

NATURE CALLS

The biggest environmental and financial decision our city will make in the coming years.



Household



Human



Industrial

Have your say NOW!

naturecalls.nz

PALMY™

PAPAIOEA
PALMERSTON
NORTH
CITY

NATURE CALLS

WE WOULD LIKE YOU TO HAVE YOUR SAY ON THE BIGGEST DECISION OUR CITY NEEDS TO MAKE

Every time you remove a sink plug, flush a toilet, turn off a tap, your dishwasher finishes a cycle or your washing machine beeps – that water goes to our Wastewater Treatment Plant at Tōtara Road, where it's treated before being discharged into the Manawatū River.

Managing water resources is the joint responsibility of the Palmerston North City Council (as applicant), and Horizons Regional Council (as regulator). The mechanism that allows us to discharge our treated wastewater is the resource consent process under the Resource Management Act (RMA).

THIS PROJECT FOCUSES ON HOW WE TREAT AND DISCHARGE THE WASTEWATER WE CREATE, FOR UP TO THE NEXT 35 YEARS

In Palmerston North, we do a pretty good job of managing our wastewater. We highly treat and discharge our wastewater to consistently meet conditions set in our resource consent. However we need to apply for new consents by mid-2022 as part of a process to continually review and improve our environment.

Since we got our last consent back in 2006, laws and standards have changed, along with many people's views about the environment. This means that our current treatment method isn't sufficient to meet future requirements, given our growth and higher standards. While the current discharge complies with all the conditions of our consent, the discharge has negative impacts on the ecology and water quality of the Manawatū River. This project is looking to identify the best practicable option for treating, and discharging, wastewater in the future to reduce the negative impacts on the river and other environments.

The RMA process requires an option that appropriately avoids or mitigates adverse effects on the environment and meets the purpose and principles of the RMA (Part 2). We have options for treatment and where and how we discharge treated wastewater. To meet these requirements we will investigate – and show proof of – our analysis of possible options and the potential effects on the natural, social, cultural and economic environments. It is essential that we also engage with our community to help identify this option.

We're calling this project Nature Calls. It is one of the largest projects Palmerston North City Council has undertaken. It will be one of the biggest environmental and financial decision our city needs to make in the coming years. It is a project we must do, doing nothing isn't an option.

SUSTAINABILITY AND GOVERNMENT STANDARDS

Sustainability is a key factor in this project

Our city's population is growing and the value being placed on our environment is high. Through this project we are also exploring ways to reduce our wastewater before it goes into the wastewater network for treatment.

These will form part of all options as they are developed and refined. We are also looking at new ways to manage, move, and treat our wastewater.

We've taken some steps already – for example, Council's recent Pressure Sewer Policy will require use of pressure sewer systems in areas that would be difficult to service with a conventional gravity sewer system, to minimise the risk and level of stormwater entry to the wastewater system.

In addition to Nature Calls, Council is also implementing a range of other waste minimisation programmes, and education initiatives about ways the city can reduce wastewater flow and contamination loads in the wastewater discharges produced by the city.

All options would meet environmental and public health standards

We're confident that all of the options we're proposing would protect public health.

We'll also ensure that any treatment method and discharge meets environmental regulations.

We're working with some of the best environmental scientists and engineers to inform us how best to achieve these targets. These targets include eco-system impact, water quality and organisms that live in water or land.

COST OF NATURE CALLS

This project will see wastewater charges increase for users. We're looking into funding options currently but there will be a rates impact.

We have detailed information about the cost on page 30.



CHANGING LEGISLATION IMPACTS NATURE CALLS

When Nature Calls began in 2017 the legislative and policy framework was different from what we are facing now. Major decisions have been made at Government level that have the potential to impact significantly on the delivery of Nature Calls. Currently we are working ahead of these major changes being implemented, however we are required to consider these as we progress to lodging the Resource Consent and Assessment of Effects. The following outlines the relevant legislative changes and how they will impact Nature Calls.

Three Waters

In mid-2017, Government commenced a review of how to improve the regulation and supply arrangements for drinking water, wastewater and stormwater (three waters). Our Council has been working with Government throughout this process. BY 2025, it is likely the Council will no longer be responsible for the delivery of the three waters and services to users. However Council is still required to continue with the Nature Calls project until these changes are implemented.

National updates on the Three Waters Bill are available at dia.govt.nz.

Freshwater Policy

A new National Policy Statement for Freshwater Management (NPSFM 2020) came into effect on 3 September 2020. The NPSFM 2020 will require Council to give greater consideration to improving water quality and giving effect to Te Mana o te Wai. The NPSFM 2020 must be implemented through the One Plan by 2024.

Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment, and protects the mauri of the wai (water). Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

Highly relevant to Nature Calls, is the requirement for Councils to manage periphyton (growth attached to under water surfaces) in rivers as a compulsory attribute to achieve ecosystem health. Managing periphyton growth is a requirement of our current consent and is included in the Rules of the current One Plan now. The NPSFM will introduce more stringent regulations and criteria than currently in place in the One Plan.

One Plan

Under the RMA, the Horizons Regional Council has established “The One Plan” to give effect to the requirements of the RMA in its region. The One Plan is the planning regulatory document Nature Calls will be assessed under. All of our options will require a resource consent under One Plan. This resource consent will need to assess the activity against the relevant Objectives, Policies and Rules for discharging treated wastewater to either land, ocean or surface water specified in the One Plan. When assessing options under the One Plan we will have to show how the option meets or improves on the criteria set in the One Plan.

Resource Management Act

Following a comprehensive review of the resource management system, which was released last year, the Government confirmed the RMA would be replaced with three new Acts. These include the Natural and Built Environment Act, the Strategic Planning Act and Climate Change Adaptation Act. It is intended that all three pieces of legislation are passed by the end of 2022.

As our application for Nature Calls will be lodged prior to the new legislation being in place, the resource consent will be assessed under the existing RMA.

A consent could be in place for up to 35 years.



TIMELINE FOR NATURE CALLS

Nature Calls is happening in a number of stages.

The whole process involves extensive engagement with iwi, the community, and other stakeholders.

We want to make sure everyone can have their say so we can make informed decisions.

The next stages of our process are:

April 2021:

Public feedback period on refined options shortlist

Mid 2021:

Councillors select an option to proceed with

2021 to Jan 2022:

The resource consent application is developed

Before June 2022:

Resource Consent application submitted to Horizons Regional Council

HOW WE DECIDE THE BEST PRACTICABLE OPTION (BPO)

In mid-2021, we will take your summaries of feedback as well as technical investigations, affordability, considerations, environmental impacts and a range of other assessments to councillors to decide on a best practicable option for the future treatment and discharge of the city's wastewater.

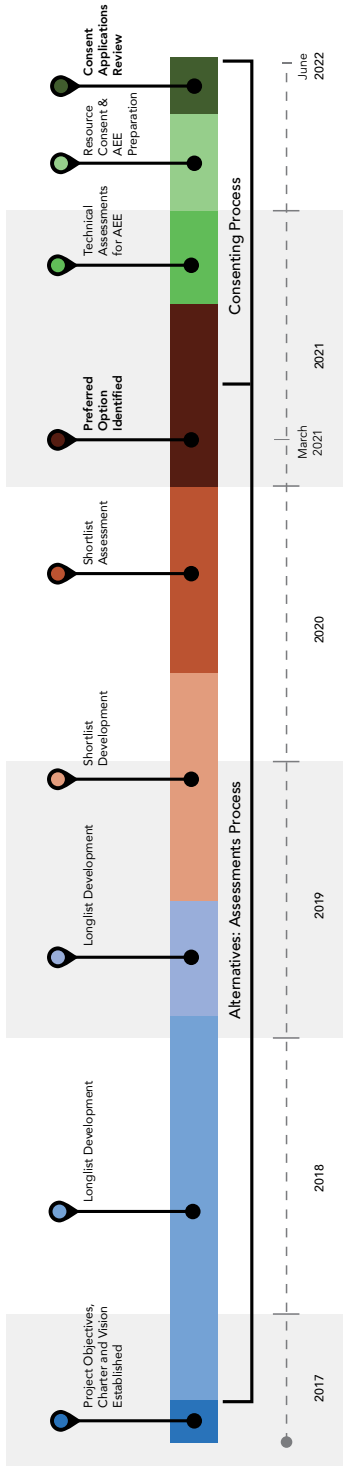
Once an option is chosen to proceed with, we'll be working on the formal resource consent application, which includes preparing an Assessment of Environmental Effects.

