Land Development Report

Private Plan Change – Cove Road Dargaville

Prepared For:
The Rise Limited

Date:
20/062022

Revision History

Revision No.	Prepared By	Description	Date
0	A.Bax	First Issue	20 June 2022
1	A.Bax		7 November 2022

Action	Name	Signed	Date
Prepared by	A.Bax		20 June 2022
Revised	A.Bax		7 November 2022

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1 Introduction

JAS Civil Ltd (JAS) has been engaged by The Rise Limited to provide a Land Development Report with respect to the proposed private plan change (PPC) referred to herein as 'the PPC' at Cove Road, Mangawhai, Kaipara District.

This report has been prepared solely for the benefit of this specific project, and the Kaipara District Council (KDC). JAS accepts no liability for inaccuracies in third party information used as part of this report. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

This report is based on development data provided by third party contributors to the plan change application as well as data obtained from the KDC and Northland Regional Council (NRC) maps current to the site at the time of this document's production. All vertical levels stated in this report are in New Zealand Vertical Datum 2016 (NZVD2016) unless stated otherwise. Should alterations be made which impact upon the development not otherwise authorised by this report then the design / comments / recommendations contained within this report may no longer be valid.

In the event of the above, the property owner should immediately notify JAS to enable the impact to be assessed and, if required, the design and or recommendations shall be amended accordingly andas necessary.

2 Site Description

The PPC Area is comprised of multiple lots located east off Cove Road to the north of the Mangawhai Heads township. The site is primarily accessed from Cove Road, Dargaville. Table 2-1 below shows the legal descriptions of the parcel that makes up the PPC Area. The PPC Area is currently zoned Rural but abuts the Residential zone and is located within the Future Residential and Business Growth Area.

Table 2-1: Existing Parcels within the PPC Area

Parcel ID	Legal Description	Property Address	Note
7996464	Lot 14 DP 533510	Cove Road	

The PPC Area is situated on an elevated area that projects eastwards from Cove Road forming a peninsular surrounded by Lifestyle blocks. Its topography slopes gently away from the centre then steepens at the extents of the site down onto the lower surrounding areas. Various water courses originate within the PPC Area and flow off in each direction eventually becoming tributaries and into the sea.

The PPC Area is predominantly in pasture with little tree cover. The figures on the following pages depict the site and some of the surrounding features.

Figure 2-1 Private Plan Change Area

Figure 2-2: Photo looking northeast over the PPC Area (Taken 20/06/2022).

3 Proposal

A private plan change is proposed to rezone the plan change area from Rural to Residential.

This report is intended to support the proposed private plan change by reporting on the following:

- Natural Hazard (Flooding)
- Earthworks
- Erosion & Sediment Control
- 3 – Waters
    - Water Supply
    - Stormwater
    - Wastewater
- Utilities (Energy Supply & Telecommunications)

The purpose of this report is to:

- Identify what infrastructure is necessary to allow development in line with the proposed zoning.
- Confirm if existing infrastructure has sufficient capacity, and if not, identify potential options to provide it.
- Identify the Kaipara District Councils commitments to bulk infrastructure upgrades (water & wastewater treatment) and convey how they relate to the PPC.
- Develop a stormwater management plan for the site that can be implemented under the proposed provisions in line with the national freshwater policy statement.
- Demonstrate that there are viable engineering solutions to support the application for the PPC.

It is not the intention of this report to propose final engineering solutions, rather to outline the solutions that are available to enable the PPC; the final engineering solutions will be detailed as part of future consents in line with the result decision.

Figure 3-1 and Figure 3-2 below shows the proposal. The Rural Zoning is green and the Residential Zoning is Yellow.

