER?

The Hervey Bay Recycled Water Scheme (scheme) provides recycled water that can be reused at irrigation sites with any excess released to the environment.

WHAT ARE THE CHALLENGES TO EXPAND THE PLANTATION SCHEME?

Federal legislation prevents the clearing of existing trees for the purpose of planting and cultivating new ones. As such, WBW can only develop new plantations on existing cleared land. In general if land is cleared, it's already being used for another purpose.

Occasionally cleared land near existing recycled water pipelines becomes available for sale.

Recently WBW purchased land with 35ha of irrigate-able plantation area near the Hebblewhite plantation, however these opportunities do not occur often.

ARE THERE CHALLENGES TO EXPAND THE REUSE SCHEME?

Irrigating with recycled water can potentially damage the soil if it's not managed properly.

There is a risk in WBW outlaying significant expenditure constructing pipes and pump stations to potential irrigators without guarantee of the amount of recycled water they might use.

WHICH SITES WOULD BE SUITABLE FOR REUSE EXPANSION?

An estimated 319ha has been identified at Cassava as suitable for plantations. This land is already owned by FCRC which means that no additional land would have to be purchased to expand the scheme. However, Cassava is approximately 17km from Nikenbah STP and the construction of a pipeline to supply recycled water to this location would incur significant costs.

WHAT ARE THE LIKELY COSTS TO EXPAND TO CASSAVA (OPTION 1 – NIKENBAH STP AND OPTION 3 – PULGUL STP)?

WBW commissioned a concept design for a pipeline to be built to Cassava at a cost estimate based on this concept alignment of $9.6million. Current estimated costs to cultivate the land, install the irrigation and plant the trees would be approximately $13,000 per hectare. This equates to $4.15 million.

In addition to the reuse potential at Cassava, owners of properties along the concept alignment were approached to seek their interest in using recycled water for irrigation should it become available, and the response was generally positive.

WHAT ARE THE ADDITIONAL COSTS TO EXPAND THE REUSE SCHEME (OPTION 1 – NIKENBAH)?

As Nikenbah is unable to release excess recycled water to a water body it needs additional expansion of the reuse scheme to ensure overflows from recycled water storage dams to do not occur. KBR and WBW preliminary modelling estimated that an additional 2000 hectares of plantations and 1000ML of recycled water storage (including Cassava) would be required to reuse recycled water from Nikenbah over the next 20 years.

Preliminary cost estimates for this additional expansion of the reuse scheme were over $40 million. This included purchase and cultivation of additional land, construction of the additional storage dams and construction of the network infrastructure required to transport the recycled water to the new plantations.

For information about the current reuse scheme and its many benefits please see our 'What happens after you flush - know your Hervey Bay Treatment Network' booklet.

WHAT DO I NEED TO KNOW ABOUT THE ESTIMATED COSTS IN THIS DOCUMENT?

KBR developed concept level designs for each of the three options.

- These cost estimates are preliminary.
- KBR's estimates were created with a nominal accuracy of +/- 40 per cent.
- Since KBR first developed the estimates the proposed size and location of the recycled water release pipe has changed. This has resulted in an additional $17 million being added to KBR's original estimates for the Pulgul options.
- The construction of a reuse pipeline to canegrowers along Vanderwolf Road has been added to the estimated cost of Option 1 (Nikenbah) for an added capital cost of $2.4 million
- To replicate the costs of expanding the reuse scheme when beneficial opportunities arise the Cassava reuse expansion and Vanderwolf Road pipeline are both being considered at 50 per cent of their estimated costs. This represents potential government funding of 50 per cent that could occur through future grants. This results in an additional $6.2 million added to the estimated capital cost of Option 3.

APPENDIX A

DEFINITIONS:

Average Dry Weather Flow (ADWF): sewage flow in a sewerage system during periods of dry weather.

Biosolids: the residual treated solids from the sewage treatment process.

Effluent: see Recycled Water

Equivalent Dwelling (ED): This is a standard unit used in load estimation. The unit is typically equal to a three bedroom house with an average number of occupants.

Inflow: is any external source of water, stormwater or groundwater that enters the sewerage system.

Mega Litre: An Olympic size swimming pool is approximately 2.5ML.

Outfall: recycled water exit point within a recycled water management network. This is also commonly referred to as 'discharge' or 'release' location.

Overflow: is the discharge of a combination of stormwater and domestic sewage caused by a sewer's capacity being exceeded during wet weather events.

When the volume exceeds the sewerage system's capacity, storm and sewage water may overflow from pump stations or recycled water storage dams.

Peak Wet Weather Flow (PWWF): is the peak flow caused by stormwater and/or groundwater in a sewerage system during extreme wet weather events.