We need to lodge the resource consent application and assessment with Horizons Regional Council before June 2022.

Horizons Regional Council will assess the application. They may approve it as is with consent conditions, or decline the application. It is likely that the consent application will be publicly notified.

Once the consent is granted, we will be required to adhere to the conditions. The consent will confirm where the treated wastewater will be discharged, how much can be discharged, what level of treatment is needed, and monitoring and reporting requirements.

MILESTONES AND HIGH LEVEL PROJECT PROGRAMME NGĀ PAE TUTUKI ME TE HŌTAKA TIRO WHĀNUI



THE 2020 FEEDBACK AND WHAT WE'VE DONE SINCE

In June/July 2020 we asked for feedback about six potential discharging environments.

These included:

- Discharging all of the city's treated wastewater to the Manawatū River at the current Tōtara Road Wastewater Treatment Plant discharge point. The wastewater would be treated to a higher standard than that achieved through the current wastewater treatment plant.
- Discharging treated wastewater to the Manawatū River at the current Tōtara Road Wastewater Treatment Plant location when the river is in high flow, and at a new discharge point south of Opiki Bridge when river flows are lower. Some wastewater would be applied to land when flows in the Manawatū River are at their lowest.
- Applying treated wastewater to land, with discharges to the Manawatū River in exceptional circumstances.
- Applying treated wastewater to land, with discharges to the Manawatū River when the river flow rises above intermediate levels.
- Applying some of the city's dry weather wastewater to land, with the remainder being discharged to groundwater via high rate infiltration (soakage) through the ground surface. Further assessment will consider whether some wastewater should be discharged to the Manawatū River when the level of groundwater is very high.
- Discharging most of the city's treated wastewater to the ocean, and applying some to land. This option would require a pipeline and other infrastructure to move the treated wastewater to a coastal discharge point.

More than 1100 people had their say on the options and environments, with both a full river and full land discharge being the most supported option.

When considering people's top two choices they also preferred a combination or hybrid of river and land discharges.

During that feedback period, the information provided was still at an early conceptual stage.

Subsequently we ruled out discharging to groundwater as an option, as it wasn't well supported by our community- both the land areas and the treatment levels required were significant.

PREVIOUS DISCHARGE OPTIONS

A number of technical assessments and evaluation processes are being carried out to inform the Council's decision-making process to determine the BPO. This includes a Multi-Criteria Assessment, cultural values assessment with Iwi, RMA tests and this engagement process.

Out of the MCA process completed in 2020, two of the five options were identified as low preference. These options included "Discharge to land 97% of the time' and 'Dual River and Land' Options.

Discharge Option: All to Land

Majority of treated wastewater is discharged to land, either fluvial soils or coastal sands, occurring 97% of the time.

This option is dramatically different to what we currently do, which is to discharge to the Manawatu River. To apply the treated wastewater at a safe and efficient rate, approximately 2,500ha – 3,500ha of land would be required. We would likely operate a 'cut and carry' operation over this land, which allows us to grow and supply cut grass as a form of income during operation of the site.

When the River is exceptionally high and the land area is saturated, during heavy rainfall periods, we would continue to discharge to the River during very high flows (approximately 3%). This river discharge would pass through a wetland or land passage, prior to discharging to the River.

Treatment & Land Requirements:

The volume of treated wastewater, application rates and soil conditions and the level of treatment are core elements that help us determine the total land area we require for this option. Within the large land areas, we have estimated, we need to include a buffer area that helps avoid potential effects on neighbouring properties and the environment. Effects like spray drift, groundwater contamination or discharge from overland flow occurring on neighbouring properties need to be avoided.

The treatment proposed for this option is the lowest being considered across each of the options and is like what we currently do at the wastewater treatment plant. With this process, we would not be required to remove phosphorus, which is currently done prior to discharging to the River.

A significant investment in infrastructure is required to operate this land-based system. It requires centre pivot irrigators, on-site storage lagoons and rapid infiltration basins where possible. You will also see many bails while the cut and carry operation is underway. The operation of this treatment and discharge method is a highly complex operation at the scale proposed, as it requires adaption depending on climate conditions and wastewater flows out of the treatment plant.

Potential Adverse Effects:

The types of soils we have identified in our region for the proposed discharge are Highly Productive Soils, which provide the right environment for crops and agricultural activities. If we were to discharge our treated wastewater, it is highly likely that these activities could not continue where we operate. At almost 3,500ha, this is a significant area of land 'the size of Palmerston Norths urban boundary'.

Land required for this option is significant and cannot be accommodated entirely within the Palmerston Norths boundary, particularly the sands areas. At this large scale, our experts have identified the potential to impact on archaeological features and groundwater sources used for supply. The impacts on individual landowners and communities is also significant.

This option is least likely to support a regionalised approach or adaptation in the future to allow for rapid growth. This is because the land areas are already significant and with growth, more land would be required to continue to operate this option without having adverse effects on the environment.

Cost:

This option requires significant capital investment of approximately \$400M.

Discharge Option: Dual River & Land

This option continues to discharge to the River with some enhanced treatment upgrades and introduces a new discharge location and ta discharge to land. During the highest flows in the River, the discharge will continue at Totara Road, during medium flow a new discharge will occur at Opiki (into the River) and a land area (approximately 1,000ha), will be used for the discharge of wastewater.

Treatment & Land requirements:

Plant upgrades will be required for this option, including UV treatment, however the treatment upgrades proposed are less than we have identified for Option 1 and 2. This is because the timing and location of our discharge is occurring when the River is less sensitive to algae growth.

Infrastructure is required for this option, including pipelines, storage, pump stations and centre pivot irrigators. These assets require heavy capital investment.

Potential Adverse effects:

This option requires significantly less land than considered than other options, however, would still be the largest land-based discharge in the country if it was to proceed (almost twice the size). With a smaller land footprint compared to the other options, the potential impacts on archaeological features, groundwater and properties may be less depending on the location, however this is still a large land footprint and the effects still need to be considered with caution.

This options also introduces treated wastewater to three locations, with lesser treatment than proposed for Option 1. The potential for adverse effects may be managed with this option, however this is still an impact the Council has identified as being adverse, given it would now impact two new locations within the region.

WE'VE DONE A LOT SINCE THEN

The information that informed the 2020 feedback period came from our work up to the end of 2019, so we could get your feedback in March. That feedback period was delayed to June/ July due to the nationwide Covid-19 lockdown.

Council's experts have now moved from a conceptual level to a more detailed understanding of each option. This work included investigations to explore proposed treatment levels and applying these to each of the discharge options to determine preliminary effects of any discharge on water quality and land-use, at desktop level.

The nature of the wetland and/or land passage components has been developed, as well as a desktop analysis of the coastal environment and where best an ocean outfall pipe could be located. Land application elements were explored at desktop level to determine how we could meet One Plan targets for nitrogen application and leaching rates leading to a refinement of the total land areas required. We have also initiated testing of wastewater arriving at and leaving the current plant to understand specific contaminants and how effectively they are removed e.g. Emerging Organic Contaminants (EOC's).

To understand how we might meet future requirements, we have used advanced modelling tools to determine the potential effects of treatment levels and volumes of wastewater on periphyton (plant)growth in the river. The outcomes of the modelling confirm there are limited options we can consider that will meet these targets.

This new information means we've been able to come back to you with a reduced shortlist of three discharge options. However all options remain on the table.

WE'RE WORKING WITH IWI

During the initial stages of this project when we were still considering all potential options for treating and discharging wastewater, our city mana whenua Rangitāne were involved. While we had some initial conversations with neighbouring iwi, following confirmation of a shortlist of options, and a better understanding of the receiving environments, we are now actively engaging with other iwi with interests in the potentially affected receiving environments.

We've worked with stakeholders to get the reduced shortlist

As part of the option selection process, we have completed a Multi-Criteria Analysis (MCA). The MCA decision tool process is often used in large scale and complex infrastructure projects in New Zealand to assess options from a range of criteria, and has been tested in the Environment Court. This process provides a systematic way of comparing options using a range of qualitative and quantitative measures. It enables key partners and stakeholders, who are provided with a range of assessments, to consider technical, social, cultural and affordability issues for each of the options.

The group were able to rank options across a wide range of criteria – and that's how we've ended up with the shortlist that we're consulting on. These are the values they considered. We'll be asking you to rank these values on the feedback form.