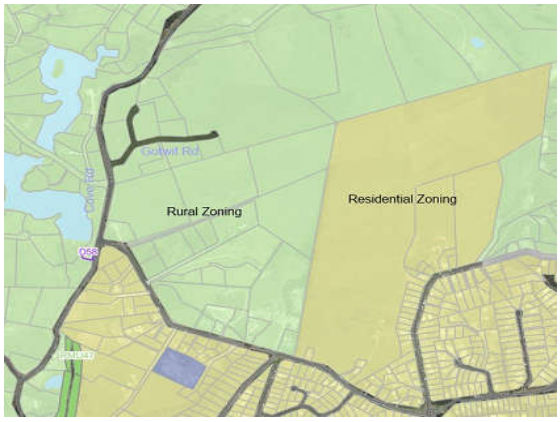

Figure 3-1: Existing Zoning

Figure 3-2: Proposed Zoning

4 Flood Risk Assessment

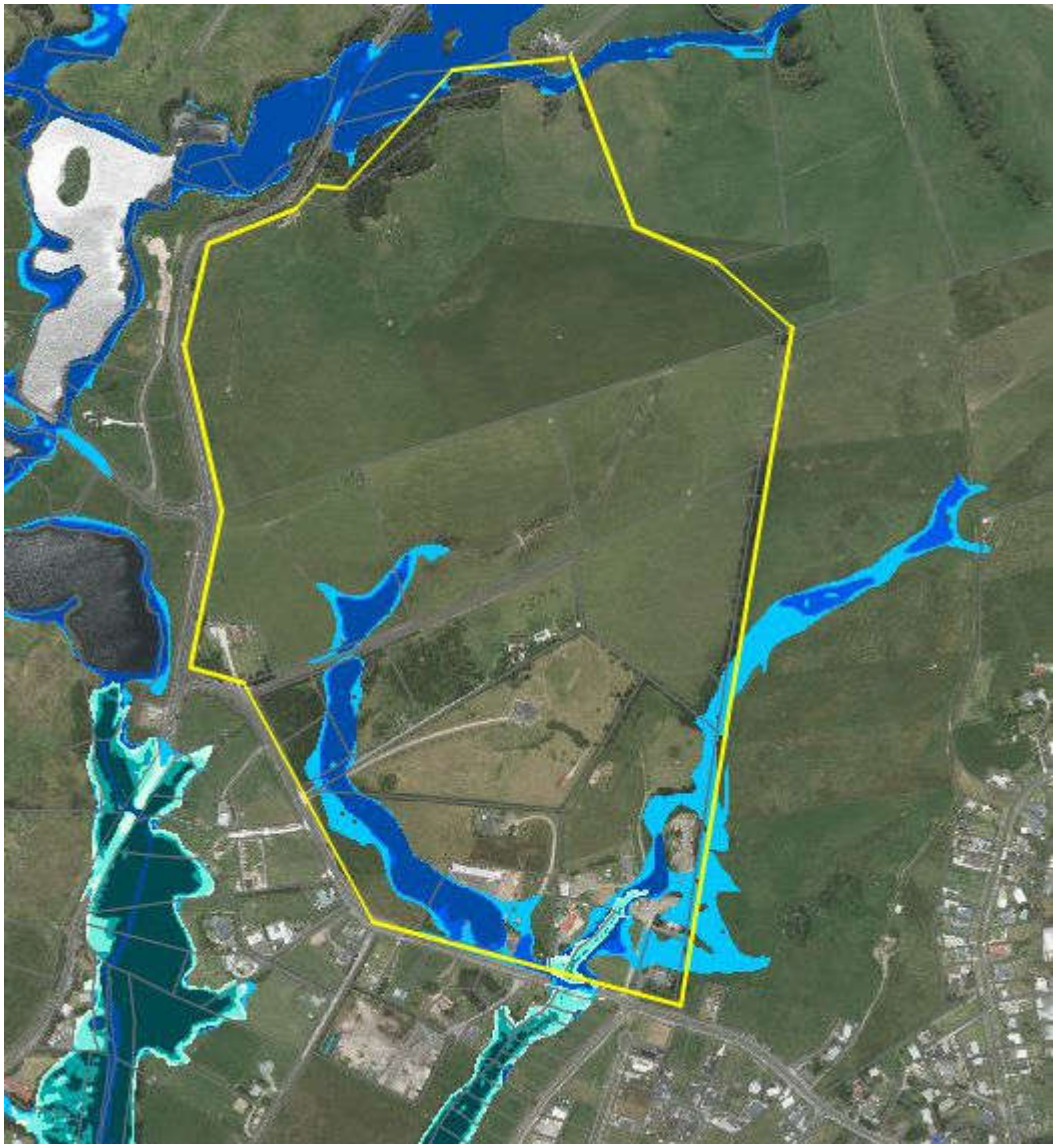

Figure 4-1: Snip of the NRC natural hazards priority rivers flood model – wider context (accessed 03/03/2022)

The southern area of the PPC has limited flood risk as shown in Figure 4-1 above.
There are option available to mitigate this flooding that can be discussed with KDC when development is approved.

