

2018-2028 WASTEWATER ASSET MANAGEMENT PLAN
He Rautaki Whakahaere Rawa mō Te Wai Paranga

PUMP STATIONS

NGĀ TAUPUNI MAPU

VOLUME TWO | PUKAPUKA TUARUA



Mountain to Sea
Te Kaunihera-ā-Rohe o Ngāmotu
NEW PLYMOUTH DISTRICT COUNCIL
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DOCUMENT CONTROL

Document Name	2018-2028 Wastewater Asset Management Plan Volume 2 - Pump Stations
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August 2018



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1. INTRODUCTION

This volume provides details of the asset lifecycle management for the **Pump Stations** asset category of the Wastewater AMP. The framework and key elements of the overall asset management plan are outlined in Table 1.

Table 1 Asset management document structure

No.	Document Name	Key Document Contents
1	Long Term Plan	Infrastructure Strategy <ul style="list-style-type: none"> • Strategic Framework • Guiding Themes • High Level Information for Each Asset Class Council Services <ul style="list-style-type: none"> • High Level Information • Levels of Service • Financial Plan
2	Asset Management Strategy	General Asset Management Principles and Overview
3	Asset Class General Volumes	General Information and Glossary about each asset class <ul style="list-style-type: none"> • Executive Summary • Introduction • Levels of Service • Future Demand • Risk Management Plan • Financial Summary • Plan Improvement and Monitoring

4	Asset Category Lifecycle Management Volumes	Asset Life Cycle Management for each asset category within each asset class <ul style="list-style-type: none"> • Description • Condition • Remaining Lives • Valuation • Operations & Maintenance • Renewals • Acquisition and Augmentation • Disposals • Annual Work Plan • Risk Management • Financial Summary • Improvement Plan
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Purpose and Key Issues

The purpose of our pump stations is to transfer wastewater within the reticulation system and ultimately to the wastewater treatment plant where it is not otherwise possible because of topography constraints.

Key issues relating to wastewater pump stations are:

- Reducing instances and volumes of overflow at pump station sites.
- Improving reliability by mitigating factors that increase the likelihood of an overflow.
- Providing sufficient on-site storage to reduce the likelihood of overflows in the event of an interruption.
- Providing energy efficiencies to reduce the costs of operation.
- Managing potentially offensive odours from pump station sites.
- Managing solids that can interfere with pump operation.

1. INTRODUCTION

Levels of Service

All the levels of service included in Section 3 of the Wastewater General AMP apply to this volume.

Future Demand

Future demand on pump stations is driven by domestic and commercial growth across the district generally and at specific land development areas e.g. Area Q. Options to provide additional capacity at pump stations or to build new pump stations for specific land development will be developed as part of our planning processes.

Over the period of this AMP we will conduct further studies of potential future growth to ascertain system capacity limits and to produce a Wastewater Master Plan.

Note: All financial forecasts are shown in inflation adjusted dollar values.



2. LIFECYCLE MANAGEMENT PLAN

2.1 Asset Description

Situated on a volcanic ring plain and extending to the coast, the sloping nature of our drainage districts - means our wastewater system generally requires less pumping than is typical for similar sized provincial centres. There are, however, situations where cost and/or construction difficulties make a gravity wastewater system unfeasible. In such cases, pump stations are installed to pump from the lowest end of a local reticulation to a suitable point on an adjacent gravity system.

We currently operate 34 pump stations as part of the public wastewater reticulation network. These range from small local pump stations serving two or three properties (e.g. Konini Street, Inglewood) to community pump stations serving residential catchments of between 10-100 properties (e.g. Herekawe pump station). They also includes major transfer pump stations on wastewater trunk mains required to transfer significant volumes of wastewater to treatment plants or adjacent drainage districts (e.g. Te Henui pump station).

Individual pump stations are those that service a single property where it is not possible to connect to the public wastewater network without pumping. Such pump stations are normally installed by the property owner who has ownership and responsibility for pump operation and maintenance.

The wastewater network and its associated pump stations cover the NPDC approved drainage districts. These are predominantly the urban and industrial zones of New Plymouth, Bell Block, Inglewood, Oakura and Waitara. We have reviewed extending the wastewater system to Urenui/Onaero but this is not included in the period of this AMP. It may occur beyond 2028.