Public Health	Degree of public exposure to health risks in treated wastewater (including through land application or re-use options)	Resilience	Degree to which the option is resilient to natural hazards and climate change, and offers operational resilience.
Maori Cultural Values	Potential adverse effects on the mauri of natural resources, on kai moana, and on the relationship of Māori, their cultures and traditions, with ancestral lands, water, sites, waahi tapu and other taonga	Growth & Economic Development	How much the option will support the population and economic growth anticipated for the City by Council?
Financial Implications	Comparative construction, operational, whole of life costs of the option, assessment of this criterion includes consideration of land acquisition costs, capital gains and product net revenue.	Social & Community Considerations	Significance of potential social effects based on the gravity, distributive equity, the need for land acquisition and degree of permanence of land use change, and public support for the option
Natural Environment	Potential adverse environmental effects on the receiving environment (including Manawatū River), particularly in relation to water quality (including the matters listed in s107 (1)(c) to (g) of RMA), soils, aquatic ecology and terrestrial ecology	Technology & Infrastructure	Degree to which the option <ul style="list-style-type: none"> • Uses reliable and proven technology • Can be staged to spread construction cost • Able to be constructed • Constructed within appropriate timeframe • Allows resource recovery/beneficial re-use

FLOWS AND LOADS

What is flow and load and how are they measured?

In wastewater, the term 'flow' is used to mean the rate of wastewater reaching the plant. It is generally measured as an instantaneous flow rate (litres per second) and longer term flow rate (cubic metres per day). The term 'load' is used to mean the amount of contaminant in the wastewater before it is treated by the Plant. Our investigations explores contaminants that are key to identifying appropriate treatment methods and to understanding the environmental effects of discharges. These contaminants include biological oxygen demand, nutrients (nitrogen and phosphorus) and suspended solids. Load, like flow, is measured as a rate. In some instances this is an instantaneous rate (grams per second), but is more commonly measured or projected over a longer period (kilograms per day).

Current flows

- Typical dry weather flow to the plant is about 250 litres per second
- About 10% (25 litres per second) is from industrial activity
- In wet weather the peak flow can be as much as 2,100 litres per second
- The peak highest inflow to the plant is limited by the installed infrastructure to 2,200 litres per second.
- Peak flows above 1,700 litres per second occur less than 0.1% of the time—less than nine hours per year

Future flows

- In 2073 typical dry weather flow is projected to be around 340–350 litres per second, 40% higher than current dry weather flows
- Industrial activity is expected to contribute about the same proportion of the flow as it does currently
- The level of growth in the North East industrial zone isn't projected to greatly influence flow to the plant. The typical range would be 10 litres per second between low and high growth scenarios
- Peak instantaneous wet weather flows are anticipated to remain largely the same; possible increases in rainfall due to climate change are likely to be offset by improvements in the wastewater collection system which will reduce the proportion of surface and ground water in the flow
- The report assumes there's no impact on the size of peak instantaneous flows associated with climate change. However, peak flows may occur more often due to climate change.

Current loads

- The current average contaminant loads reaching the plant per day are indicated below as are future projections.
- The contribution to these loads from the city's major industrial activities is typically around 11% for nitrogen and phosphorus and as much as 25% for biochemical oxygen demand.
- These rates are considered typical for a city such as Palmerston North based on a per head contribution.

Contaminant	Current Load Per Day	Future Load Per Day (2073)
Biochemical oxygen demand	6,600 kilograms	10,544 kilograms
Suspended solids	7,300 kilograms	10,027 kilograms
Total Nitrogen	1,200 kilograms	1,632 kilograms
Phosphorus	196 kilograms	302 kilograms
Ammonia	740 kilograms	1085 kilograms

Future Loads

- Future loads have been projected to increase in a similar proportion to population growth
- The rate of growth in the North East industrial zone is projected to have a minor influence on future loads
- Two growth scenarios have been developed for industrial growth, namely "low" and "high" warehousing.

POPULATION GROWTH AND HOW IT'S BEEN FACTORED IN.

Palmerston North is growing in population, and as a result the number of residential and commercial properties is also growing.

Palmy's current population is 91,100. Our projections include a population of 112,400 by 2058 and 119,400 by 2073.

The majority of greenfield housing development is currently at Kelvin Grove, Aokautere and Whakarongo. Kākātangiata urban growth area has also been identified for greenfield housing development in the medium to long term.

We're also ensuring that a range of housing is available – as well as traditional houses the District Plan enables infill housing, multi-unit housing development, minor dwellings and apartments.

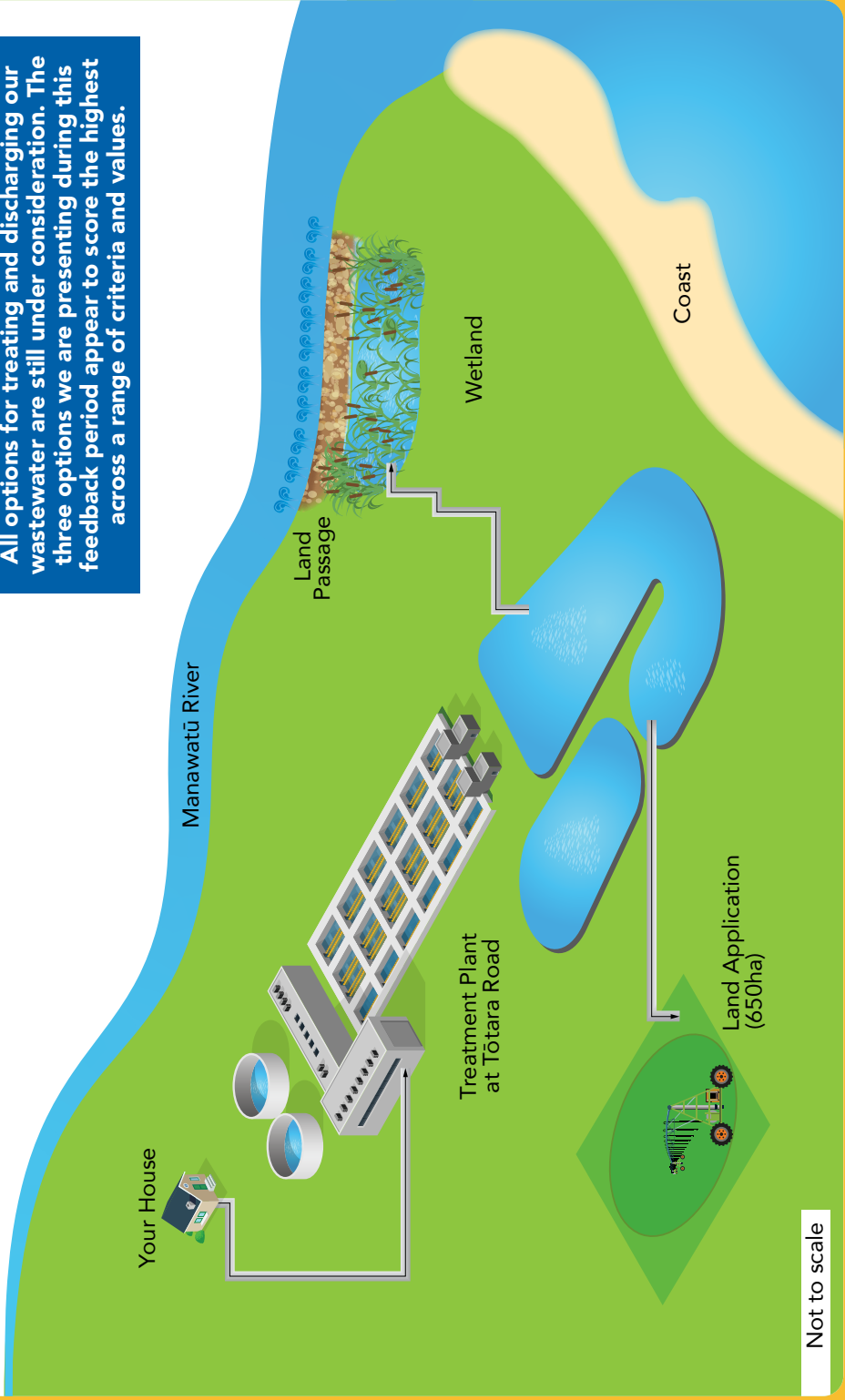
Trade waste projections have been assumed to be at the same percentage growth rate as the domestic population. A further allowance of 300 cubic metres per day has been allowed for trade waste in the Longburn area.

