WAIMAKARIRI
DISTRICT COUNCIL

Activity Management Plan 2021

Poyntzs Road Water Supply Scheme

3 Waters | July 2021

Prepared by

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Document Acceptance

Action	Name		Signed	Date
Prepared by	Colin Roxburgh	Water Asset Manager		12/02/2021
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Reviewed by	Kalley Simpson	3 Waters Manager		17/02/2021
Approved by	Gerard Cleary	Manager Utilities and Roading		17/02/2021
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1 Executive Summary

The following table provides a summary of the key asset management components that have been assessed for the Poyntzs Road Water Supply Scheme. These have been identified through consideration of the levels of service, consents, asset condition, risk analysis, disaster resilience, growth projections, and capacity assessment:

Table 1: Key Asset Management Components

Resource Consents	The scheme continues to comply with its resource consent conditions.
Levels of Service	Most levels of service are being met. However, the water quality of the source is not fully compliant with the health requirements of the Drinking Water Standards. Principally there are no effective barriers against protozoa contamination from the scheme's source. The Ph aesthetic guideline is also not met from time to time. An upgrade is programmed for completion in 2021 to join the scheme with West Eyreton, which has a compliant source.
	Levels of service for flow, losses and storage have also not been met Flow for restricted connections does not meet the LoS because of insufficient data, which the restrictor inspection programme will address with time. For the losses LoS, implementation of actions within the Water Conservation Strategy is required before it can be met. The storage LoS will be met once the scheme is connected to the West Eyreton scheme
Capacity & Performance	Capacity of the current water supply system has been assessed as being capable of meeting existing demand, but elements of this system will become back up only when the scheme is connected to the West Eyreton scheme. No elements of capacity will be reduced by connecting to the West Wyreton scheme Upgrades to meet future demand are included in the source upgrade works required to ensure the DWSNZ are met.
Asset Condition	The majority of the scheme is in good condition, with only minor renewals required over the next 50 years. The headworks are only assessed as adequate, but once the West Eyreton connection is complete, the existing headworks become backup supply only
Risk Assessment	The highest risks to the scheme identified through the Risk Assessment relate to the non-secure source and the potential for contamination through inadequate treatment process. These will be mitigated through the source upgrade project scheduled to be completed in 2021.
Disaster Resilience	The Disaster Resilience Assessment indicated that security (risk of public interference at the head-works) is rated as the highest hazard on this scheme. The headworks also appear to be vulnerable in a large earthquake. Further works are required to refine the earthquake resilience assessment and security requirements and identify future improvements. The upgrade project to join the scheme with West Eyreton will mean that the existing headworks becomes a backup only.
Growth Projections	The scheme is predicted to increase in size by 23% over the next 10 years, and by 86% (increase in connections rather than demand) in the next 50 years. It is assumed that this growth will predominantly be accommodated by requiring semi restricted supplies to be surrendered when parent blocks are subdivided, although there is some allowance for additional fully restricted connections to join as well. This may not be a safe assumption and will be monitored during the term of the 2021-2031 LTP

2 Introduction

The purpose of this Activity Management Plan (AMP) is to:

- Provide an overview of the Poyntzs Road water supply scheme and the assets that make up the scheme;
- Outline any significant issues associated with the assets, and show how the Council will manage these;

This plan summarises the various components of the Poyntzs Road water supply scheme, its condition and performance, and identifies future funding requirements including upgrades where necessary.

It is noted that this document was drafted in 2020, but is to be published in 2021. At the time it was being drafted in 2020 the Poyntzs Road scheme was a standalone scheme, however was planned to be joined to the West Eyreton scheme in 2021. Due to the uncertainty around the timing of the project to join with West Eyreton, particularly with the COVID-19 pandemic event, this plan has been written as though the schemes are separate, however the likely completion of the source upgrade project in 2021 is acknowledged.

The data that has been relied upon to produce this document was taken at the end of the 2019/20 financial year (i.e. 30 June 2020). There are more up to date scheme statistics available on document 121108078783 which is intended to be updated quarterly.

Further details of the asset management practices used by Council to manage this scheme are summarised in the District Water Supply AMP Overview document (200120006283).

Projects identified to improve asset management processes for this scheme will also benefit the performance of other 3 waters schemes and are managed at a District level for efficiency.

Projects are also identified within this AMP that will maintain or improve levels of service.

All figures within this AMP exclude inflation.

3 Related Documents

The following related documents have been used as reference documents or for guidance in the development of some of the sections in this Activity Management Plan

- Waimakariri District Plan
- Population in the Waimakariri District (TRIM 170328030077)
- New Projections for LTP 2021-2031 (TRIM 200908117997
- WDC Asset Management Policy (TRIM 180605062091)
- 2019 Customer satisfaction Survey (TRIM 200313034937)
- Development Contributions Policy 2021/22 (TRIM 200729095963)

4 Scheme Description (What Do We Have?)

The Poyntzs Road water supply scheme is a rural water supply delivering water to a mixture of fully restricted and semi-restricted connections. The fully restricted connections, which are the majority of connections on the scheme, supply 2-units (2,000 L) per property per day. The smaller number of semi-restricted connections supply 13 litres per minute per connection (19 units per day per property).

The water is pumped from the single shallow groundwater well source, with no backup source. The supply is a non-secure groundwater source that requires chlorine disinfection for bacterial treatment. However, the existing treatment system provides no protection against protozoan contaminants such as Giardia and Cryptosporidium. It is also noted that the source water has elevated nitrates at approximately 80 - 90% of the maximum acceptable value (MAV).

Therefore, the Poyntzs Road scheme complies with the bacterial part of the Drinking-water Standards for New Zealand (DWSNZ), doesn't comply with the protozoal requirements, and is at risk of not complying with the chemical requirements in the future.

As noted in the Introduction, a project to upgrade the Poyntzs Road scheme was planned for 2021 at the time that this plan was being drafted. The proposal is to upgrade the Poyntzs Road scheme to comply with all the requirements of the DWSNZ by joining it with the West Eyreton scheme. This would require the construction of a booster pump station, plus about 8km of new pipework.

While the physical solution is relatively simple, due to the reasonably large amount of pipework, and the relatively small rating base, the cost and rating impact is significant. At the time this document was being drafted, consultation on this project on how this should be funded was ongoing. It has since been agreed that this will be funded from the Government's Stimulus Grant.

Some key statistics (2019/20 year) of the scheme are shown below. The extent of the currently serviced area and comprehensive flow data records are presented in Figure 13 and Figure 14

A schematic view of the principal source, treatment, and distribution system is presented below in Figure 1.

Table 2: Scheme Statistics for 2019/2020

Scheme Parameter	Statistics	Source
Type of Supply	Restricted and Semi-restricted	
Principal Source	Single shallow well	
Back-up Source	Nil	
Treatment	Chlorine disinfection	
Nominal Storage Capacity	49,000 litres	200121007544
Length of Reticulation	6.1 km	Water Asset Valuation Tables 7-4 and 7-5, pages 53 - 55.
Total Replacement Value	$598,000	
Depreciated Replacement Value	$383,000	
Number of Connections	87	2019/20 Rates Strike
Number of Rating Charges	437	
Average Daily Flow (5 year average)	121 m^3/day	Flow Data Analysis – Water
Peak Daily Flow (5 year average)	207 m^3/day	
Resource Consent Abstraction Limit (Principal Source)	656 m^3/day* (expires 31/03/2041)	CRC990927 *Based on annual abstraction limit of 239,258 cubic metres per year (note: 11 litres per second allocation limit at peak instantaneous flow)
Average Daily Flow per Connection (5 year average)	1,430 L/conn./day	Flow Data Analysis – Water
Peak Daily Flow per Connection (5 year average)	2,446 L/conn./day	

Table 3: Water Supply Pipe Data Summary

Water Supply pipe length (m) by diameter and pipe material				
Pipe Material	**Pipe Diameter (mm)**			
	< 50	**50**	**100**	**Total**
PE	0m	2,974m	0m	2,974m
PVC	0m	3,179m	20m	3,199m
Total	**0m**	**6,154m**	**20m**	**6,174m**