5 Earthworks, Erosion & Sediment Control

5.1 Earthworks

The envisaged earthworks required to enable residential development within the plan change area is not expected to significantly modify the topography / landform of the environment. Typical earthwork operations to build roads, control stormwater and install in ground services will be required however they will be minor in nature given the site is gently rolling and ready to receive development without substantial modification to the existing landform.

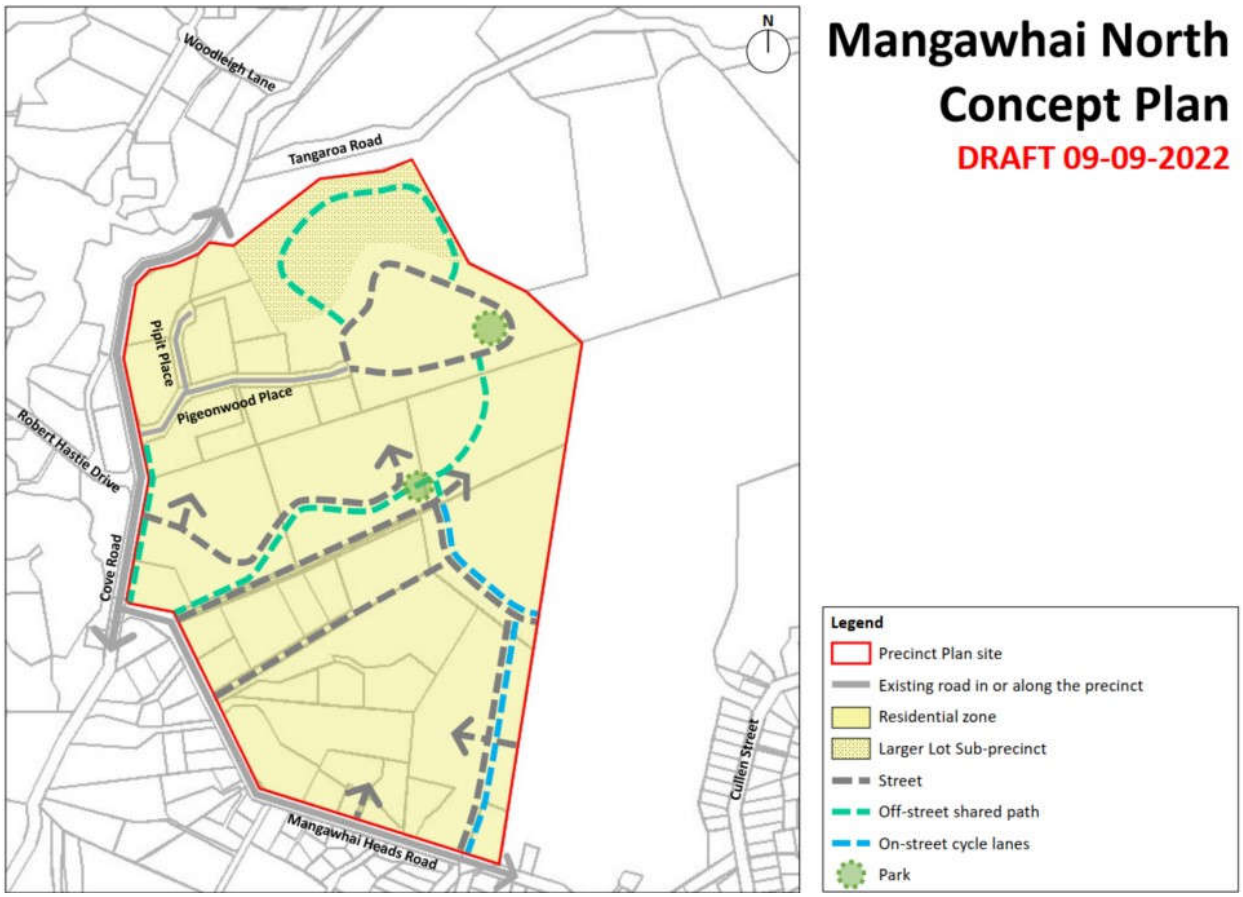

Figure 5-1: Concept Plan

- Earthworks Effects

Any effects within the PPC area through a planning lens is limited to the difference between the provisions of Rules 12.10.1a and 13.10.1a of the current KDC district plan. From an engineering perspective the existing rural zoning is more permissive so the up zoning of the area would result in the council having a more central role to manage the potential effects of earthworks operations as the trigger for needing a land use consent is reduced. So, considering this additional discretion, it is our opinion that the potential earthworks effects are reduced. Future development applications to enable the residential development will trigger a requirement for an Excavation and Fill Management Plan being required under a resource consent.

5.2 Geotechnical

For further geotechnical information please refer to the accompanying letter prepared by Wiley Geotechnical.

It concludes that there is no reason why the proposed subdivision could not be constructed.

5.3 Erosion & Sediment Control

From an engineering perspective the means to manage the effects of any land disturbing activity relates to the applicability and the effectiveness of the Erosion and Sediment Control practices to be implemented.

The development site lends itself to the effective implementation of erosion and sediment controls because:

- Topography – the development site has a gentle slope and is relatively short, thus reducing the potential for high velocity and concentrated run-off of flows.

- Erosion-prone Land – the development site is not identified as being on erosion prone land.
- Flood hazards – the development site is located clear of flood hazard areas.