Our BPO must consider the future growth rates of the city and the region. We are continually reviewing these assumptions as the project progresses. Factors that are considered, in projecting future wastewater flows and contaminant loads, include:

- Historical flow and load data
- Wet and dry weather conditions
- Population growth projections
- Potential industrial growth in Palmerston North
- Climate change
- Practical technologies to reduce flows and loads at source

By understanding the flows and loads coming into the wastewater treatment plant, we can assess our options robustly; understand the potential environmental, social and cultural effects that may arise as a result of different options; and understand how the environmental effects of different options may change over the duration of the resource consent.

All options for treating and discharging our wastewater are still under consideration. The three options we are presenting during this feedback period appear to score the highest across a range of criteria and values.



DISCHARGE OPTION 1

MAJORITY OF TREATED WASTEWATER IS DISCHARGED TO THE MANAWATŪ RIVER VIA A WETLAND AND/OR LAND PASSAGE, WITH SIGNIFICANTLY IMPROVED REMOVAL OF CONTAMINANTS INCLUDING PHOSPHORUS AND NITROGEN

This option is most similar to how we currently do things, with the majority of treated wastewater from the Wastewater Treatment Plant on Tōtara Road being discharged to the Manawatū River, but with significantly improved treatment.

When the river is at very low levels about 75% of treated wastewater would be applied to land. We'd need about 670ha of land for this.

The river discharge will also treat the wastewater by passing through either a wetland and/or land passage. This ensures the water has had a final filter before entering our awa. Wetlands are like a kidney filtering out any remaining contaminants.

TREATMENT:

This wastewater would have one of the highest treatments currently in New Zealand, with advanced removal of contaminants including nitrogen and phosphorus. Nitrogen gets into wastewater from urine and phosphorus comes from cleaning products, food, fertilizer. We are looking at removing these through anaerobic and aerobic bacteria (biological treatment) and a membrane filtration process.

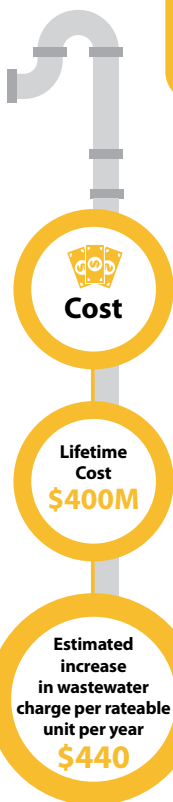
This would help contribute to a significant reduction of periphyton growth in the river downstream of our discharge, which can impact freshwater species. There are other factors that contribute to periphyton other than wastewater.

By applying some wastewater on land during low flow periods we'd be more confident in meeting guidelines set in the regional One Plan for freshwater.

New innovative technology which uses less energy will be considered.

We'd expect to see an increase in biosolids, the treated sludge produced in the treatment process, which is made up of dead wastewater bacteria and material removed through the treatment process.

We'd be able to further improve treatment over time as new technology is developed, which has the potential to improve wastewater quality.



CONSTRUCTION:

We'd still use our existing treatment plant, but it would need significant upgrades for the new treatment levels, and to cope with a growing population.

We'd build an even better wetland or land passage for the treated water to run through before entering the river.

We'd also need to build a pipe network to the land discharge site, and purchase irrigation equipment.

CLIMATE CHANGE:

Climate change wouldn't have significant impact on this option.

COSTS:

This option has smaller upfront infrastructure costs than some of the other options. The largest costs are associated in the investment in upgraded treatment, purchasing land, installing the pipes to the land discharge site and upgrading the treatment plant.

The operational costs for this option are considered high due to the energy and labour costs of operating a sophisticated treatment plan.

This option would have a capital cost of \$290m and an annual operating and maintenance cost of \$8m per year. This results in a lifetime cost (35 years) of \$400 million.

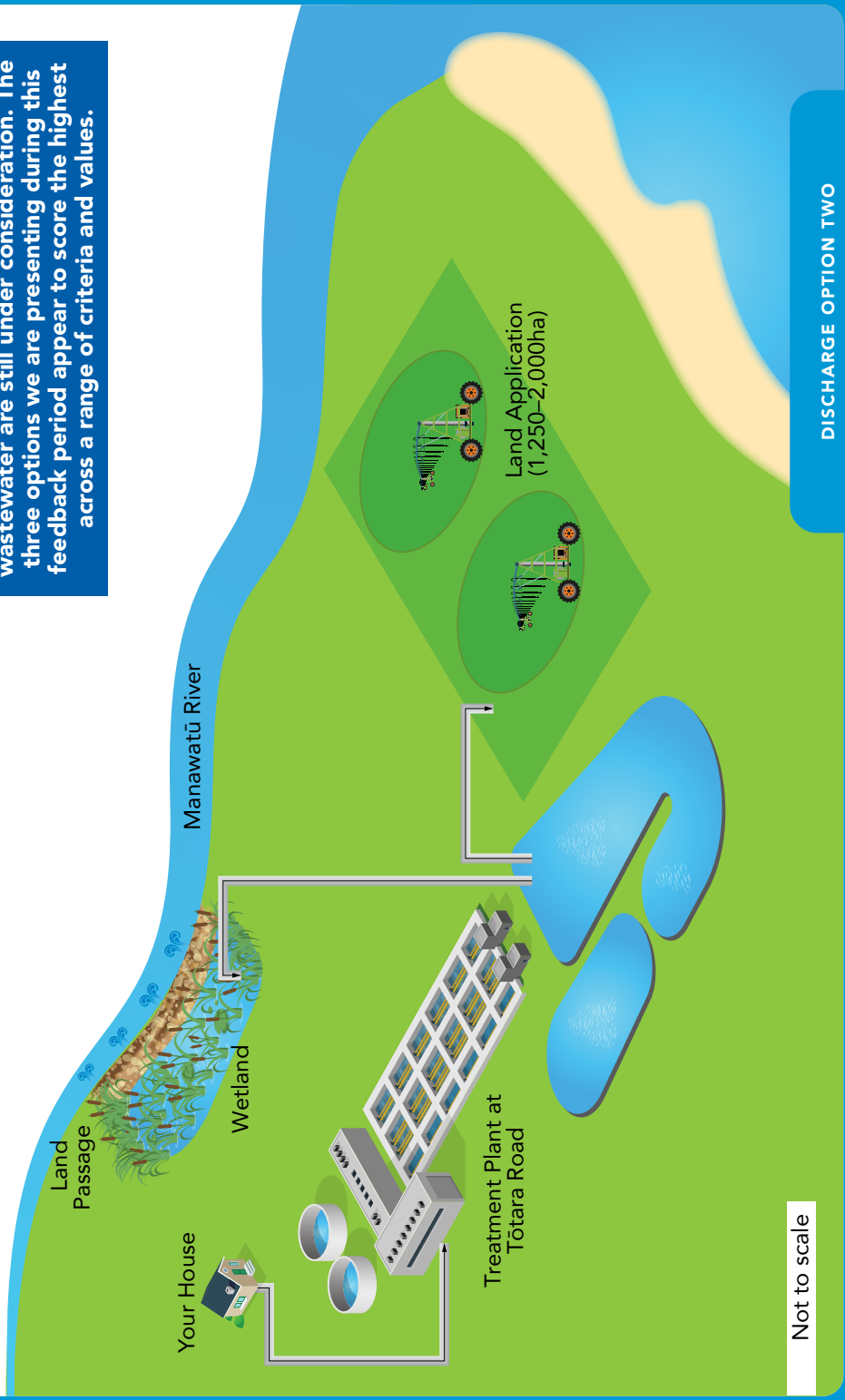
REGIONAL GROWTH:

We could look at taking other councils wastewater, provided they treat it to agreed standards and contribute to expanding the land application area and treatment plant expansion.

TRADE-OFFS:

- We know many members of our community and our neighbours in Horowhenua do not want treated wastewater in the Manawatū River.
- People may refrain from recreational activities in the river as a result.
- The discharge of even highly treated wastewater could negatively impact the mauri (life force) of the river and impact the mana of iwi, who are kaitiaki (guardians) of the river.
- Achieving ever-increasing freshwater standards will be complex, but we believe we can do this with the right technology.