2. LIFECYCLE MANAGEMENT PLAN

The links between pump stations and the wastewater treatment plant are shown in the schematic in Figure 1.

Figure 1 Pump station link schematic

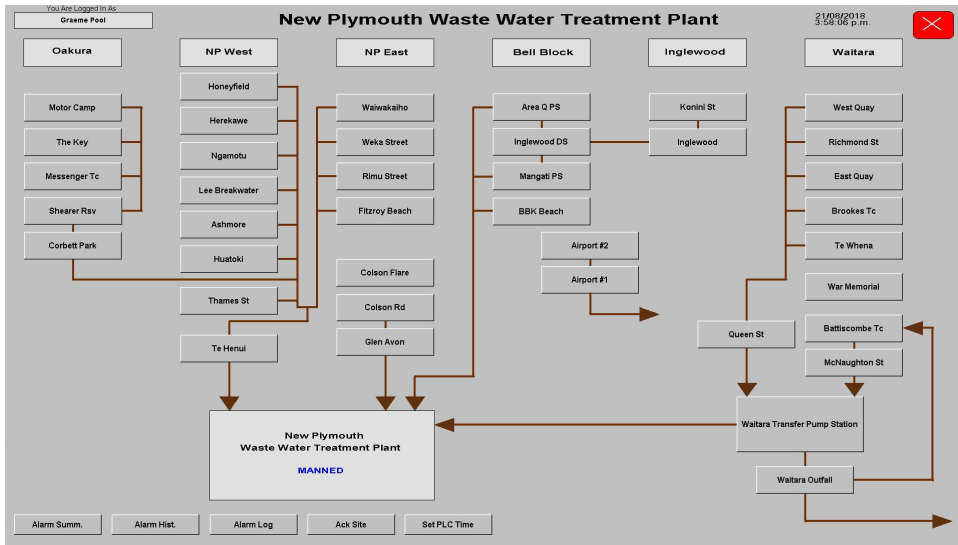


Table 2 List of pump stations

Site	Name
200	Huatoki PS
201	Te Henui PS
202	Herekawe PS
203	Lee Brekwater PS
204	Fitzroy PS
205	Rimu Street PS
207	Waiwakaiho PS
208	Colson Road PS
211	Ngamotu PS

212	Airport PSs
213	Glen Avon Road PS
215	Bell Block PS
216	Mangati PS
217	Weka PS
218	Konini PS
219	Waitara Outfall PS
220	Queen Street PS
221	McNaughton Street PS
222	West Quay PS
223	Richmond Street PS
224	East Quay PS
225	Battiscomb Terrace PS
226	Te Ekena Place PS
227	Brookes Terrace PS
229	Ashmore Grove PS
230	Thames Street PS
231	Shearer Reserve PS
232	Corbett Park Transfer PS
233	Messenger Terrace PS
234	Oakura Motor Camp PS
235	The Key PS
236	Onaero Motor Camp PS
237	Urenui Motor Camp PS
238	Area Q Pump Station

All pumps are powered by electrical motors driven via a connected gearbox. Two pumps are installed at each pump station, configured in working/standby mode, high/low demand mode or twin duty at times of high demand. This provides some redundancy for outages due to failures or maintenance.

2. LIFECYCLE MANAGEMENT PLAN

The asset components of the pump stations include pumps, valves, piping, meters, cables, controls/SCADA and associated buildings. The pump station buildings are included in the Property AMP.

Onaero Motor Camp and Urenui Motor Camp pump stations discharge into dry fields. The intermediate transfer Pump Stations at Shearer Reserve, Corbett Park, Te Henui, Waitara and Area Q pump waste into rising pressurised mains. The remaining pump stations discharge into gravity mains.

Our well maintained and updated asset inventory means the data on the number, quantity and age of the assets presented in this AMP is classed as grade **B – Reliable**.

2.2 Asset Condition

Asset condition grades are given in accordance with Section 5 of the Asset Management Strategy.

No formal asset conditions for wastewater pump stations have been conducted and all asset conditions are recorded in the asset inventory as **6 - Unknown**. Therefore the data accuracy for stormwater asset condition is classed as grade **E – Unknown**. **This is a data integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

2.3 Asset Remaining Lives.

Beca assessed the expected lives of pump station assets as part of the 2016 plant and equipment valuation and we have recorded this data in EAM. Therefore, the data accuracy for asset remaining lives is classed as grade **B – Reliable**.