Best practice erosion and sediment control would be implemented as a standard requirement within a residential zone to mitigate the effect of the earthworks on the surrounding environment. The sediment control devices would be constructed in general accordance with the applicable engineering standard and may include, but not be limited to the following:

- Stabilised Construction Entranceways
- Silt Fences / Super Silt Fences
- Clean water diversion bunds
- Decanting earth bunds / Sediment Retention Ponds
- Progressive site stabilisation

5.4 Performance standards

We note that the provisions of the proposed residential zoning under the district plan refer to the Kaipara District Council Engineering Standards 2011 as the means to meet the relevant performance standards of the district plan. The Engineering standards refer to the "*Auckland Regional Councils Technical Publication* 90 (TP90)" for Erosion, Sediment and Dust Control for guidance. TP90 has been updated and replaced by the document; "*Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region"*, known as GD05. As a result, GD05 is the document that would be referred to for guidance on what the relevant performance standards are, and the best practical means of achieving them. GD05 is widely used in the Northland Region and is explicitly referenced in the Proposed Regional Plan for Northland (Appeals Version – March 2022) as being required for any earthwork activity.

We anticipate that this plan change area would apply the current best practice document as the required standard at the time of development, which is currently GD05 as sighted above.

6 Water Supply

6.1 Mangawhai's Existing Water Supply Network

Mangawhai has a limited water source that supplies the local shopping area and a few ancillary areas. (see figure below) No known upgrade is imminent so any future subdivisions will be self-contained with on site tanks filled with rainwater off the house roofs.

Figure 5-1: Existing Water Supply reticulation (KDC Asset Management Plan 2015)

6.2 Firefighting Water Supply

Firefighting water supply requirements are set out in the Engineering Standards and SNZPAS4509:2008. For the residential type of development that this PPC would enable the firefighting water supply requirement is that set out Table 6-1 below.