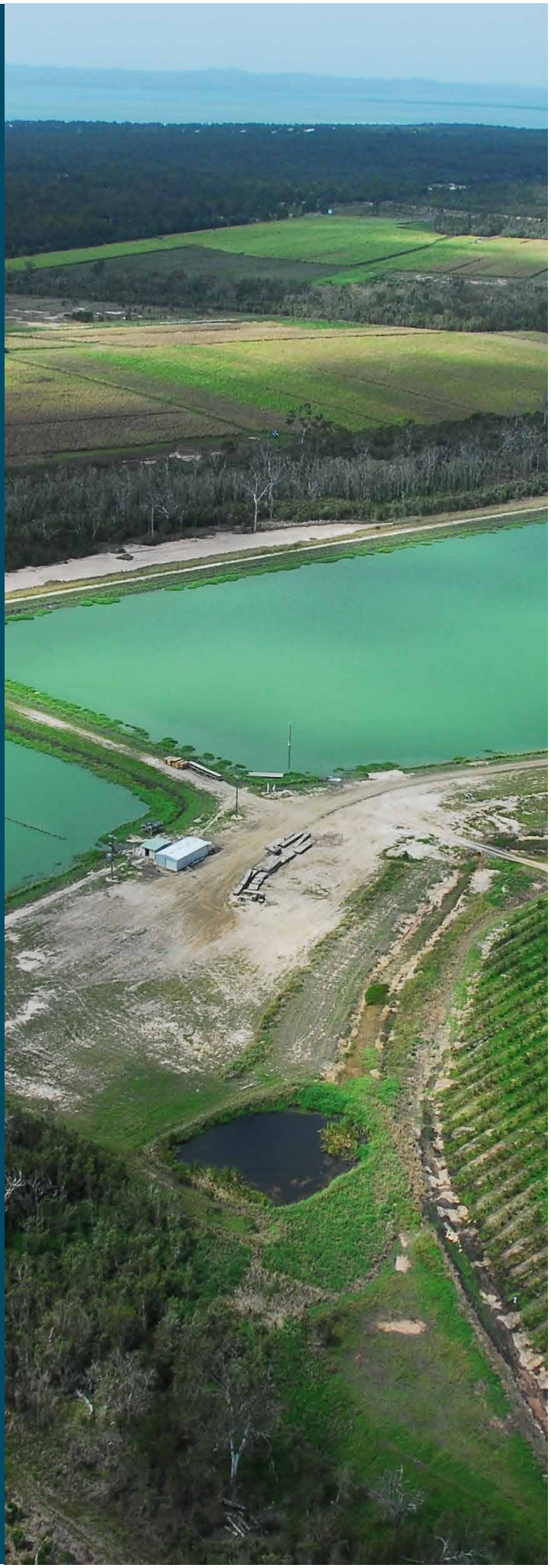
Recycled Water: is the product of a multi-stage mechanical, biological and chemical sewage treatment process.

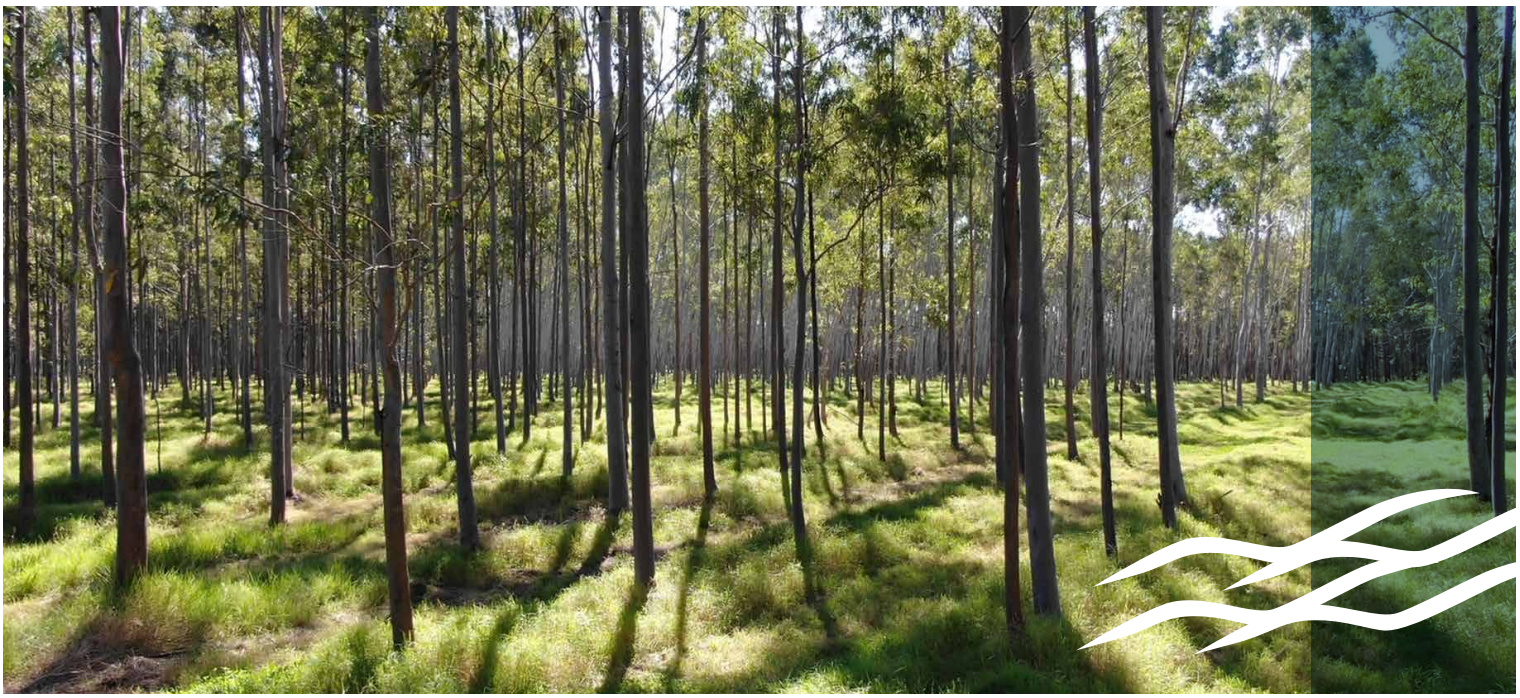
Sewage: wastewater from a shower, bathtub, washing machine, dishwasher, kitchen sink and toilet.