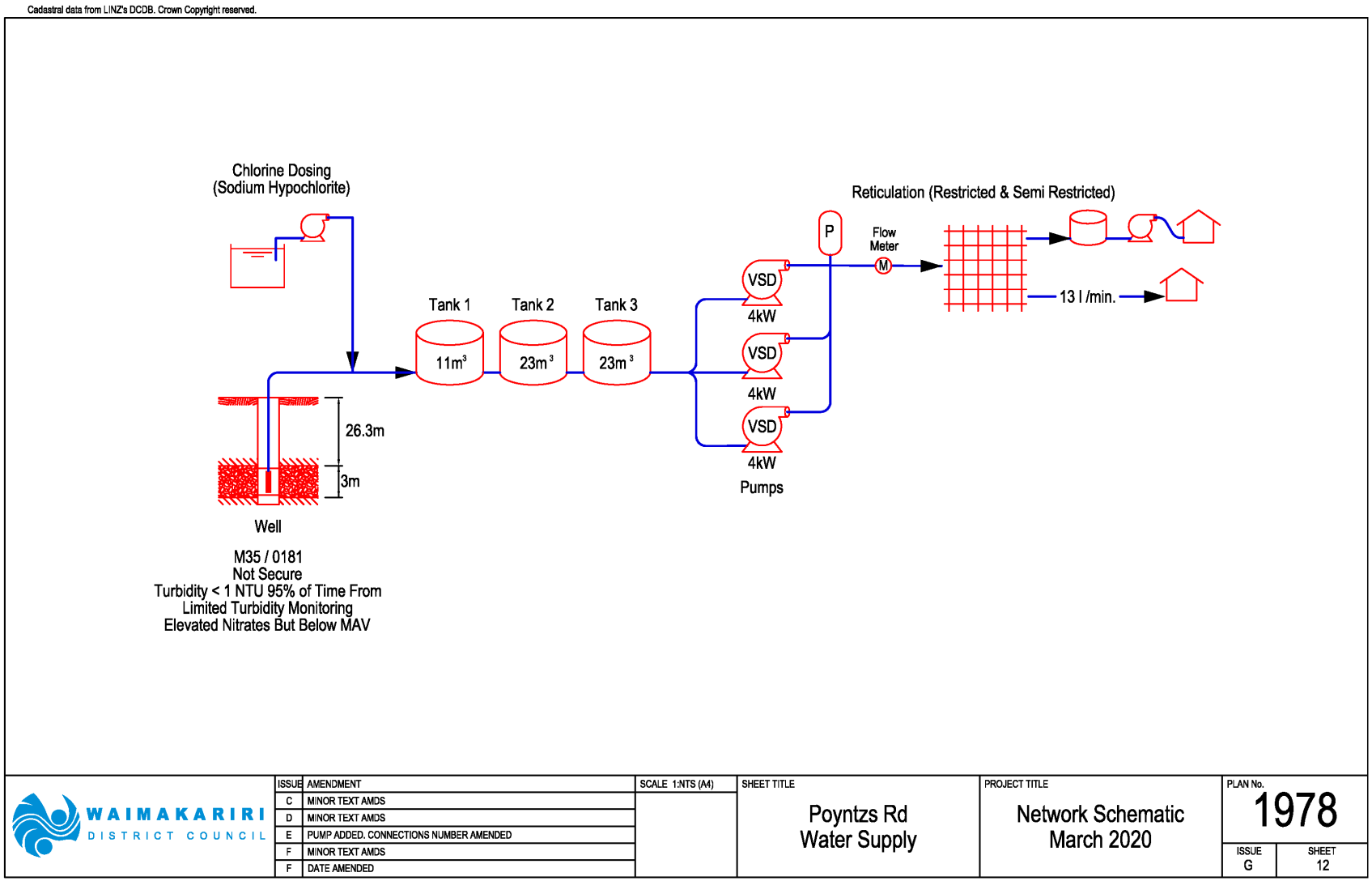
Table 4: Water Supply Valve Data Summary – Poyntzs Road

Water Valves	
Diameter (mm)	Count
< 50	0
50	7
Total Valves	7
Fire Hydrants	0

Table 5: Data References

Data Reference	Trim Reference
2020 3 Waters Asset Valuation	200824109857
Flow Data Analysis - Water	121108078783
2020 Water Conservation Strategy	200501050668
2020 50 Year Water and Sewer Growth Forecast	200224024348
2016 Water Safety Plan	150813118968
2016 Water Supply System Assessment	150813118967
2020 Fire Fighting Code of Practice Compliance Update	200904117110

Figure 1: Network Schematic



5 Scheme Management Issues (What Do We Need to Consider?)

There are a number of key aspects to consider when managing a water supply; these include:

- Target and actual levels of service
- Asset condition & criticality
- Capacity and performance of the supply
- Risks associated with the supply
- Growth predictions for the scheme

These issues have been assessed in detail and are explained in the following sections.

5.1 Levels of Service

Table 6 sets out the performance measures and targets specific to the Poyntzs Road water scheme, and performance achievement against targets since 2008.

Mandatory performance measures are measured at the district wide level and are not included in the individual water supply scheme AMPs. They are located in the District Overview Water Supply Activity Management Plan. However there is considerable overlap between the measures at Scheme and District levels. Mandatory measures cover drinking-water standard compliance, water losses, time to respond to faults, and complaints. The scheme LOS measures also include drinking-water standard compliance, water losses and outages, among other measures. However, within the scheme AMP, these are assessed at the scheme level rather than at a district level. These scheme level results then feed into the district level results in the overview document.

None of the WDC targets are planned to change over the 10 year LTP period, so only the one target value has been shown in this document.

Performance in Table 6 is measured against the performance measures set in 2018, as part of the 2018-28 Long Term Plan process. Going forward from 2021 onwards, performance will be against the modified set of performance measures that were presented to the Council's Utilities and Roading Committee in 2020 (refer report 200406043184[v2]), and subsequently approved by Council. These revised levels and targets are detailed in the District Overview Water Supply Activity Management Plan.

Table 6: Elective (non-mandatory) Levels of Service Targets and Performance Measures as Assessed in 2020

**** Note "Y" indicates that the LOS has been met, and "N" indicates it has not been met***

[#] Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment.

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results[#]			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil/yr	Nil	No non-compliance reports from Ecan.	Achieved	NA	Y	-	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water supply delivers water that complies to a standard suitable for compliance with the aesthetic requirements of DWSNZ	Complies	Doesn't comply	pH marginally less than aesthetic guideline range of 7 - 8.5 at times.	Not achieved	LoS amended from 2021 onwards. Refer Overview document.	Y	N	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/yr	Nil	No E. coli detected	Achieved	NA	Y	Insuf. Data	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the health requirements of DWSNZ	Complies	Doesn't comply	Source upgrade project required to achieve compliance. Proposed to join with West Eyreton	Not achieved	Capital upgrade project to address.	N	Y	N	N

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results#			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
	DWSNZ - Sampling Non-compliance	Number of instances where sampling programme did not comply with DWSNZ, as demonstrated by Water Information NZ (WINZ) database	Nil/yr	Nil	All samples taken in accordance with DWSNZ	Achieved	NA	Y	Y	Y	Y
Water Flow	Flow – Allocated Units	Water flow at the point of supply in Restricted or Semi Restricted schemes, excluding outages, as demonstrated by programmed restrictor audits, that tests restrictors at not less than 5 yearly intervals	>0.69 L/min/unit	Insuf. Data	Restrictor checks are programmed to be undertaken every 4 years. However, there is currently insufficient data.	Not achieved	Implement Phase 2 of AMIS project, to allow adequate data collection and analysis.	Insuf. Data	N		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by measured or calculated minimum flow for On Demand schemes	< 240 litres/ connection/ day	463	Actual losses estimated at 463 L/conn./day based on night flow monitoring	Not achieved	Implement actions as identified in Water Conservation Strategy.	Y	N	Y	N
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/yr	Nil	No events > 8 hours during 19/20 period	Achieved	NA	Y	Insuf. Data	Y	Y
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as	>150kPa for 100% of the time	Complies	Validated by water model, running scheme at target	Achieved	NA	Y	Y	Y	Y