All options for treating and discharging our wastewater are still under consideration. The three options we are presenting during this feedback period appear to score the highest across a range of criteria and values.



Not to scale

DISCHARGE OPTION TWO

DISCHARGE OPTION 2

HYBRID DISCHARGE BETWEEN LAND (55%) AND THE MANAWATŪ RIVER (45%)

Wastewater from your homes and businesses would be treated to a slightly higher standard than currently and then discharged onto land 55% of the time and into the Manawatū River the remainder of the time.

The discharge to land would be over our warmer months when river levels are lower. We'd discharge to the river when the river levels are higher- typically over winter.

While there was strong support for a full land discharge during the 2020 consultation, the land area required for that was bigger than Palmy's urban footprint making this unaffordable and requiring large amounts of productive land.

This option would still need huge amounts of land, roughly 1740 hectares making it by far the biggest land discharge in New Zealand.

The land area includes large buffer areas so the wastewater wouldn't run into streams or nearby water sources.

We'd be looking at alluvial land closer to Palmerston North for the land discharge. This is land near, but not next to, rivers. This type of land is silty and drains well. We've investigated land closer to the coast, but that's not our preferred site because of the cost of this land and extra infrastructure required to treat and move wastewater from our plant to the coast.

TREATMENT:

The wastewater would be treated to a higher standard than it currently is, but not as high as if we were discharging primarily to the river like in Option 1.

We'd enhance our removal of suspended solids and other contaminants, using biological treatment rather than chemical methods, as well as continuous clarification.

The discharge to the river would flow through a wetland or land passage before entering the waterway.

Some nutrients in wastewater that are applied to land are beneficial as they promote plant growth, which can earn an income.

New innovative technology which uses less energy will be considered.

We'd be able to further improve treatment over time by investing in further treatment to improve wastewater quality.



Cost

**Lifetime
Cost**
\$315M

**Estimated
increase
in wastewater
charge per rateable
unit per year**
\$340

CONSTRUCTION:

We'd still use most of our existing treatment plant, but it would need upgrades to meet the new treatment levels, and to cope with a growing population.

We'd build a wetland and land passage for the treated water to flow through before entering the river.

We'd also need to build a pipe network to the land discharge site, invest in storage and irrigation equipment, and establish the site for crop growth.

CLIMATE CHANGE:

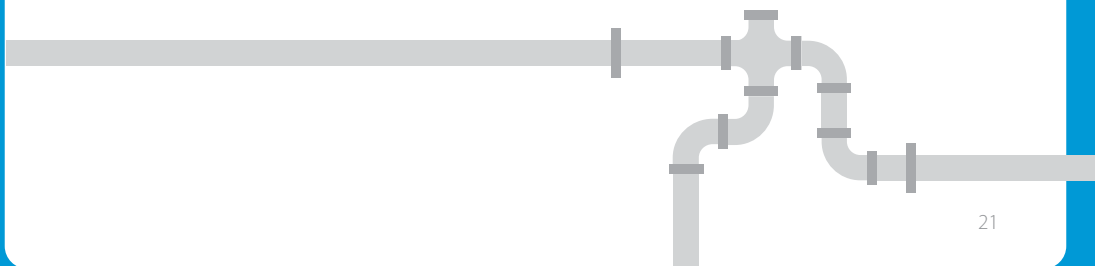
We need to factor in climate change for this option, as we are expecting there will be an increase in the intensity and occurrence of heavy rainfall events. This can impact the land based discharge due to the land's ability to absorb treated wastewater immediately after these events. This could mean we may need to discharge to the river more after these events. We'd attempt to mitigate this as much as possible during the design.

COSTS:

This option has high upfront costs because of the need to buy large amounts of land, and construct pipelines from our treatment plant to the irrigation area. We'd also need to invest in storage and irrigation equipment.

This option would also have high operational costs associated with the treatment for the river discharge, and staffing needed for maintenance of the land irrigation area and managing the land use.

This option would be estimated to \$260m in capital costs and \$5m per annum for operation and maintenance. This results in a lifetime cost (35 years) of \$315 million.



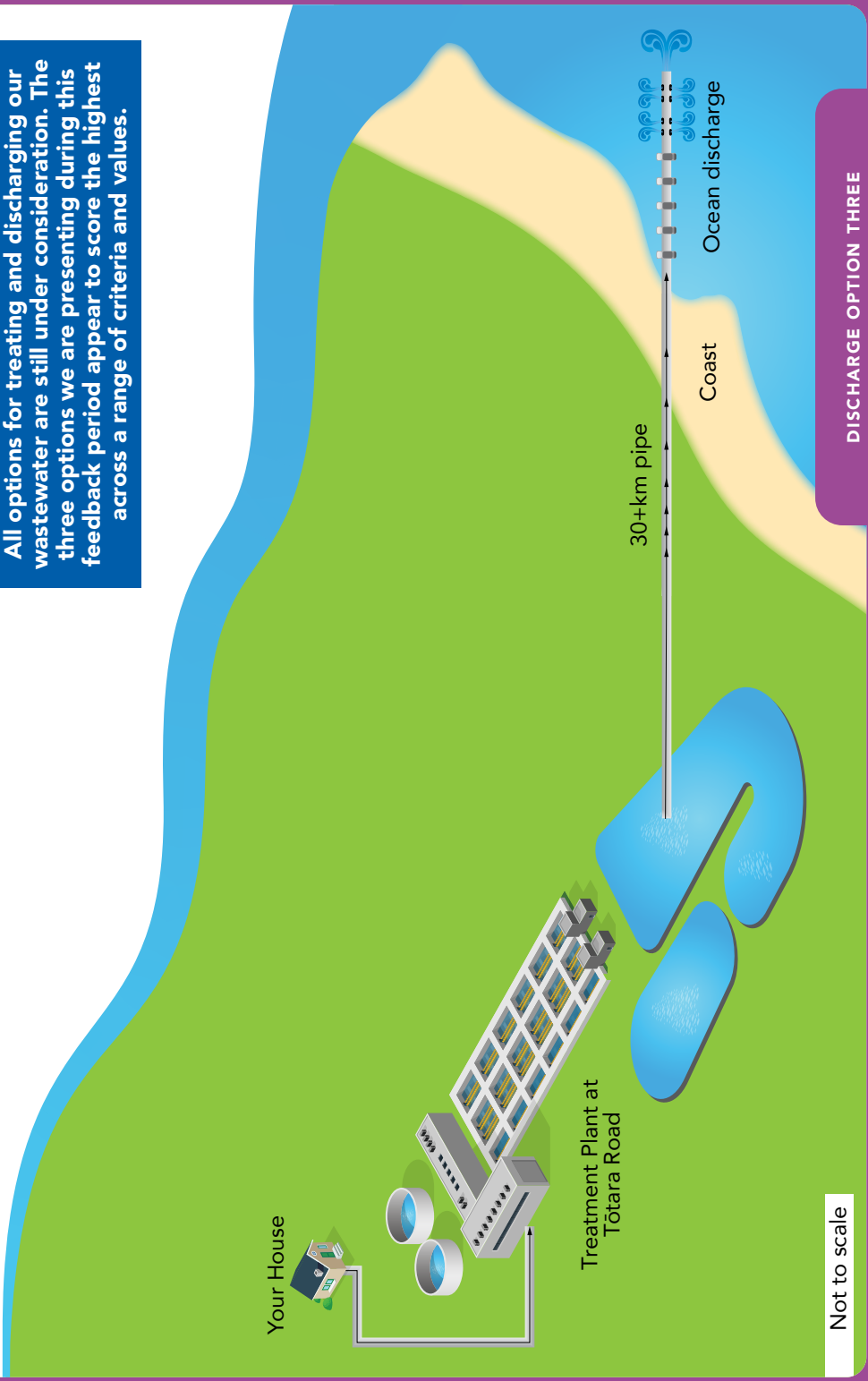
REGIONAL GROWTH:

We don't think this option would accommodate other councils wastewater in the future because of the constraints around acquiring even larger areas of land.