2.4 Asset Valuation

As at 30 June 2016, the value of pump station assets is shown in Table 3.

Table 3 Asset valuation

Asset Category	Gross Current Replacement Cost (\$)	Annual Depreciation (\$)	Optimised Depreciated Replacement Cost (\$)
Waste Water Treatment Plant	19,819,498	367,189	11,863,800

Beca provided a detailed valuation of each asset component as part of the general plant and equipment valuation during the 2016 statutory valuation. Therefore, in conjunction with a well maintained and updated asset inventory, the data is classed as **B – Reliable**.

2.5 Operations and Maintenance

2.5.1 Operations

City care visit major transfer pump stations at least weekly to perform routine checks and to log pump status (hours run, duty load etc.). They visit other pump stations at least once monthly to check pump status, hose out debris and fat accumulation in the wet wells, check for correct operation of switches and valves, and to see that no vandalism has occurred.

Normally, the only above ground structures for minor pump stations are the main control cabinet (MCC) and switchboard, the telemetry gear (also housed in a weather proof lockable cabinets) and the communications antenna.

All reticulated water supplies used to hose wet wells at pump stations are metered and include a suitable back flow preventer.

2.5.2 Maintenance

Our maintenance contractors provide specialist maintenance services for reactive and preventative maintenance at pump station sites: the mechanical maintenance contractor for pumps and fittings; the electrical maintenance contractor for electrical control gear and telemetry; and the reticulation maintenance contractor for the rising mains. Each operates under the instruction of the relevant water and wastewater technical team.

We schedule routine maintenance annually.

2.5.3 Critical Spares

We have not yet assessed the critical spares required for pump stations. **This is an asset integrity issue and is recorded as an action in Section 5 – Improvement and Monitoring Plan.**

2.5.4 Opex Forecast

The general 10-year Opex forecast for wastewater assets is included in the Wastewater General Volume, including the Opex forecast for the maintenance and operation of headworks and intakes assets.

2.6 Renewals Plan

Our general approach to asset renewal is included in Section 4.3 of the Asset Management Strategy.

Pump station components with moving parts i.e. motors, gear boxes and pumps have finite lives in the region of 15-20 years depending on usage. As pump stations continue to age, we will require investment in renewals to maintain current reliability levels. Prior to confirming expenditure on renewal projects, we will undertake condition and criticality assessments and review the remaining life of the assets to ensure optimum value from the assets is being achieved.

Pump stations consist of plant and equipment components. Renewal on these items is included in the general P&E planned and emergency renewal provision included in Volume 1 – Treatment Plants. Therefore, no general renewal plans are included for pump stations in this volume.

Specific major renewal projects for pump station assets include:

- WW1055 - The renewal and long term maintenance of the Waitara outfall pipeline undertaken as part of the agreement between NPDC and Methanex to continue to protect the integrity of the outfall. Future ownership options are to be explored with Methanex now that the Waitara transfer pump station is commissioned as we only require the outfall in emergency situations.

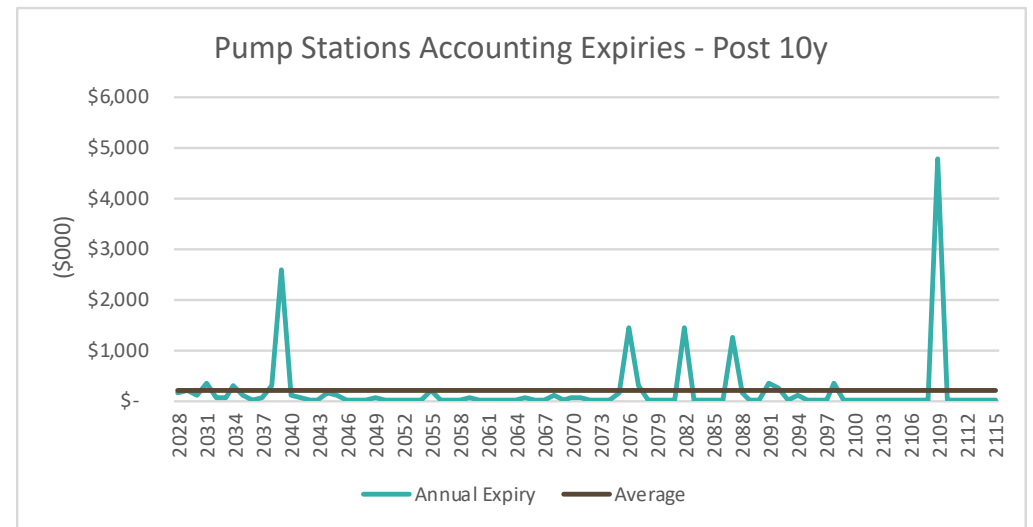
The Capex forecast for pump station renewal projects for the period of the AMP is shown in Table 4.