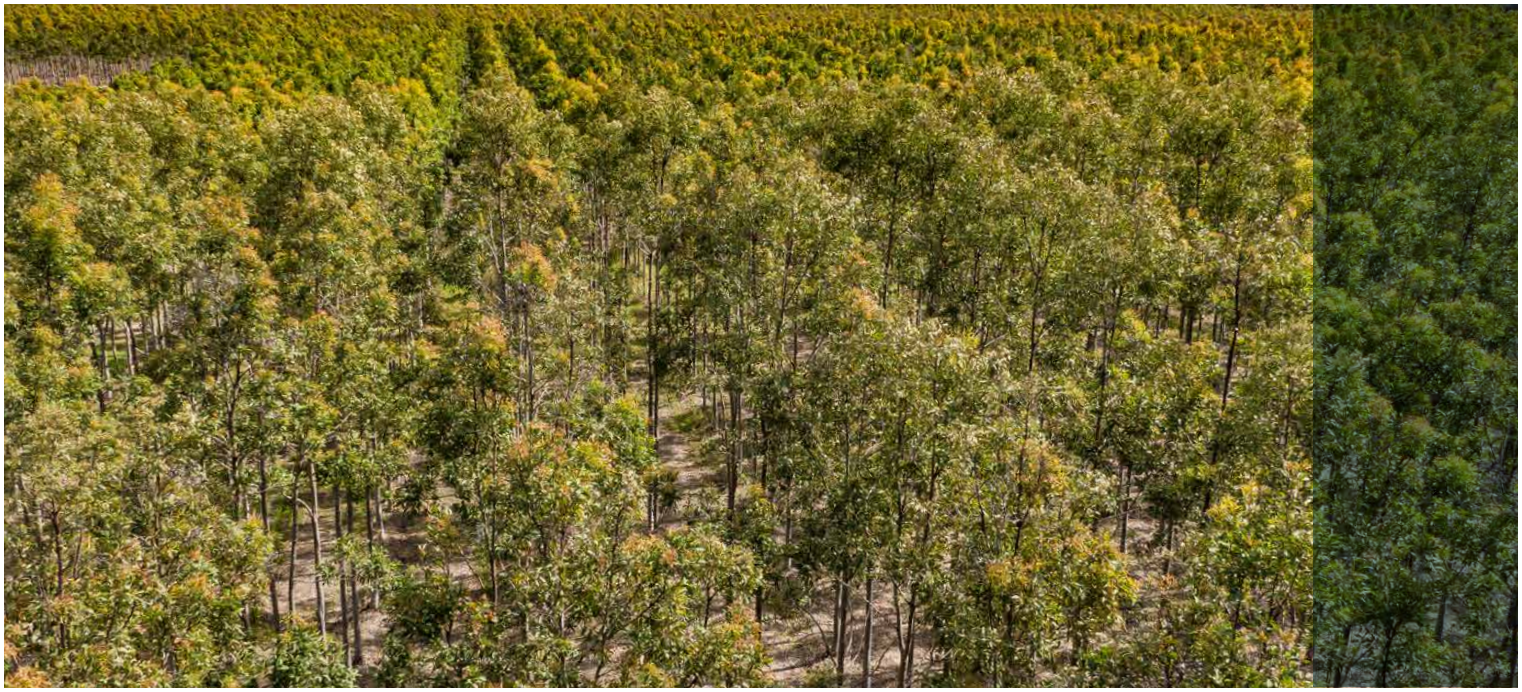
Sewer: a pipe, usually underground, that is used for carrying sewage away from buildings to a place where it can be safely treated.

Sewerage: refers to the collection of physical facilities (e.g., pipes, lift stations, and treatment and disposal facilities) through which sewage flows.

Sewage Treatment Plant (STP): physical, chemical and biological processes used to remove contaminants and produce recycled water that is safe for reuse and/or release into the environment.







WIDE BAY water

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HAVE ANY QUESTIONS, FEEDBACK OR NEED MORE INFORMATION?

CONTACT THE PROJECT TEAM AT WBWENGAGEMENT@FRASERCOAST.QLD.GOV.AU
OR SPEAK TO A PROJECT TEAM MEMBER BY PHONE ON 07 3217 6849