Table 6-1: SNZPAS4509:2008 firefighting water supply requirements

Fire Water Classification	Reticulated water supply			Non-reticulated water supply	
	Required water flow within a distance of 135 m	Additional water flow within a distance of 270 m	Maximum number of hydrants to provide flow	Minimum water storage (within 90m)	
				Time (firefighting) (min)	Volume (m^3)
FW2	750 L/min	750 L/min	2	30	45

6.2.1 Non-Reticulated Water Supply

As an alternative to a reticulated water supply network, dedicated firefighting water supply storage tanks can be situated throughout a subdivision. Normally, these would be underground, located within widened road reserves and be easily accessible for Fire and Emergency personal to access. Water would typically be extracted from the tanks using a portable pump or fire appliance. Flow diversions from the reticulated stormwater network would be routed through the tanks to provide intermittent circulation and re-filling.

6.2.2 Full Potable On-Site Supply

As an alternative to extending the councils water reticulation network, on-site potable water supply tanks may be implemented which would be supplied by rainwater harvesting and supplemented by tanker truck as/if required on a house-by-house basis. This is widely used in the Kaipara District in both the residential and rural environment. The proposed provisions would require that this meets the requirements of the building act which refers to 'adequate supply' as being the performance criteria. What 'adequate supply' means is somewhat subjective. From an engineering perspective this is influenced by many factors including, water demand, catchment/roof area, rainfall, and storage volume. Table 6-2 below has been taken from the ARC Countryside Living Toolbox and is what we recommend as minimum rainwater tank volumes to provide adequate supply for residential dwellings.

Table 6-2: Recommended Tank Volumes for On-site Residential Supply

Roof Catchment (m2)	**Bedrooms**				
	1	**2**	**3**	**4**	**5**
100	$20m^3$	$50m^3$			
120	$15m^3$	$35m^3$			
140	$10m^3$	$30m^3$	$75m^3$		
160		$20m^3$	$60m^3$		
180			$50m^3$	$75m^3$	
200			$45m^3$	$65m^3$	
220			$35m^3$	$55m^3$	$90m^3$
240			$30m^3$	$50m^3$	$80m^3$
260			$30m^3$	$45m^3$	$70m^3$
280				$40m^3$	$65m^3$
300				$35m^3$	$60m^3$

As shown above a typical 600m2 site with a 240m2 roof area and nominal 4-person house would require 50m^3 of on-site storage. This could be provided by two 25m^3 above ground tanks which would typically take up 20-30m^2 of a sites area. This is practical on a 600m^2 site which would be the typical site size expected.

7 Stormwater

7.1 Adoption of Chapter 13 Stormwater Rules

With respect to stormwater, the potential effect the development could have on the receiving environment is limited to the differences between the existing chapter 12 provisions in the district plan and the proposed chapter 13, Mangawhai provisions for stormwater and how they control development. Table 7-1 below identifies the most relevant rules.

Table 7-1: Relevant District Plan Rules to Stormwater

Chapter 12 – Rural - Existing Condition	Chapter 13 – Residential – Proposed Condition
12.10.8 Permeable Surfaces	13.10.12 Permeable Surfaces - Modified
12.15.5 Stormwater Disposal	13.14.5 Stormwater Disposal – Modified

7.2 Permeable Surfaces

When comparing the rules, a notable difference is that in the rural zone a 15% impermeable coverage within any one hectare of a site is considered a permitted activity, where in the proposed residential Mangawhai zone this is increased to 60% of the net site area.

The change in zoning does give rise to additional potential stormwater effects. In our opinion the management of those effects are suitably addressed within the proposed provisions of the Mangawhai Area; specifically, any development must comply with the proposed rules relating to stormwater. Because the proposed provisions impose what we consider best practice stormwater management for all impermeable area, irrespective of permitted impermeable allowances, the effects of development with respect to stormwater will be managed.

The purpose of the permeable surfaces rules in this context is to guide catchment planning and ensure that future land uses stay within the limits allowed for. An example is, where a subdivision proposes a catchment stormwater device to protect the receiving environment, that device would be designed to allow for the permitted impermeable allowance of its catchment. What the rule does is ensure that future Lot owners in that subdivision don't increase their impermeable coverage over what has been allowed for.

Given the above, we hold the opinion that applying the proposed Chapter 13 Mangawhi community rules to the PPC Area will be sufficient to mitigate the potential effects on the receiving environment from residential development.