Table 4 Renewals expenditure forecast

Pump Stations Renewals Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
WW1055 - Waitara Outfall Pipeline Renewals	40	41	42	43	44	45	46	47	48	50	446
Total	40	41	42	43	44	45	46	47	48	50	446

The accounting expiries for the years beyond 27/28 are shown in Figure 2. This shows that major expenditure of approximately \$2.5m for the renewal of pump station assets occurs in 2039. However it is expected that expenditure will be spread evenly each year based on more accurate condition and remaining life assessments, combined with cyclical renewal of components containing mechanical moving parts.

Figure 2 Pump stations accounting expiries post 10Y



2. LIFECYCLE MANAGEMENT PLAN

2.7 Acquisition and Augmentation Plan

Acquisition

Any new assets installed by developers to serve new domestic and non-domestic developments are usually vested in us. Assets are built to our NZS4404: 2010 – Land Development and Subdivision Standard and to the specific requirements as defined in New Plymouth District Council (NPDC) and South Taranaki District Council (STDC) adopted standard for Land Development and Subdivision Infrastructure, which is based on NZS 4404:2010 with local amendments. When an asset is vested with us, we have full responsibility for the asset and it is included in our operations, maintenance and future renewal plans.

Growth

The following growth projects are planned during the period of the AMP.

- WW2014 – To enable secure control of our major transfer pump station a fibre connection is required. With growth and increasing flows we will need to control the flow into the WWTP during high flow events. We are starting to experience inflows up to the capacity of the outfall. Once this capacity is exceeded there will be an overflow. This project will enable control of inflow to plant to avoid overflows.

The capex forecast for this growth project is shown in Table 5.

Table 5 Growth expenditure forecast

Pump Stations Growth Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
WW2014 - Te Henui Fibre Connection	-	103	-	-	-	-	-	-	-	-	103
Total	-	103	-	-	-	-	-	-	-	-	103

2. LIFECYCLE MANAGEMENT PLAN

Levels of Service

The following level of service projects are planned during the period of the AMP.

- WW2007 – When the current access covers on all 34 Wastewater Pump Stations are open, there is no void protection, which results in exposure of operations and public to a potential fall. We propose installing alternate covers with grates and barriers to make working on pump stations safe. This will eliminate / control a safety risk that is no longer considered acceptable in today's environment.
- WW2008 - This project is linked to WW1042 (Renewal of Waitara Outfall Pump Station components). The dual failure of sewage transfer pumps at Waitara Transfer Pump Station highlighted the lack of redundancy at this site. There is emergency storage available but this relies on mains power being available and is only sufficient for 2 - 3 days depending on incoming flow. During the dual failure event a new pump was purchased. This pump is not suitable as a direct replacement without modification. A minor capital project realised approximately 700m³ of gravity storage at the Waitara Outfall Pump Station. Installing the purchased pump at the outfall pump station and constructing a new rising main approximately 100m long would allow sewage to be pumped to New Plymouth, even if there was no mains power at either the Waitara Transfer or McNaughton St Pump Stations. This project would reduce the frequency of overflows to the Waitara embayment and provide redundancy in the event of major failure at Waitara Transfer Pump Station by enabling continued pumping of sewage from Waitara to New Plymouth in the event of power failure.

- WW2002 - Many of our wastewater pump stations have no or very limited emergency storage in the event of a power cut or other system failure. This has contributed to the 34 overflows of raw sewage from pump stations that have occurred over the last 3 years. Our COP requires 6 hrs ADWF storage. This project will be to either install this emergency storage (where practical) or to investigate alternative options e.g. generators where it is not practical.
- WW2012 – This project is to reduce odours generated from sewage at Mangati Pump Station that are offensive to neighbours and users of Mangati walkway. This will reduce complaints and reduce the risk of compliance action being taken by TRC.