TRADE-OFFS:

- This will require significant areas of land, and purchasing or leasing this would affect a significant number of people.
- The kind of land needed for wastewater discharge is well draining soils which means we'd be requiring land that is ideal for farming and food production.
- There is no legislative guide to help us determine the long-term impacts of discharging onto land for up to 35 years (a potential maximum consent period).
- We'd also still need to do more investigation into the cultural and archeological feature of the land area but we believe we can mitigate any potential effects.
- We know many members of our community and our neighbours in Horowhenua do not want treated wastewater in the Manawatū River.
- People may refrain from recreational activities in the river as a result of their perceptions about water quality.
- The discharge of even well treated wastewater during periods of high flow would negatively impact the mauri (life force) of the river and impact the mana of iwi, who are kaitiaki (guardians) of the river.
- Given the very large land area required, it would be difficult to avoid discharging to suitable land that does not hold significant cultural value for Māori.

All options for treating and discharging our wastewater are still under consideration. The three options we are presenting during this feedback period appear to score the highest across a range of criteria and values.



Your House

Treatment Plant at Totara Road

30+km pipe

Coast

Ocean discharge

Not to scale

DISCHARGE OPTION THREE

DISCHARGE OPTION 3

ALL TREATED WASTEWATER IS DISCHARGED TO THE OCEAN

This option would see all the wastewater from our homes and businesses being treated at our treatment plant and then piped to the coast before being discharged via a 2km ocean outfall off the Horowhenua/Manawatu Coast in the South Taranaki Bight.

Ocean discharges are the most common type of wastewater discharge in New Zealand, which means the impacts and consenting requirements are well understood.

An ocean outfall pipe takes the treated wastewater more than 2km off the coast, with the final section comprising a diffuser pipe with multiple outlet ports located around 20m deep to disperse the wastewater into the ocean.

We would carefully consider recreation values when selecting the location of the outfall pipe.



Cost

TREATMENT:

We'd ensure the treatment process for our wastewater meets guidelines for ocean water quality.

Lifetime Cost
\$415M

CONSTRUCTION:

As we are at least 30 km from the coast, this option would require significant investment in pipes and pump stations to move treated wastewater to the coast.

Estimated increase in wastewater charge per rateable unit per year
\$430

COSTS:

This option has high upfront costs with us needing to construct pump stations and a pipeline to take wastewater from our treatment plant to the ocean. The operational costs would be lower than the other options.

This option is estimated to cost \$343 million in capital costs and \$5 million per year in operation and maintenance costs (based on today's costs). This results in a lifetime cost (35 years) of \$415 million.

CLIMATE CHANGE:

Climate change means we need to factor in sea level rise, warming temperatures and coastal erosion. We'd mitigate these measures as much as possible in the design.

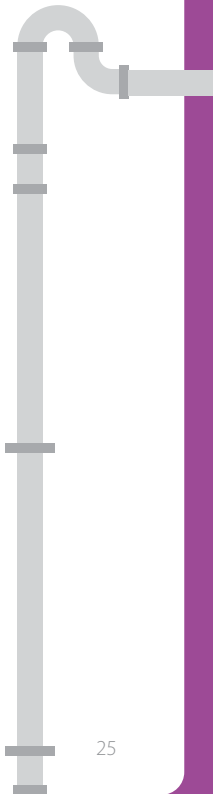
REGIONAL GROWTH:

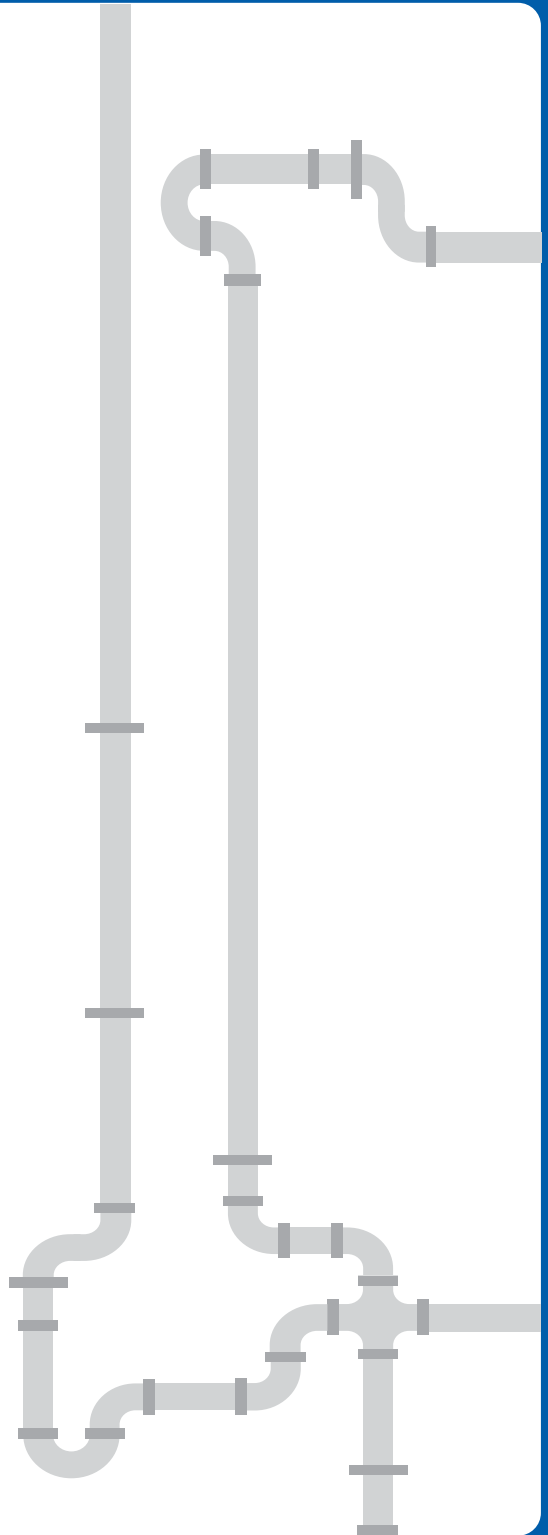
This option best aligns with our project objectives in respect to growth as it could accommodate higher population and business growth than we've predicted.

We could also let other councils use the pipe to discharge as well, meaning this could become a regional solution.

TRADE-OFFS:

- We know that many members of the Horowhenua and Manawatū communities do not want a treated wastewater discharge direct to the ocean.
- People may refrain from recreational activities, or food gathering, in/ from the ocean as a result of perceptions about water quality.
- The ocean is a significant taonga (treasure) for iwi and iwi and hapu in Manawatū and Horowhenua have indicated to us that this is not an acceptable option to them.
- The discharge of treated wastewater could negatively impact the mauri (life force) of the ocean, the ability to harvest kaimoana and impact on the mana of iwi, who are kaitiaki (guardians) of the ocean.
- We'd need to manage the construction carefully so it doesn't impact sensitive environments, however it could also result in us being able to restore some dunes.
- We'd need to build a significant pipe network to get the treated wastewater from our treatment plant, to the sea. This would be expensive to construct due to the costs of the pump stations, pipeline and ocean outfall.





TREATMENT OF WASTEWATER IN THE FUTURE

What are the contaminants we are treating?

Our Wastewater Treatment Plant uses a range of processes to remove contaminants so that wastewater meets safe and legal quality levels for discharge to the environment. This will remain the case, regardless of the option we proceed with.

Understanding the types and quantities of contaminants present in our wastewater helps us predict the requirements of the treatment plant in the future. Improvements to accommodate increased wastewater flows and changing contaminant loads will be a key part of the capital investment and work programme resulting from our future option.

Wastewater contaminants originate from residential, commercial and trade waste sources.

Wastewater treatment addresses four major groups of contaminants.

Contaminants include:

Suspended solids: These are undissolved inorganic and organic materials that are suspended in the wastewater and pass through the initial screening process. The main two items are faeces and food. Some of the solids are removed through our sedimentation tanks where they sink to the bottom and are removed for further treatment in our aerobic digester tank. The remaining suspended solids are removed in our lagoons where natural micro-organisms and bacteria consume them and transform them into biosolids. A small portion of solids remain in the discharge.

Dissolved contaminants or nutrients: These items include nutrients like phosphorous and nitrogen, and also a range of other contaminants such as metals and inorganic and organic compounds.

Phosphates come from cleaning products, fertilisers and detergents. Nitrates come from protein waste matter and ammonia in urine. These nutrients can contribute to algal blooms in oceans and rivers which overwhelm other plant and animal inhabitants in these environments.

Phosphorus and nitrogen are currently treated and removed in part from the wastewater by biological nutrient removal. At low river flows phosphorus is removed to very low levels by using chemical treatment.