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results#			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
		demonstrated by a reticulation model or audits.			demand and ensuring target pressure is achieved.						
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>1150 litres/ allocated unit/ day	Complies	Validated by water model, running scheme at target demand and ensuring target pressure is achieved.	Achieved	NA	Y	Y	Y	Y
Storage Volume	Storage – Restricted	Volume of available and usable storage for On Demand and Semi-Restricted schemes (dependant on source type)	72m3	6.9 hours	Deficiency identified.	Not achieved	Proposal to upgrade scheme will address this issue.	N	N	N	N
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	74%	Refer to Water Conservation Strategy (200501050668)	Achieved	NA	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed	94%	Refer to Water Conservation Strategy (200501050668)	Achieved	NA	N	N	Y	N

Section	Level of Service	2018 – 2021 Performance Measure	2018 – 2021 Target	2020				Previous Results#			
				Result	Commentary	Status	Action to Address	2017	2014	2011	2008
			reasonable water use								

5.2 Asset Condition

The asset condition for the reticulation has been determined based on criteria set out in the International Infrastructure Management Manual (IIMM), published by the Institute of Public Works Engineering Australasia (IPWEA), combined with updated calculations of base lives for the pipeline asset types.

The IIMM sets out criteria for converting remaining useful life as a percentage to a Condition Grade from 1 (Very Poor) to 5 (Very Good). This is a relatively simple conversion. However the process for determining the base lives, which in turn gives the condition grading is more complex. The details of this process are outlined in the Water Overview AMP. The following expected asset lives have been adopted:

Table 7: Adopted Reticulation Asset Base Lives for Pressure Pipes

Pipe Category and Definition	Calculated Asset Life (years)
PVC Modern (PVC pipe installed post 1997)	100
PVC Old (PVC pipe installed prior to 1997)	60
PE Modern (PE pipe installed post 1990)	100
PE Old (PE pipe installed prior to 1990).	35
AC Small (AC pipe with diameter < 100mm)	55
AC Medium (AC pipe with diameter 100mm to 150mm)	60
AC Large (AC pipe with diameter >= 200mm)	90

Asset Condition Calculation

With the asset base lives calculated as per the process described above, and the condition defined as a function of remaining useful life, the remaining data required to calculate the condition of each asset is the year of installation of the asset. This information is held for each asset within the Council's TechOne asset database. Thus, through a combination of expected asset life, year of installation, remaining useful life of asset, the condition grade for each asset is able to be assigned.

Figure 2 below has been generated using the above process, to show the assessed condition of all the pipe assets on the scheme. Also included within this is the pipe burst data held against each asset.

Figure 3 shows this same information graphically, and also includes headworks assets, and Table 8 presents this information is tabular format.

It is noted that "Headworks" is inclusive of all above ground assets associated with the water supply scheme (e.g. reservoirs, buildings, pump sets). "Reticulation" covers the remainder of the assets, which are typically below ground pipework related assets.

Figure 2: Pipe Condition Assessment Plan

Figure 3: Asset Condition Summary

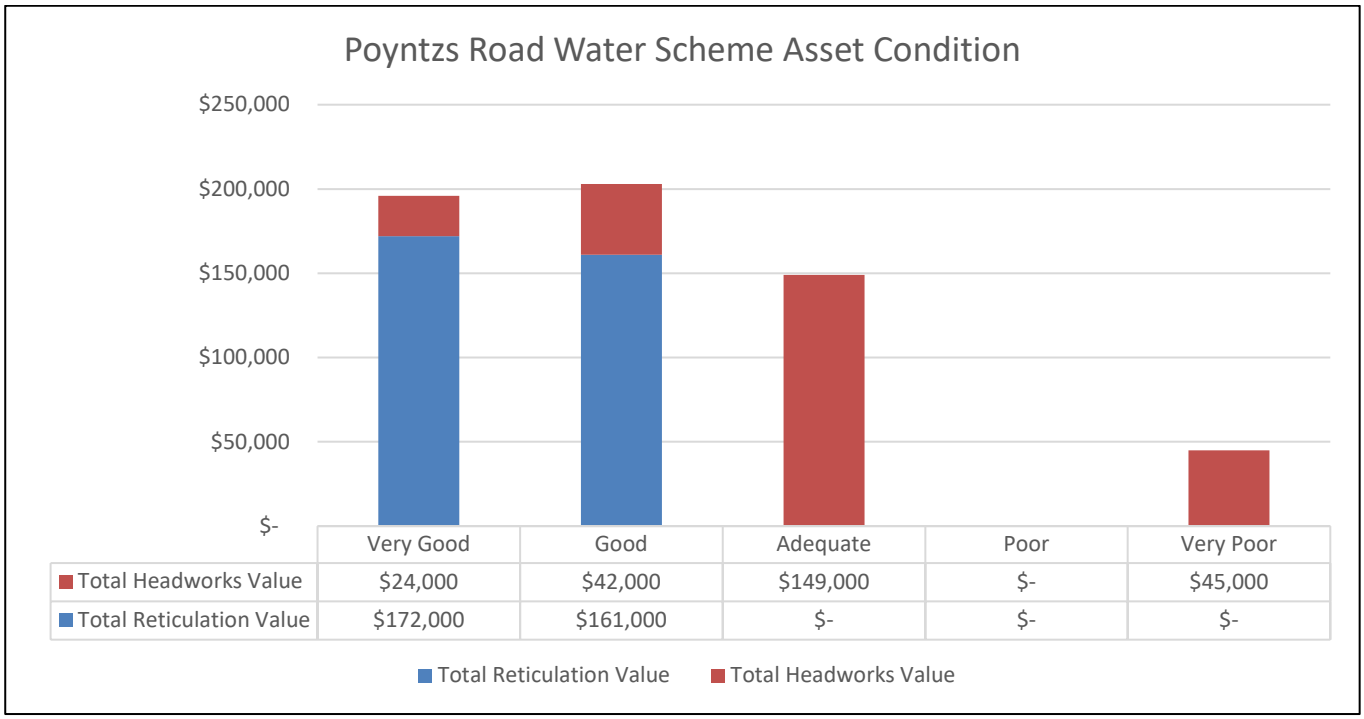


Table 8: Pipe Condition Summary

Condition Grade	Definition	Pipeline Quantity	Total Reticulation Value	Total Headworks Value	Total Value
1	Very Good *More than 80% of life remaining*	3.0 km *48%*	$ 172,000 *52%*	$ 24,000 *9%*	$ 196,000 *33%*
2	Good *Between 50% and 80% of life remaining*	3.2 km *52%*	$ 161,000 *48%*	$ 42,000 *16%*	$ 203,000 *34%*
3	Adequate *Between 20% and 50% of life remaining*	0.0 km *0%*	$ - *0%*	$ 149,000 *57%*	$ 149,000 *25%*
4	Poor *Between 10% and 20% of life remaining*	0.0 km *0%*	$ - *0%*	$ - *0%*	$ - *0%*
5	Very Poor *Less than 10% of life remaining*	0.0 km *0%*	$ - *0%*	$ 45,000 *17%*	$ 45,000 *8%*
Total		**6.2 km**	**$ 333,000**	**$ 260,000**	**$ 593,000**

5.3 Asset Criticality

Asset criticality provides an indication of the importance of an individual asset and the corresponding impact on the service delivery should the asset fail for any reason. Criticality is used in risk based investment decisions to help decide when an asset should be replaced to avoid the consequences of failure. The Council has developed an assessment process which scores assets from most critical 'AA' to least critical 'C'. Further details of the criticality assessment methodology is covered in the WS Overview AMP.

The pipe criticality scoring process has been significantly improved through automation and dynamic links to GIS data layers for this AMP. A similar level of automation is planned to be developed for all facilities assets. Figure 4 provides a spatial view of asset criticality for the scheme.