The Capex forecast for these level of service projects is shown in Table 6.

Projects beyond the period of the AMP will be identified by the Wastewater Master Plan.

Table 6 Level of service expenditure forecast

Pump Stations Level of Service Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
WW2007 - Pump Station Safety Access Covers - Void Protect	252	257	-	-	-	-	-	-	-	-	509
WW2008 - Elimination of use of Waitara Marine Outfall	-	-	105	967	-	-	-	-	-	-	1,072
WW2002 - Wastewater Pump Station Overflow Prevention	-	232	526	537	549	562	575	589	603	618	4,791
WW2012 - Odour Control At Mangati Pump Station	-	154	-	-	-	-	-	-	-	-	154
Total	252	643	631	1,504	549	562	575	589	603	618	6,526

2. LIFECYCLE MANAGEMENT PLAN

2.8 Disposal Plan

Disposal is the retirement or sale of assets when they become surplus or superseded by new or improved systems. Assets may become surplus to requirements for any of the following reasons:

- Under-utilisation
- Obsolescence
- Provision exceeds required level of service
- Replacement before end of predicted economic life
- Uneconomic to upgrade or operate
- Policy changes
- Service provided by other means (e.g. private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social)
-

No asset disposals are planned over the 10 year AMP period.

2.9 Annual Work Plan

We will base our detailed work plans for Annual Plans on the asset renewal forecasts included in section 2.6 and the augmentation projects identified in section 2.7.



3. RISK MANAGEMENT PLAN

3.1 Critical Assets

We have not yet conducted criticality ratings for pump station assets; therefore, there is currently no data recorded in EAM. **This is an asset integrity issue and is recorded as an action in Section 5 - Improvement and Monitoring Plan.**

Following asset criticality assessment, we will develop a focused management plan to ensure the integrity and resilience of critical assets. **This is recorded as an action in Section 5 - Improvement and Monitoring Plan.**

3.2 Risk Assessment

Details of our Risk Management Framework are included in section 6.2 of the Water Supply General AMP volume and section 7 of the Asset Management Strategy.

3.3 Infrastructure Resilience Approach

During the development of the Wastewater Master Plan we will consider the criticality and resilience of the system, taking into account the plans to construct new assets to meet growth projections and maintain levels of service. When our condition and criticality assessments have been completed we will undertake further resilience planning to identify any potential improvements.

Following on from ex-cyclone Gita which damaged one of our water supply trunk mains crossing a pipe-bridge in February 2018 and the Havelock North Water Inquiry; the importance of our wastewater network has been highlighted. This has caused us to consider the resilience of our wastewater assets based on cost versus risk assessments. Section 6.3 of the General Wastewater volume gives details the items selected for investment in improving asset resilience.



4. FINANCIAL SUMMARY

The Capex forecast for pump stations is shown in Table 7.

Table 7 Capex forecast summary

Pump Stations Expenditure Forecast (\$000)											
Activity	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	LTP Total
Renewals	40	41	42	43	44	45	46	47	48	50	446
Service Level	252	643	631	1,504	549	562	575	589	603	618	6,526
Growth	-	103	-	-	-	-	-	-	-	-	103
Total	292	787	673	1,547	593	607	621	636	651	668	7,075

A general provision for minor renewal of pump station assets is included in Volume 1 – Treatment Plants plant and equipment renewals.

The Opex forecast for operations and maintenance is included in the overall Opex forecast for Wastewater detailed in the LTP. It is also included in the Wastewater General Volume.

5. IMPROVEMNET AND MONITORING PLAN

Our general Asset Management Maturity Improvement Plan is included in the Asset Management Strategy.

General improvements to Wastewater assets are included in the Wastewater General Volume.

The specific areas of improvement identified for treatment plant assets are listed in Table 8.

Table 8 Improvements summary

No	Improvement Area	Owner	Start Date	End Date
1	Assess asset condition and record results in EAM	Asset Operations Planning Lead	Jul 2018	Jun 2020
2	Assess critical spares and procure any required components	Manager Three Waters	Jul 2018	Jun 2019
3	Conduct criticality assessment and record results in EAM	Asset Operations Planning Lead	Jul 2018	Jun 2020
4	Produce focused management plan for those assets identified as critical	Manager Three Waters	Jul 2018	Jun 2020



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