Micro-organisms: This group includes viruses and bacteria. We measure faecal coliforms as an indicator of the presence of human or animal wastes in the water and while most are harmless, some can cause diseases, such as hepatitis B, gastroenteritis or typhoid.

Micro-organisms are removed at the treatment plant through physical settlement both with and without the use of chemicals while micro-organisms are inactivated using oxidation and UV light which can kill up to 99.9% of these.

Emerging Organic Contaminants (EOCs): Emerging organic contaminants are synthetic or naturally occurring chemicals that accumulate in the environment with potential to cause adverse ecological and/or human health effects.

This is an area of ongoing research. Effects of the accumulation of EOCs in the environment are only starting to be understood as detection methods have only recently become available.

Examples include: food additives, pharmaceuticals, and natural & synthetic hormones. The extent to which EOCs are removed through the treatment process is specific to each chemical and the level of treatment. Membrane filtration systems can remove high levels of EOC's.

The trade waste factor

Around 12 per cent of wastewater volume comes from trade waste. It contributes varying amounts of contaminant loads depending on which contaminant (BOD 25 per cent, suspended solids 7 per cent, nitrogen and phosphorus 10-12 per cent). Tradewaste discharge is controlled through a permit system, and the low concentration of contaminant in tradewaste discharge is due to pre-treatment onsite before it enters our wastewater system.

By comparison, residential and other commercial sources make up 88 per cent of wastewater volume and 75-98 per cent of contaminant loads.

Treatment under the three discharge options:

Treatment options have been developed to allow the council to consider a total treatment scheme. This means the impact of different treatments from the moment wastewater enters our treatment plant, all through the process until it's discharged.

The options have been developed to include scientific investigations into the sensitivity of river flow levels and engineering expertise in treatment technologies that are used in New Zealand and overseas. We've also included wetland and/or land passage options prior to discharging to the river. We've analysed soil conditions to give us an idea of what kind of soils would be best for land application of wastewater and to determine the sustainable application rates for both nutrient and water.

Conveyance (pipes and pump stations) is also an essential part of many of the treatment options. For all options we have considered the lengths of pipeline and number of pump stations required.

Staging possibilities and regional or sub-regional scheme options could allow us to pick up wastewater from communities in Marton, Feilding, Bulls and Halcombe, for example. Our options have identified the flexibility within each option to consider these.

The costs of these options has been developed considering all of these factors, forming the total scheme approach.

Discharge Option 1- Majority of treated wastewater is discharged to the Manawatū River via a wetland flow, with significantly improved removal of contaminants including phosphorus and nitrogen

A 5 stage Bardenpho Biological Nutrient Removal with Membrane treatment (MBR) and UV disinfection, is the recommended treatment proposed for Option 1. The MBR Treatment Plant has the highest level of treatment proposed of all the options and would be one of the highest levels of treatment for wastewater currently used in New Zealand. This treatment process:

- Achieve the highest level of treatment before discharging to the River. The highest level of treatment is achieved when river flows are at their lowest and the river bed is more susceptible to adverse effects from the treated wastewater discharge
- Provide for removal of contaminants including nitrogen and phosphorus
- Have the ability to be staged to accommodate increasing growth and/or a regional solution
- Be relatively more affordable than other alternative options being considered
- Include a wetland and/or land passage before discharging into the River

A Reverse Osmosis (RO) Plant was considered early on in the project evaluation process. This is a method used for treating water to drinking water quality. The RO plant is not proposed for this option on the basis it has high capital investment, operational and maintenance costs and the treatment process produces a brine product that is difficult to dispose of. The RO is also not well tested at the scale needed to treat Palmy's volumes of wastewater.

Treatment upgrades will be required to the existing treatment plant. If a regional scheme is considered desirable, further upgrades to the treatment plant will be needed.

Option 1, which sees the majority of treated wastewater discharged to the river, includes a discharge to land during low river flow. This option will ensure all targets in the One Plan are met at all times. This will require an approximate land area of 670ha (the smallest area of land compared to other options). This land may be accommodated within the Council's boundary.

Option 2- Hybrid discharge between land (55%) and the Manawatū River (45%)

The area of land necessary to discharge treated wastewater 55 per cent of the time has been determined through the modelling of river flows and the application rates of the treated wastewater to either alluvial soils or coastal sands.

Upgrades are needed to the existing treatment plant. We'd need to implement a number of new or improved processes within the existing wastewater treatment plant. The outcome of these upgrades results in a slightly higher quality of the treated wastewater compared to the existing wastewater discharge.

Significant land area is required, approximately 1,740ha of alluvial soils would be needed to discharge treated wastewater to 55 per cent of the time and this land is not likely to be available within the Council's boundary. If a regional scheme is proposed, additional upgrades to the treatment plant will be required in addition to acquiring more land.

Option 3 - Ocean

All treated wastewater would be discharged via an outfall pipe located on the sea bed, and extending approximately 2km off the coastline (in ocean waters). The end of the outfall would be at least 20m below the surface of the ocean.

The level of treatment proposed for this option is similar to the existing wastewater treatment process however we wouldn't chemically treat phosphorus, as the sea water mitigates the impacts of this. This means only minor upgrades will be needed at the existing wastewater treatment plant.

In addition to upgrades to the existing treatment plant, new infrastructure is needed to pipe the treated wastewater to the outfall. This pipeline will be at least 1300mm in diameter and 38km in length, supported with at least 4 pump stations and an outfall of 2km in length and diffuser at the end.

A wetland and/or land passage may need to be considered for this option, prior to discharging via the outfall. This is not included in the option at this stage.

If a regional scheme is proposed, a larger pipeline and additional upgrades to the treatment plant, will be required. The discharge will be outside the Council's boundary.

As technology progresses and legislation changes, we can continue to improve treatment of our wastewater. A good analogy is windows. In the past many homes had single glazed windows, but over time people have upgraded to double-glazed. This is similar to how treatment could work. We could improve current processes, or if new technology comes in, we can add that into the process.



THE IMPACT ON OUR TRADEWASTE CUSTOMERS

Trade waste is the liquid wastewater businesses discharge into the wastewater system. Trade waste can contain substances which are detrimental to the wastewater system, treatment plant processes and the environment, and to the health and safety of people working in wastewater plants.

Under Council's Wastewater Bylaw, our tradewaste customers must obtain a consent to discharge wastewater into the network and often a charge is associated with this discharge depending on the nature of this discharge. Depending on the option selected as the BPO, these charges are likely to change. Council is also seeking greater investment in pre-treatment of tradewaste, prior to discharging into the network.

The benefits of implementing pre-treatment at source, will reduce the contaminant loads entering the treatment plant and costs to customers and Council. Because the needs of our tradewaste customers differ between industry sectors, we will continue to work with our tradewaste customers to explore the optimal approach to managing tradewaste.



This project will impact your rates

Before this project started in 2017, a placeholder budget of \$128.8M was set aside in our 10-year Long-Term Plan for a new wastewater solution. Since investigating options and doing technical work, we now know that the cost will be far higher.

This project is likely to be the single biggest programme to be contemplated by Council for our 10 Year Plan.

It will have very significant impacts on Council's debt levels and the rates income required to not only service and repay the debt but also to operate the treatment process and discharge.

The Council will, as part of its decision making process, be faced with prioritising its investments in other facilities and services. This is so that its debt levels do not exceed the limits that will be imposed by its lenders and rates increases are not higher than ratepayers can afford.

Unfortunately, this isn't an optional project. We need to get a new resource consent, so these costs will need to be factored into long term planning for our city.

The challenge will be to determine the most cost effective option that strikes an appropriate balance between environmental, cultural, social and financial considerations. Government, external and industry funding is being explored, and these conversations will continue as we get closer towards choosing the best option for our city.

For each option we have outlined the lifecycle cost, which is the cost of purchasing infrastructure or land, upgrading facilities, maintenance and the operational costs for the potential 35 year life of the project.

We've also given a very indicative view of increases in rates levels that might be necessary to fund the various options.

The rates impact assumes a very significant contribution by our trade waste customers. Around 500 businesses currently pay around \$1M combined per year.

These costs are just estimates, and are likely to change as we investigate options more. We have had to make assumptions to get to these rate impacts. You can read more about these on our website, naturecalls.nz



NATURE CALLS AND THE 10-YEAR PLAN

Every three years, councils are tasked with creating a plan for their city for the next ten years.