Figure 4: Pipe and Facilities Criticality

5.4 Risk Assessment

An Operational Risk Assessment was first undertaken for the Poyntzs Road Water Supply Scheme in 2004, and it has been regularly updated since that time. It was last updated for the 2015 AMP review. The last two reviews have revealed no extreme risks for the Poyntzs Road water supply scheme, but 3 high risks were identified.

The District Wide Overview details the risk events considered and includes a summary of the risk assessment results for all the water supply schemes and is useful in indicating overall water supply network priorities.

Table 9 below shows a summary of the number of events at each level of risk for the Poyntzs Road water supply scheme.

Table 9: Number of Events per Level of Risk

Risk Level	2004	2008	2011	2014
Extreme risks	0	0	0	0
High risks	4	4	3	3
Moderate risks	21	22	17	16
Low risks	16	16	25	25
Not applicable	14	13	13	14
Total	**55**	**55**	**58**	**58**

The three risks identified in 2014, related to source and treatment issues. There was a risk of contamination due to livestock, treatment was not adequate to remove protozoa if it was present, and there was no standby chlorine dosing system. All of these risks will be mitigated with the completion of the source upgrade project in 2021.

District wide, moderate risks are being deferred until extreme and high risks have been addressed

5.5 Water Safety Plan

Poyntzs has an approved Water Safety Plan (WSP). This provides a summary of how the scheme is operated, undertakes a risk assessment for the scheme, identifies preventative measures, and recommends any upgrades to address unacceptable risks. Under the Health Act, these are required to be renewed every 5 years. The Poyntzs WSP was last approved in 2016, which means it will be due for renewal next in 2021. With the scheme to join to West Eyreton, rather than update the Poyntzs Road plan, the Poyntzs Road scheme would need to be amalgamated with the West Eyreton Water Safety Plan.

Budgetary requirements arising from the plan are incorporated into the draft LTP.

When the Water Services Bill comes into effect, which is expected to be in mid-2021, the requirement for WSPs to be produced will be transferred from the Health Act to the Water Services Bill. The plans will then be submitted to Taumata Arowai, rather than the current Drinking-water Assessors which operate under the Ministry of Health.

5.6 Disaster Resilience Assessment

The 2009 Disaster Resilience Assessment (DRA) is a desk top study that primarily considered the risks to above ground structures presented by natural hazard events to above ground assets across all Council operated 3 Waters schemes. The original assessment was updated in 2012 using revised hazard and asset behaviour information captured during the 2010-11 Canterbury earthquake sequence.

Risk from earthquake events that could induce liquefaction, on brittle pipes (AC and earthenware) is managed using a reticulation vulnerability score. This is used as an input to the risk based renewals assessment.

Above Ground Facilities

The above ground facilities were assessed for risk of failure against 13 natural and 2 manmade hazard scenarios. The following risk profile (Table 10) reflects the likelihood of the event occurring and the consequence on the community of the facility failing. Hazards classified as having 'No Known Risk' have been omitted from the table.

Table 10: Risks to Above Ground Facilities

Threat	Poyntzs Road Headworks
100 yr Local Flooding	L
475 yr Earthquake Induced Slope Hazard	L
Earthquake (50 yr)	M
Earthquake (150 yr)	M
Earthquake (475 yr)	L
Wildfire (threat based)	L
Snow (150 yr)	L
Wind (150 yr)	L
Lightning (100 yr)	L
Pandemic (50 yr)	M
Terrorism (100 yr)	H
E =- Extreme, H = High, M = Moderate, L = Low	

The Poyntzs Road Headworks has been identified as at high risk from terrorism and are considered to be moderately resilient to this hazard.

The scheme has been identified as having low resilience against earthquake events, the buildings are of garden shed type construction on concrete pads and are not expected to perform well during severe shaking.

The Council's response to these risks is being managed at a district level via the DRA Action Plan and related projects. Refer to the District level AMP for details. Since there is some overlap of the DRA

and Operational Risk Assessment, a review and integration of the risk assessment methodologies is planned, prior to risk assessments next being carried out.

5.7 Growth Projections

Situation

The majority of the growth from new connections of this water supply is assumed to be within the existing scheme boundary. The growth is expected to occur as the last remaining 20 ha blocks within the existing supply area are subdivided to lot sizes of 4 ha. If this occurs it will enable the redistribution of the current 13 litre per minute connections into fully restricted connections delivering into onsite storage tanks for the new lots.

The overall district population growth scenario used for the 2021 AMP update was supplied by Council's Development Planning Unit, broken into towns and rural areas. Water supply growth projections were calculated using the New Projections for LTP 2021-2031 (TRIM200908117997), which was the basis for infrastructure planning.

Due to issues that have occurred with the Census 2018, the population projections that would normally be used as a basis for updating the work previously developed by the Council's Development Planning Unit have not been released by Stats NZ in time for the development of this assessment.

However, based on the historical growth patterns of new dwelling Building Consents over the last three years (636 in 2017/18, 661 in 2018/19 and 615 in 2019/20), the projections used for the previous LTP/infrastructure strategy remain valid to be used for infrastructure planning. As the timeframe for this infrastructure planning is for the thirty years between 2021 to 2051, the previous population projections have been extended out a further three years, as documented in New Projections for LTP 2021-2031 (TRIM200908117997).

It is important to provide a brief comment on COVID19 and the impact it could have on population projections. At the time of writing this paragraph (August 2020), New Zealand is currently in Level 3 restrictions in Auckland and Level 2 restrictions in the remainder of the country. While international migration is currently low arising from the COVID19 travel restrictions, a significant number of New Zealanders are returning home due to the impact of COVID19 on overseas countries. This has contributed to a high level of population growth nationally over the last six months, which has had a flow on effect to growth in the Greater Christchurch and Waimakariri Districts. How long this might continue for and when international migration (from other countries) might return to pre COVID levels is still to be determined. However the existing population projections remained the most appropriate to use for infrastructure planning at this time.

Demand

Demand on the Poyntzs Road water supply is expected to remain similar to current levels over the next 50 years. It was assumed that any development would occur within the existing scheme boundary via properties converting from 13 L/min connections to fully restricted connections. The net effect would mean that the amount of rating units would remain the same, as the number of connections increase. Therefore the rating unit and demand growth is 0%. It is also noted that as part of the proposed joining of Poyntzs Road to West Eyreton, work was underway with existing 13 L/min (19-unit) connection holders to surrender their units in order to reduce their rates, while still retaining the ability to subdivide and redistribute units in the future. So while there is some

allowance for new connections outside of existing scheme boundaries, this is likely to be largely cancelled out by the surrender of units from existing properties.

It is projected that there will be an increase in connections by 23%, by the end of the 2021-31 Long Term Plan (LTP) period. This projection is based on the New Projections for LTP 2021-2031 (TRIM200908117997), more specifically the rural growth profile.

The number of restricted (two units per day) connections will be increased by an average of 2 per year during the 2021-31 LTP period as shown in (Table 11).

Table 11: Growth Projections

Poyntzs Road	Rates Strike July 2019	Years 1 - 3	Years 4 - 10	Years 11 - 20	Years 21 - 30	Years 31 - 50
	2019/20	2021/22 to 2023/24	2024/25 to 2030/31	2031/32 to 2040/41	2041-42 to 2050/51	2051/52 to 2070/71
Projected Connections	86	94	106	122	135	160
Projected Rating Units	467	467	467	467	467	467
Projected increase in Connections		10%	23%	41%	58%	86%
Projected Average Daily Flow (m^3/day)	137	137	137	137	137	137
Projected Peak Daily Flow (m^3/day)	275	275	275	275	275	275

Note that the time frames have been chosen to reflect the periods 3, 10, 20 and 30 years from the AMP release date, however due to the time it takes to complete the analysis the base rates strike data used was from 2019/20.

Demand over the next 50 years is projected to increase by 86% for connections. It has been assumed that development will only occur within the existing scheme boundary via properties converting from 13 L/min connections to fully restricted connections. The net effect of this is that the amount of rating units would remain the same, as the number of connections increase. Therefore the rating unit growth was predicted to be 0%.