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8 Wastewater

8.1 Mangawhia's Existing Wastewater Network

Mangawhai has an existing reticulated wastewater network. The reticulated network conveys wastewater to the Mangawhai Wastewater Treatment Plant (MWTP). Figure 8-1 below illustrates the general arrangement.

Figure 8-1: Existing Wastewater Network (KDC Asset Management Plan 2015)

8.2 Current Wastewater System

As part of our reporting, discussions have been undertaken with representatives of the KaiparaDistrict Council regarding wastewater and the wastewater treatment plant (WWTP).

From our investigations we make the following comments with respect to Mangawhai's current wastewater treatment capacity and how it relates to the proposed plan change area.

8.2.1 Wastewater Treatment Plant

The current Wastewater system is formed by a network of gravity and pumped sewers. Many properties have historic septic tanks below the sewer levels, so the system has a large number of small on property grinder pumps to lift house wastewater to the network. No changes are proposed to these pump systems.
Mangawhai Heads is predominantly a gravity network (sewage flows downhill) but has several smaller pump stations to lift low lying areas into the network. Flow passes to Thelma Road (Outfall pump station).
Flow from the north of Mangawhai Heads passes to Thelma Road through Jack Boyd Drive (Pump Station K) to Thelma Road.
Mangawhai Village Pump Station (Pump Station VA) is the main pumping location in Mangawhai, and the rising main discharges to Thelma Road. The rising main crosses the causeway with a number of smaller pump station connections.

We understand the following with respect to the WWTP:

At the time of this report (June 2022) KDC has an investigation underway into the condition and the treatment capacity of the WWTP.
KDC have commissioned a Master Plan Strategy describing the current situation at the Mangawhai Community Wastewater System, (CWWS) the history of the system, the current challenges and the effects of continued growth in the community.
An interactive workshop with KDC and WSP team members was held on 3 November 2021 which considered the needs of Mangawhai and the key elements that require action to accommodate future growth.
The key outputs from the workshop were to provide this strategic plan report and provide an outline programme. The outcome will provide the framework and direction necessary to meet the capacity and programme driven by growth of the Mangawhai CWWS. It is envisaged that this strategy will become a live document underpinning the direction for network, treatment and disposal solutions

8.2.1.1 Reticulation Network

The Council has advised that a network model completed by a sub-consultant exists. We have requested the results of this model as well as the provided flow scenarios to be tested in this model. At the time of this report (June 2022) this information had not been provided.

8.2.2 Existing network Constraints Summary

There is a knowledge gap with respect to the condition and treatment capacity of the WWTP. The Kaipara District Council has a budget in the Long-Term Plan for investigation which it is currently utilising. Until the current investigations are complete, the need for upgrades, and the details of whatthose upgrades might be are unknown.

In our opinion because the existing system appears to have constraints, an alternative viable solutions to increase WWTP capacity as required, and the general acceptance is that the existing WWTP will need to be upgraded to accommodate the future growth being planned for in Mangawhai.

Simply put, there are two potential constraints to service the PPC Area with reticulated wastewater:

8.2.2.1.1 Capacity constraints in the councils existing pipe network and wastewater pump stations
8.2.2.1.2 Capacity limitations at the Mangawhai WWTP

Neither of these constraints in our opinion prevent the re-zoning of the land as alternative on site remedies are available.

8.3 Wastewater Demand

The PPC seeks to enable residential development that will not increase the demand on the existing Mangawhai Wastewater Network. Table 8-1 below summarises the estimated Wastewater demand that can be engineered for on-site disposal.

Table 8-1: Estimated Wastewater demand as per KDC & NZS4404 Standards.

Scenario	Household Equivalent	Number of Persons per Household	Catchment Design Population	Average Dry Weather Flow	Dry weather diurnal PF	Dilution/Infiltration Factor	Average Dry Weather Flow (L/s)	Peak Dry Weather Flow (L/s)	Peak Wet Weather Flow (L/s)	Daily Design Volume (m3)
Proposed Plan Change (Based on 600m2 minimum lot sizes)	85	4	340	210	2.5	2	3.38	8.46	16.92	71.4

8.3.2 Gradual Demand Increase

The increased demand on the wastewater network will be gradual and cumulative through the widerwater catchment due to the significant lag between zoning, development, and the occupation of the resulting dwellings. Additionally, land is released in stages to control supply and capital.