A large part of our 10-Year Plan focuses on our infrastructure assets, like water. We've known that we're going to need to plan for our future wastewater discharge for some time, and it has featured in the past three 10-Year Plans.

As part of the 10-Year Plan process, we are required to indicate an amount we think Nature Calls could cost. As we are in consultation currently, we have not identified a preferred option, so we don't have a set dollar figure yet.

So, we've assumed an acceptable option could be delivered for \$350 million (plus inflation) but it could be more or less than this based on the final preferred option, and a range of other factors.

We want you to have your say on Nature Calls and the 10 Year Plan

This year, Nature Calls is a critical element of our 10-Year Plan because, over the next three-year period, we'll be selecting and applying for the consent for our future discharge. This is the biggest financial project we're preparing for in our 10-Year Plan.

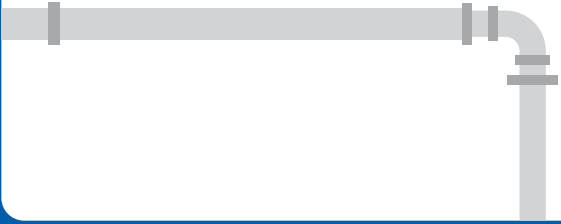
The consultation for the 10-Year Plan is occurring over a similar time period to the Nature Calls consultation, but they are being undertaken separately as they are governed by different legislation.

The 10-Year Plan consultation falls under the Local Government Act. It will be asking you about a range of things, including Nature Calls. However, when it comes to Nature Calls, the key impact of the project on what else Council can afford to do, is the key question.

In comparison, the Nature Calls consultation falls under the Resource Management Act and will be asking you a range of questions about your social, environmental, cultural, technical and financial values to guide Council in selecting the preferred option.

We'd love you to make a submission on both consultations, however the feedback from both consultations will be shared with Council as part of their decision making on both processes.

You can find out more about our 10-Year Plan at pncc.govt.nz/10yp



WHAT DO THE COSTS INCLUDE?

Identifying the costs for each of the options has been a refinement process that began when the Council developed the long list of options in 2018. At this early stage, each of the shortlist options included a high level estimate of capital, annual operation and maintenance and Net Present Value. For the feedback period in 2020, the cost estimates were refined. Although still conceptual at this point, the cost estimates were updated to include more up to date capital, operational and maintenance costs as well as potential income. The type of income estimated for land based discharges is from commercial crop activities or forestry. Land values were also estimated for coastal and inland on an average hectare basis.

There are a number of considerations we take into account in refining the cost estimates for each of the shortlisted options, these include:

- Operating & Maintenance (O&M) costs presented are based on the O&M costs in the first year of funding and do not include net income from land use activities as these are not yet established.
- O&M varies depending on growth, and includes renewal works for infrastructure in the year estimated to be required.
- Net Annual Income is assumed to happen annually from Year 1 (Y1) for inland cut and carry sites, and for the forestry sites it has been assumed they will be harvested and replanted through Y26-30.

Why have costs dropped since the 2020 feedback period?

Since July 2020, our technical team of experts has refined each of the options, including identifying a desirable treatment regime that will achieve One Plan targets and minimise effects on the environment. Further work has also been undertaken to model the effects of growth on the network and associated operation and maintenance costs for each option. We have also further explored the opportunities for revenue with each of the land based options and updated these costs. While the Council is continuing to engage with Government over potential funding opportunities for the BPO and other infrastructure investments, we have not accounted for external funding at this stage of the project, as this is not yet known. The Council is directly engaged with Government through the Three Waters programme and is continuing to explore funding opportunities for the BPO option.

THIS GRAPHIC SHOWS HOW MUCH YOUR RATES COULD INCREASE UNDER THE THREE OPTIONS



OPTIONS	CURRENT PROPOSED FOR 2021/22 WASTEWATER CHARGE PER RATEABLE UNIT PER YEAR	ESTIMATED INCREASE IN CHARGE DUE TO NATURE CALLS
DISCHARGE OPTION 1- Majority of treated wastewater is discharged to the Manawatū River via a wet land flow, with significantly improved removal of contaminants including phosphorus and nitrogen	\$299	+ \$440
DISCHARGE OPTION 2- Hybrid discharge between land (55%) and the Manawatū River (45%)	\$299	+ \$340
DISCHARGE OPTION 3- All treated wastewater is discharged to the ocean	\$299	+ \$430

A rateable unit is a residential home or unit or per pan (toilet) for non residential rate payers.

PUBLIC MEETINGS AND DROP IN SESSIONS

Join us at one of our information sessions!

These sessions will be subject to Covid-19 Alert Level Changes.

If we move into Alert Level 2, we will require registration for the public meetings.

Online

We'll be doing a live Q and A on the Palmerston North City Council's Facebook Page.

You'll be able to ask your questions and get them answered in real time!

Where Palmerston North City Council Facebook page

When Monday 25 April, 7-8pm

Palmy

Public Meeting

Where Palmerston North Conference and Function Centre,
Main Street, Palmerston North

When Thursday 22 April, 5.30-7pm

Drop in sessions

Where Palmerston North Central Library

When Saturday 17 April, 1-3pm

Saturday 24 April, 10-12pm

Saturday 1 May, 10-12pm

Where Awapuni Library

When Saturday 17 April, 10-12pm

Rangioutu

Where Rangioutu Hall

When Tuesday 27 April, 7-8.30pm

Horowhenua

Where Te Awahou Nieuwe Stroom, 92 Main St, Foxton

When Wednesday 21 April, 5.30pm-7pm

FEEDBACK CLOSES AT 5PM ON SUNDAY 9 MAY

Feedback forms are not returned, so please make a copy for yourself.

HAVE YOUR SAY FEEDBACK FORM



Please drop your feedback form to our Customer Service Centre or the central library.
You can also fill this in online at naturecalls.nz

Or post it to: Nature Calls Submissions, Palmerston North City Council, Private Bag 11034,
The Square, Palmerston North, 4442

You may add additional pages if you want to expand on any of your answers.

Your feedback from this form will be summarised in a report to Council.

Name				
Address				
Email Address				
Do you live in Palmerston North? <i>(please tick)</i>			<input type="checkbox"/> Yes	<input type="checkbox"/> No
Are you a business owner in Palmerston North? <i>(please tick)</i>			<input type="checkbox"/> Yes	<input type="checkbox"/> No
What age range are you in?	<input type="checkbox"/> under 18	<input type="checkbox"/> 18 - 30	<input type="checkbox"/> 31 - 40	
	<input type="checkbox"/> 41 - 50	<input type="checkbox"/> 51 - 60	<input type="checkbox"/> 61+	
Do you identify as tangata whenua in Palmerston North, Horowhenua, Manawatū? <i>(please tick)</i>			<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, please identify your iwi/hapu/tribal affiliation				
What kind of area do you live in?	<input type="checkbox"/> Urban	<input type="checkbox"/> Rural	<input type="checkbox"/> Coastal	



Please turn over to complete form

Values discussion

Our MCA process considered scoring and weighting of criteria, which are representative of values. We want to know which values are more important, to you. Refer to the table on page 8 for the descriptions.

Please rank these items from 1 (most important) - 8 (least important)	
	Natural Environment (ecology etc)
	Public Health
	Innovation and future proofing technology
	Growth and Economic Development
	Financial (cost of option)
	Maori Cultural Values
	Social and Community Impacts
	Resilience and Climate Change Impacts (future)

Based on your ranking above, which Option do you believe, will meet your set of prioritised values?	
Discharge option 1 - River with enhanced treatment	<input type="checkbox"/>
Discharge option 2 - To land 55% of the time and river 45% of the time	<input type="checkbox"/>
Discharge option 3 - To ocean with improved treatment	<input type="checkbox"/>
Other option (please describe below)	<input type="checkbox"/>



Tell us more about your preferred option

Tell us which value you selected as most important and why?

What do you think is the most sustainable solution for Palmy and our Region?

Which option has the right balance between environmental protection/impacts and community affordability?

Sustainability in your home

Please tick which measures you'd use to reduce your wastewater at home

<input type="checkbox"/> Remove insinkerator	<input type="checkbox"/> Low energy appliances
<input type="checkbox"/> Greywater tank	<input type="checkbox"/> Urine separate toilets
<input type="checkbox"/> Water reducing showerheads and taps	<input type="checkbox"/> Water metering
<input type="checkbox"/> Composting toilet	<input type="checkbox"/> None of the above