This long term projection is higher than the 2017 growth projection, 67% (used for the 2017 AMP). Both projections utilised the best data and information available to project the connections for the water schemes at the time. This connection projection used the rural profile, from the New Projections for LTP 2021-2031 (TRIM2009081179970).

Water use predictions for the Poyntzs Road water supply scheme have been based on the standard assumption used when modelling the future water demands within the water distribution models. These are an average and peak daily water use per day of 1,000 litres and 2,500 litres respectively (including losses).

Projections

Figure 5 and Figure 6 present the projected growth and corresponding demand trends for the Poyntzs Road Water Supply Scheme.

Figure 5: Population Projections

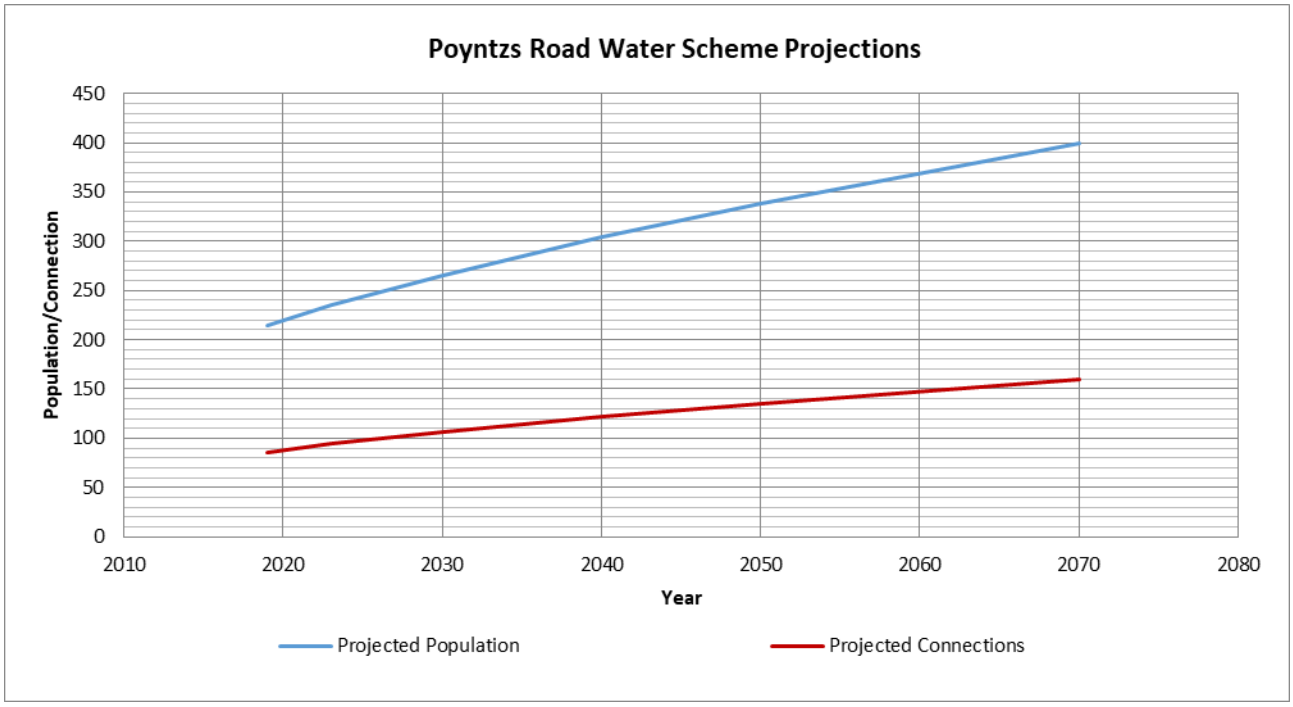
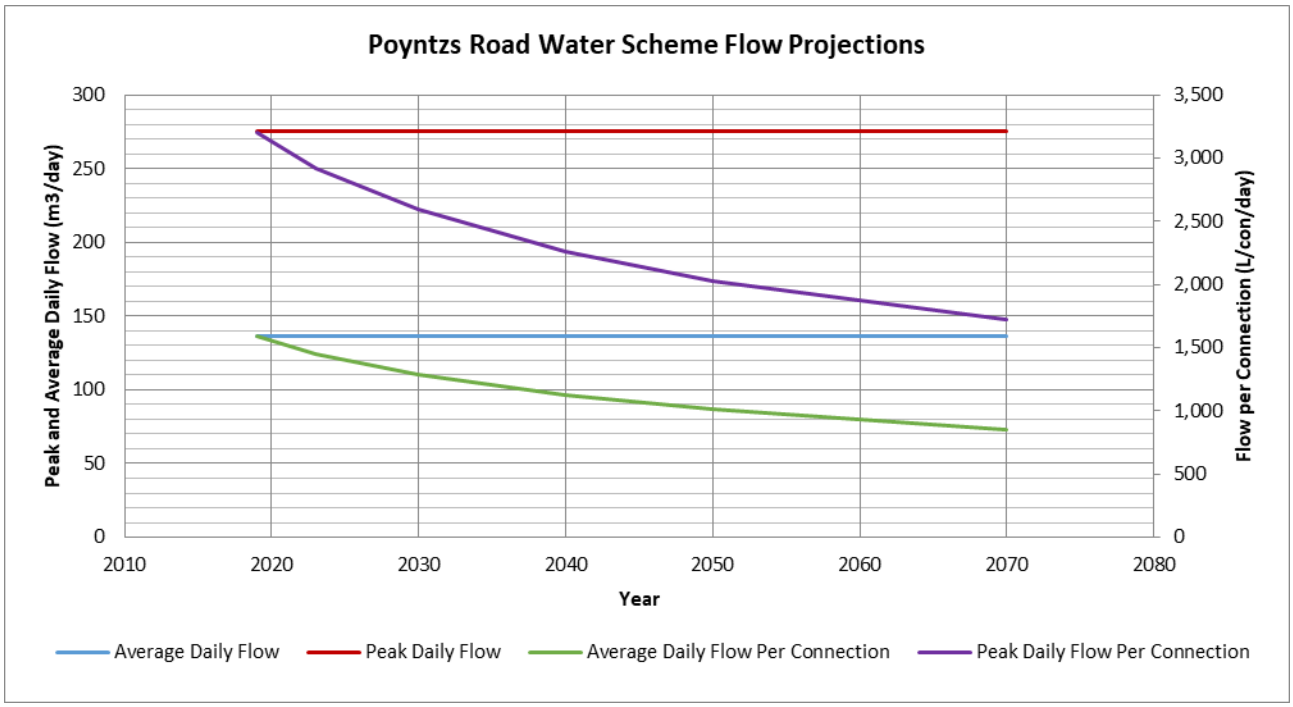


Figure 6: Flow Projections



5.8 Capacity & Performance

This section of the AMP considers the capacity and performance of the Poyntzs Road Water Supply. The specific aspects of the scheme that have been considered are the source, treatment, storage, headworks, and reticulation system. These are discussed in more detail in the following sections. Note that the discussion relates only to the current source, which is due to become an emergency backup following the joining to West Eyreton in 2021.

Source

The Poyntzs Road Water Supply Scheme draws water from the following primary sources (Table 12).

Table 12: Scheme Sources

Well name	Well No.	Diameter (mm)	Depth (m)
Poyntzs Rd	M35/0181	200	29.3

The resource consent (CRC990927) conditions for the current well limit the allowable abstraction to 239,258 cubic metres per year at a maximum rate of 11.0 L/s.

The existing Poyntzs Road well pump has a capacity of approximately 7.8 L/s. This was calculated by pump hours divided by the total volume delivered by the station over a set period (refer 210212024126).

Table 13 presents the projected water demand and associated source capacity for the Poyntzs Road supply. To calculate the required source capacity, a contingency is introduced through assuming 10% down time, which increases required source capacity above the Peak Daily Flow.