8.3.2 Proposed on Site Provisions

Environment Technology offer an efficient on-site system, AES -38. (see below)

OSET-NTP NZ Test Results
AES exceeds secondary levels by 10x

Exceptional test results show AES is a high quality treatment.

Effluent Type / Parameters	Raw Effluent	Primary (Septic Tank)	Secondary (Aerated)	Advanced Secondary	AES test results* (median)
BOD_5 mg/L	250-350	120-250	≤20	≤10	<2
TSS mg/L	300-400	50-70	≤30	≤10	3
Faecal Coliform CFU/100ml	$>10^8$	>100,000	≤100,000	≤100,000	2260

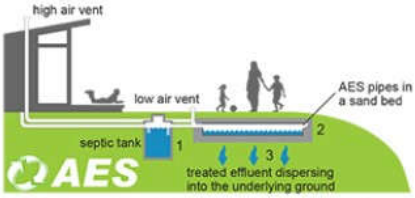
* AES-38 system tested at OSET-NTP Rotorua 2016-17

Next Steps

Property Owners
Contact us on 03 970 7979 to find a wastewater designer near you. You will need a site assessment and design for your specific site, to include with your building consent application.
AES wastewater systems can save you $$$

Wastewater Designers and Installers
Complete our free online training course at www.et.nz. We provide full support, design advice and review of AES designs.

The effluent treatment process



1. Used water from the house goes into a standard locally-sourced septic tank for primary treatment. This usually includes black and grey water. Solids settle in the septic tank, and first level treatment by anaerobic organisms takes place.
2. After primary treatment, wastewater then enters the AES bed for passive aerobic treatment involving biofilm growth. Natural air circulation through low and high vents increases aerobic microbial efficiency. The locally-sourced AES system sand provides final treatment. The combination of biofilm growth and AES system sand disperses the advanced secondary treated effluent evenly along the base of the AES bed.
3. After this advanced secondary level of treatment, effluent can sustainably infiltrate into the underlying soil, safely recharging water resources - protecting your environment.

Environmenttechnology
sustainable wastewater treatment

Environment Technology is the NZ-wide distributor of AES components and associated drainage products. View videos and more info at www.et.nz or contact us.

Web: www.et.nz
Call in: 105 Pascoe St, Nelson
Talk to us: 03 970 7979
0800 WASTE H20 / 0800 927 834
Email: info@et.nz

AES Wastewater Treatment
Advanced Enviro-Septic

Wastewater treatment to the highest standard for the least lifetime cost

Choose AES for your environment

ZERO operating costs

- 20 year warranty
- Low installation cost
- No servicing costs - huge savings
- No power use in standard installation
- No pumps or chemicals, silent operation
- No alarms to sound in the middle of the night
- 500,000+ systems installed worldwide
- Resilient to high & low flows, and intermittent use
- Fit to existing septic tank for a low cost upgrade
- 10x better than NZ secondary wastewater treatment standards at OSET-NTP, Rotorua, NZ
- Complies with AS/NZS 1546.3:2008 On-site domestic wastewater treatment units

Environmenttechnology
sustainable wastewater treatment

AES tested at OSET NTP, Rotorua
NZ AS/NZS 1547 secondary treatment system

Environmenttechnology
www.et.nz

AES system pipes being installed in a sand bed by an AES certified installer.

Effluent Treatment Quality Assurance

AES systems have been tested at research facilities around the world with consistently excellent results.

In New Zealand an AES-38 standard system tested in 2016-17 achieved the following results.

BOD_5 <2mg/L
TSS 3mg/L
Faecal Coliforms 2260 CFU/100ml

This is 10x better than the standard required for secondary treatment.

Discharge of the treated effluent into the soil can be sustained indefinitely, giving an expected lifetime of more than 30 yrs based on USA installation performance history.

In 2017-18 an AES-38R system tested in OSET-NTP Trial 13 achieved an additional A grade – TN <8mg/L - for nitrogen reduction, using one small pump to recirculate the treated effluent back through the septic tank.