Table 13: Project Demand and Required Capacity for Scheme

	0yrs	10yrs	20yrs	30yrs	50yrs
Projected Peak Daily Flow (L/s)	3.2	3.2	3.2	3.2	3.2
Required Source Capacity (L/s)	3.6	3.6	3.6	3.6	3.6

Council plans capacity for its water supplies on the basis that one of the primary wells is out of operation at any given time. This concept was used in deciding when source capacity upgrades would be required. This ensures that each scheme has an acceptable level of redundancy. As Poyntzs Road has only one well, it currently does not satisfy the requirements in terms of redundancy. The project to join with West Eyreton in 2021 will mean that it will inherit use of the two secure wells at the West Eyreton headworks, and this criteria will be satisfied. The existing well will be relegated to an emergency backup.

As it is predicted that only the number of connections will increase and the rating units will remain constant, it is assumed that the peak daily flow will remain constant for the 50 year period.

As noted previously, there is a project due for completion in 2021 to upgrade the Poyntzs Road scheme by way of joining it with West Eyreton. This is proposed to be funded predominantly from the Government's Stimulus Grant, which was part of the Government's response to COVID-19. As this is funded from the Stimulus Cost Centre, the budget does not show within the Poyntzs scheme accounts, or within this AMP financially, while the project is for the benefit of the scheme.

Treatment

The existing treatment system comprises chlorine disinfection only. While the scheme achieves compliance with the microbiological requirements of the Drinking Water Standards, the treatment system provides no protection against protozoan contaminants, such as Cryptosporidium or Giardia.

The chlorine disinfection system was upgraded in 2010 to include a residual analyser and automated dosing system.

Future treatment following joining with West Eyreton would include both chlorine dosing immediately, with provision for UV treatment in the future. The West Eyreton scheme source is "secure" but in anticipation of the removal of this category of source water under the Health Act, budget has been included in the draft LTP for installation of UV treatment for the West Eyreton Source.

Certain water supplies have a risk of being plumbosolvent. The definition of plumbosolvent water is water that is able to dissolve lead easily. Water that has low pH and alkalinity tends to be slightly corrosive and therefore plumbosolvent. The Council complies with the requirements of the Drinking Water Standards for plumbosolvency by advertising twice per year advising customers to flush the first 500 mls of water before taking water for drinking purposes. Adverts are district wide and do not distinguish between water supplies.

Storage

The Poyntzs Road scheme has a total storage capacity of 49 cubic metres made up from three 19 cubic metre tanks and a single 11 cubic metre tank.

Emergency storage requirements for Poyntzs Road are 9.7 hours of Average Daily Flow, based on work carried out in Water Supply Source Resilience Analysis (170623064893).

Table 14 presents the required storage capacity.

Table 14: Required Storage Capacity for Scheme

	0yrs	10yrs	20yrs	30yrs	50yrs
Required Storage Volume (m3)	58	41	41	41	41
Planned Storage Volume (m3)	49	60	60	60	60
Note that connecting to West Eyreton would increase the redundancy in the scheme, which would reduce the requirements for emergency storage to 6.94 hours, hence the reduction in storage requirements in year 10.					

When the Poyntzs Road scheme is connected to the West Eyreton scheme, a new pump station will be constructed, with two new plastic reservoirs, with a storage volume of 60 m^3. The purpose of this pump station would be to pump water from the West Eyreton scheme into the Poyntzs Road scheme. The new reservoirs will mean that the required storage volume will be met.

Headworks

The existing Poyntzs Road headworks consists of three supply pumps connected to a pressure tank. These are 4kW pumps, the original two operating as duty-standby, with the third pump installed in 2013, and have a combined capacity of 7.0 L/s, based on flow meter records. Recent SCADA analysis of the pumps actual operation over the summer period shows a consistent and regular on/off cycle, indicating that the well pump is able to adequately replenish the reservoir on a daily basis. Generally only one surface pump operates at any given time, meaning that peak demand from the station is approximately 3.5 L/s.

The maximum theoretical demand from the 86 restricted and semi-restricted connections with a total of 467 units is 5.4 L/s. The capacity of the new pipeline to join the schemes will exceed this value. The pumps initially will be sized to approximately match this figure, although additional pumping could be added in the future to then exceed this. It is noted that this theoretical maximum

demand exceeds maximum demand that has actually been experienced, based on flow record history.

Reticulation

The capacity of the headworks and reticulation has been assessed using an uncalibrated but validated reticulation model. No upgrades were predicted for the Poyntzs Road scheme.

For the purposes of assessing the future capacity of the scheme, it has been assumed that all new connections within the current scheme boundary will draw a peak daily flow of 2,000 litres per property per day and that the existing 13 L/min connections will be changed to fully restricted if the parent block is subdivided. This has the effect of capping the overall water demand to its current level or reducing demand if the freed-up capacity is not taken up in expansions to the scheme. As a result the projected 50-year demand will have no reticulation upgrades required over that period apart from extensions to service the expanding area.

6 Future Works & Financial Projections (What Do We Need To Do?)

This section covers the future works required to meet the target levels of service, maintain the asset in an acceptable condition, reduce the risks to an acceptable level and accommodate growth.

Financial forecasts do not include inflation

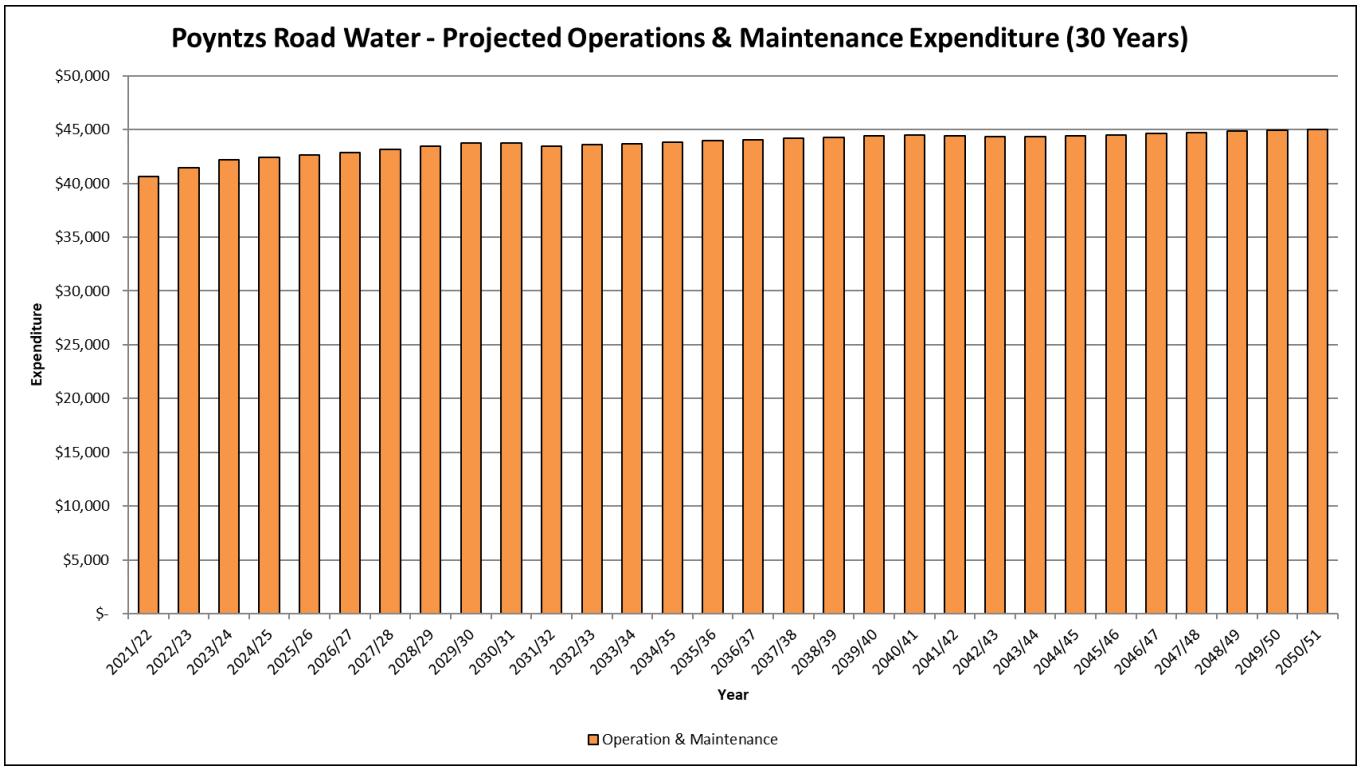
6.1 Operation & Maintenance

Operation and maintenance (O&M) expenditure incorporates the day to day running of the water supply network and allows the system to carry on functioning to deliver the agreed levels of service.

The O&M programme includes a combination of reactive and planned tasks. Examples of the differing nature of these tasks is summarised within the Overview document.

O&M budgets are set based on a combination of past expenditure (for reactive tasks), cost estimates for planned works, and adjustments going forward to account for growth, inflation, depreciation and any significant new works planned. Further detail of this process is provided in the Overview document. The end result of this is shown in Figure 7. There are no known deferred maintenance items

Figure 7: Projected Operation & Maintenance 30-Year Budget



6.2 Renewals Programme

A renewals model is used to generate renewal timeframes for each reticulation asset on each scheme. This model takes into account the remaining life from the asset condition data, and the criticality of each asset, and recommends an acceptable renewals window for each pipe. More information on the model is provided in the overview document.

Renewal of pipework assets are then programmed on an annual basis, taking into account the outputs from the renewals model, but also being informed by other works that may be planned in

the area, as well as local burst history for the cases where a particular asset may be performing differently than its base life suggests.

The outputs from the renewals model are summarised in Figure 8 below, with category bands depicting how soon renewal is required of each asset. This data is available to staff for analysis on the Council's GIS mapping system (Waimap).

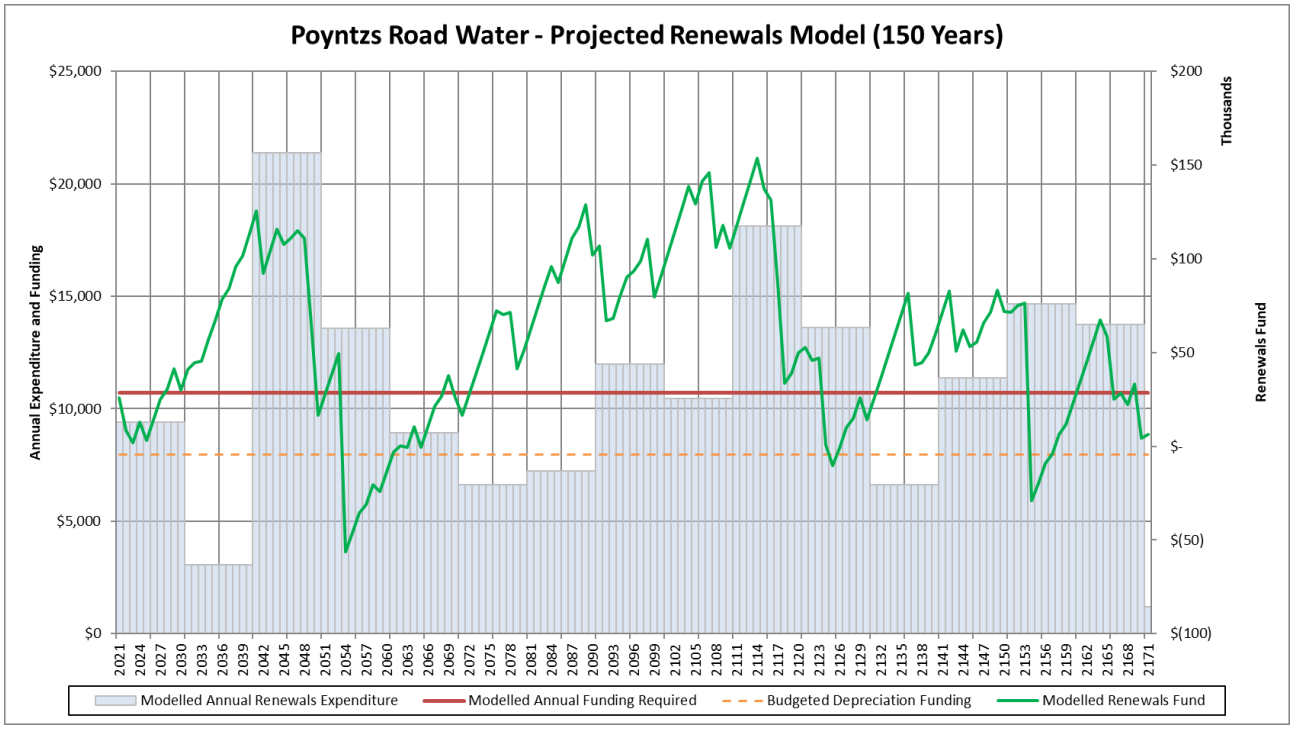
The first ten years of the programme are based on the above assessments by the Asset Manager, but from year 11 forward expenditure is taken directly from the model.

Figure 8: Pipe Renewal Time Frames

Figure 9 below shows the financial output from the model alone. Over a 150 year period it shows the projected expenditure; the value in the renewals fund; the level of funding required to ensure the fund can meet the required renewals programme, and the annual depreciation.

The figure only shows the output from the model, so expenditure shown in the graph for the first ten years may be different from the expenditure shown in the LTP, as adjustments may have been made by the Asset Manager from the direct renewals model outputs. Individual scheme AMPs detail the actual planned renewals budgets for the first ten years. There are no deferred renewals.

Figure 9: Annual Water Renewals 150-Year Budget



The key parameters in the figure above are explained below:

- **Modelled Annual Renewals Expenditure:** This is the direct output from the renewals model, recommending the annual investment to be made in renewals each year.
- **Modelled Annual Funding Required:** This is the amount of annual renewals funding required, to ensure there are sufficient funds available to carry out the recommended annual renewals each year.
- **Budgeted Depreciation Funding:** This is the actual amount of depreciation being collected, which is extracted from the Council's budgets.
- **Modelled Renewals Fund:** This is the modelled balance in the renewals account, assuming the annual funding and annual expenditure is completed as per the recommendations from the renewals model.

The key point to note is that the Budgeted Depreciation Funding is less than the Modelled Annual Funding Required. The reason for this discrepancy is twofold:

- **Depreciation Discount Factor:** Council's financing of future renewals incorporates the expectation that depreciation funding can be invested at a higher rate of return over the life of the assets than the rate of inflation. Further information regarding this approach is

provided in the Finance Policy. This concept is embodied in the scheme budgets in the form of a discount rate (referred to in the budgets as the 'Depreciation Discount Factor'). This reduces the annual depreciation funding required from rates, while still ensuring that there will be sufficient funding available to renew assets at the end of their useful life. The renewals model takes a simpler and more conservative approach to the way this effect is calculated, which accounts for some of the difference shown in Figure 9.

- **Improvement in Asset Base Lives:** The second, and more significant, factor explaining this difference particular to this LTP, is a consequence of recent analysis work carried out on the base lives of all water pressure pipe (refer 200508053285 for a record of this analysis, or refer to the Asset Condition section). A significant difference from the previous base lives to the updated ones is that the previous 100 year life for old PVC (defined as pre-1997 installation) pipe, should be reduced to 60 years. This reduced life for this particular pipe class increases the depreciation rate, and therefore increases the annual renewals funding required for schemes with a high proportion of old PVC mains. The analysis was undertaken after asset lives were finalised for the three yearly valuation update, so the updated depreciation rates from the pipe burst analysis work were not able to be incorporated into the 2020 valuation work. However they have been incorporated into the renewals model, which is the primary cause of the difference shown in Figure 9. This will be self-correcting at the next LTP, as a common life for old PVC pipes will be used for both the valuation and the renewals modelling work. Going forward this improved understanding of the expected base lives of pressure pipes will ensure that the required amount of depreciation funding is allowed for.