Where are AES systems used?

- Residential Dwellings
- Holiday Homes
- Farm Houses
- Campgrounds
- Community Buildings
- Small-medium sized towns
- Marae
- Schools
- Factories
- DOC huts
- Sub-divisions
- Remote Locations

AES System Advantages

- No six-monthly maintenance means huge savings over the lifetime of your AES system
- No power required for a standard AES system so not only cost savings but no noisy pumps activating that will eventually fail and need replacing
- No aerator, blower or filters that can fail or need servicing and replacing
- As AES operates passively, no alarms to sound in the middle of the night in a standard system
- Compact - AES beds can be installed under lawns, landscaping or even under your driveway
- No homeowner intervention needed
- Reliable with intermittent use. Biofilm quickly re-activates when required. Ideal for holiday homes and baches
- AES treated effluent can be used for subsurface irrigation, watering landscaping or orchards
- Especially appropriate in sensitive areas due to
  - High quality output
  - No risk of performance failure from lack of servicing
  - Ability to adjust to large variations in flow without intervention

"We are absolutely thrilled with our AES system - probably one of the best purchases I've ever made."

Craig Watson, Kapiti. AES system owner

AES lined bed to dripper lines irrigating landscape

AES is adaptable to all site conditions

Raised bed on very permeable soil, groundwater at 400mm, beach nearby

High Groundwater
AES systems can be installed in raised beds.

Heavy Clay Soils
Sand bed extensions can provide a larger dispersal area.

AES pipes can be installed in a lined bed and the treated effluent then siphon or pump-dosed to irrigation dripper lines. Siphon dosing maintains the AES system as totally passive and requires a 10m vertical fall to the dripper field.

Small Section
On a small section an AES system could occupy less than 20m² of lawn area or be installed under a driveway.

Sloping Section
AES beds can be installed horizontally along the contour, or stepping down a slope.

Nitrogen/ Nutrient Reduction Areas
The AES-38R system tested at OSET-NTP Trial 13 achieved TN<8mg/L. This easily meets the requirements of TN<15mg/L for areas such as the Rotorua and Taupo lake catchments.

www.et.nz

A typical system for a 3-bedroom house would require a septic field of 20m^2 with a 10m^2 reserve area. If we allow for a 4-bedroom house with category 4 soil, then a septic field of 32m^2 with a 16m^2 reserve area. (Total area required is 48m^2) The AES-38 system can also be placed under driveways if limited area is an issue.

The AES-38 system is an advanced secondary system with exceptional test results exceeding secondary levels by 10 times. (See above brochure)

AES systems are well suited to large scale projects with their OSET-NTP tested high levels of treatment, flexibility of design to meet specific conditions and Council Compliance. AES has been used on some very large projects including a town of 200 homes. It is increasingly being used on large projects in New Zealand

9 Utilities

As part of our assessment, we have coordinated with the relevant service providers and requested comment with respect to servicing the PPC Area for new residential connections. The following summarises our findings, for the correspondence please refer to the appendix.

9.2 Energy Supply

We have consulted with Northpower, and they have confirmed that the PPC Area can be serviced with power without any large network upgrades being required.

The design would be created when the development plan is known.

9.3 Telecommunications

Both Chorus and Northpower have confirmed that they can service new connections at the development site for fibre. It is likely that as part of the development a new 'backbone' cable would need to be installed along Godwit Place Road from an access point to the existing exchange. Once at the development site, reticulation throughout would be straight forward air blown fibre.

10 Conclusion

We do not believe there is any engineering limitation discussed within the scope of this report that would prevent the future development of the area in accordance with the proposed zoning and the associated provisions.

11 Limitations

11.2 This assessment contains the professional opinion of JAS Civil Ltd Consultants, in light of the information available to it during the preparation, using its professional judgement and acting in accordance with the standard of care and skill normally exercised by professional engineers. No other express or implied warranty is made as to the professional advice contained in this report. The assessment is also based on information that has been provided to JAS Civil Ltd from other sources or by other parties. The assessment has been prepared strictly on the basis that the information that has been provided is accurate, completed, and adequate.