6.3 Capital Works

The following graph shows the 50 year budget for all capital works, including projects driven by growth and levels of service. Renewals expenditure showing in the first ten years of the graph, includes the actual planned programme, not the model output.

Figure 10: Projected Capital Works Expenditure

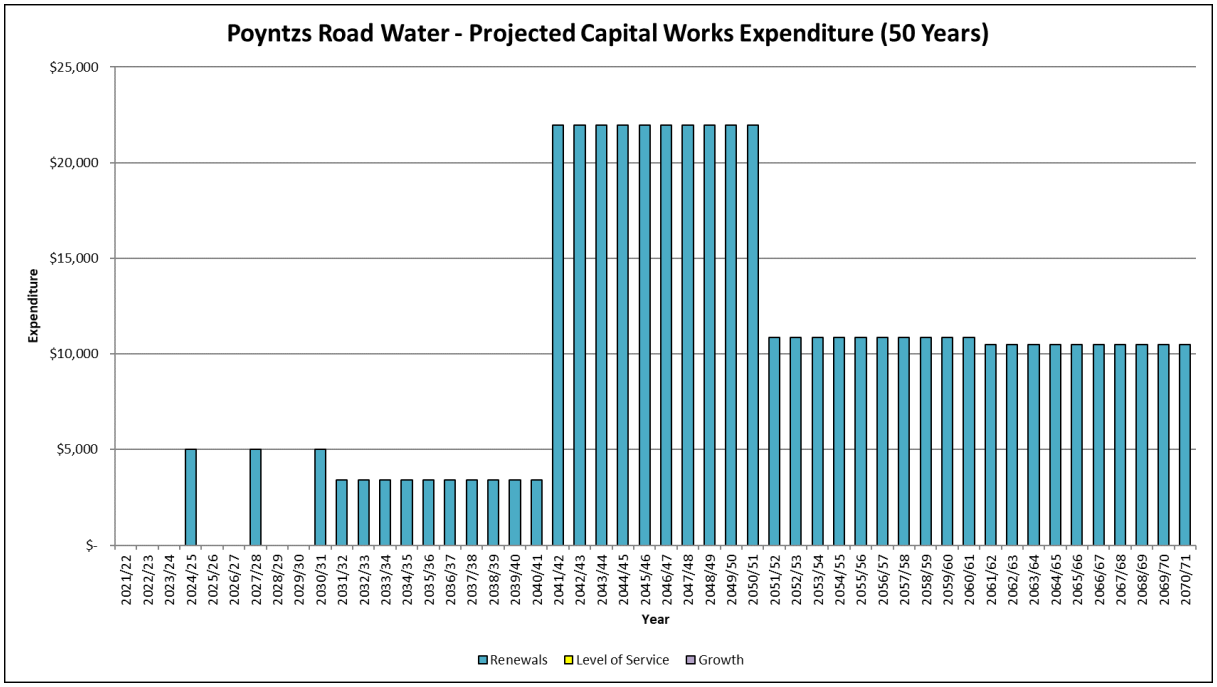


Table 15 summarises the projected capital works for the next 50 years, including renewals. Figure 11 shows the corresponding location of the projected capital works. The $128,500 being spent in the 20/21 year as part of the governments stimulus grant is not shown.

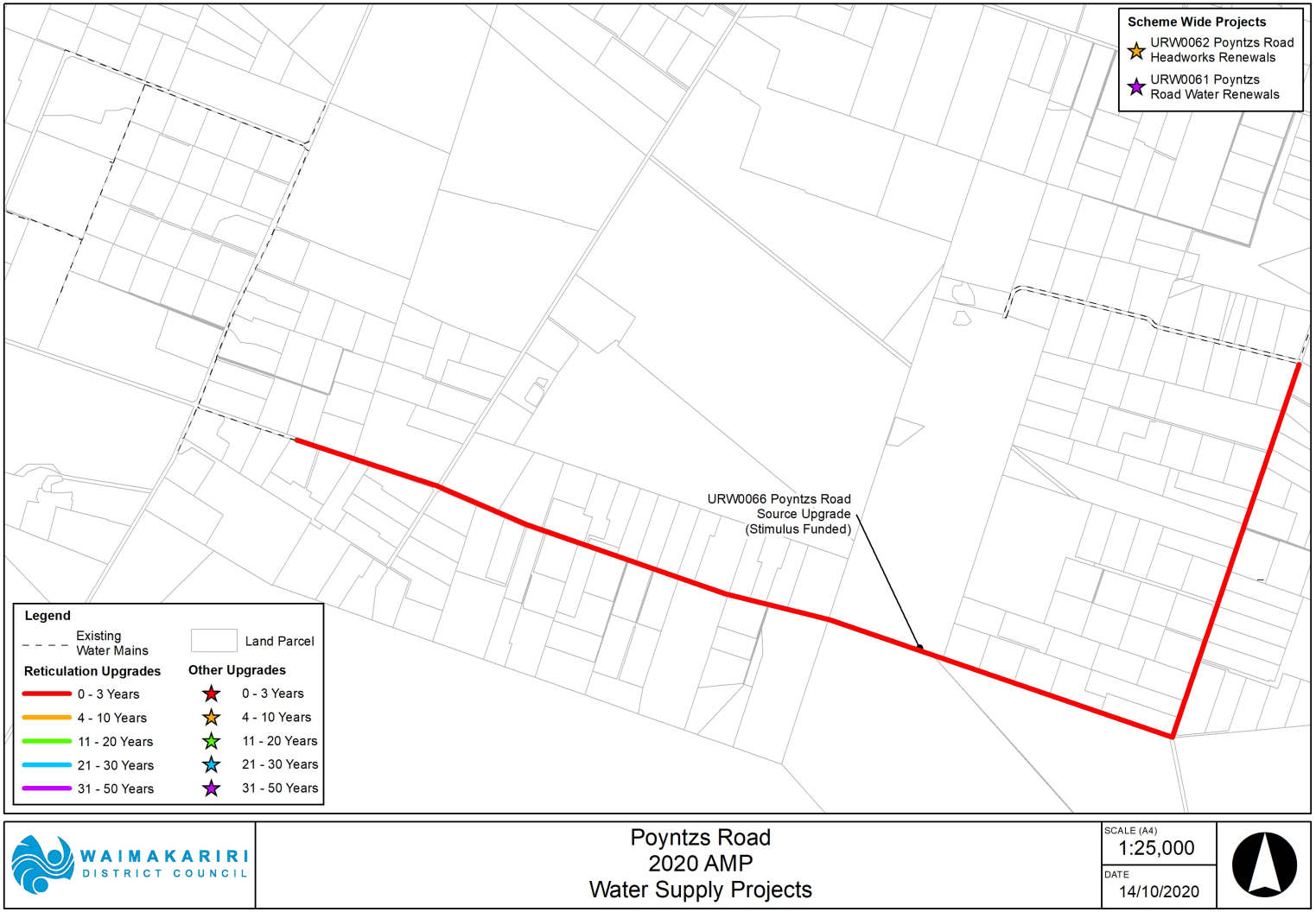
The level of confidence in the budget for the works (High / Medium / Low) is presented in the table. For a more complete discussion on the level of optimisation, refer to the introductory chapter of the AMP. The figures in the table are not adjusted for inflation.

Any programme or project that occurs over a number of years, such as the renewals programme, is only shown within the table for the first year in which it occurs. The Project Value indicates the projected full total cost of the project over the number of years it occurs.

Table 15: Summary of Capital Works (Includes Renewals)

Year	Project ID	Project Name	Level of Confidence	Project Value	LOS Component	Renewals Component	Growth Component
Year 1 - 10							
2025	**URW0062**	Poyntzs Road Headworks Renewals	**3 - Low**	**$ 362,116**	**$ -**	**$ 362,116**	**$ -**
Year 31 - 50							
2052	**URW0061**	Poyntzs Road Water Renewals	**3 - Low**	**$ 119,931**	**$ -**	**$ 119,931**	**$ -**
Grand Total				**$ 482,047**	**$ -**	**$ 482,047**	**$ -**

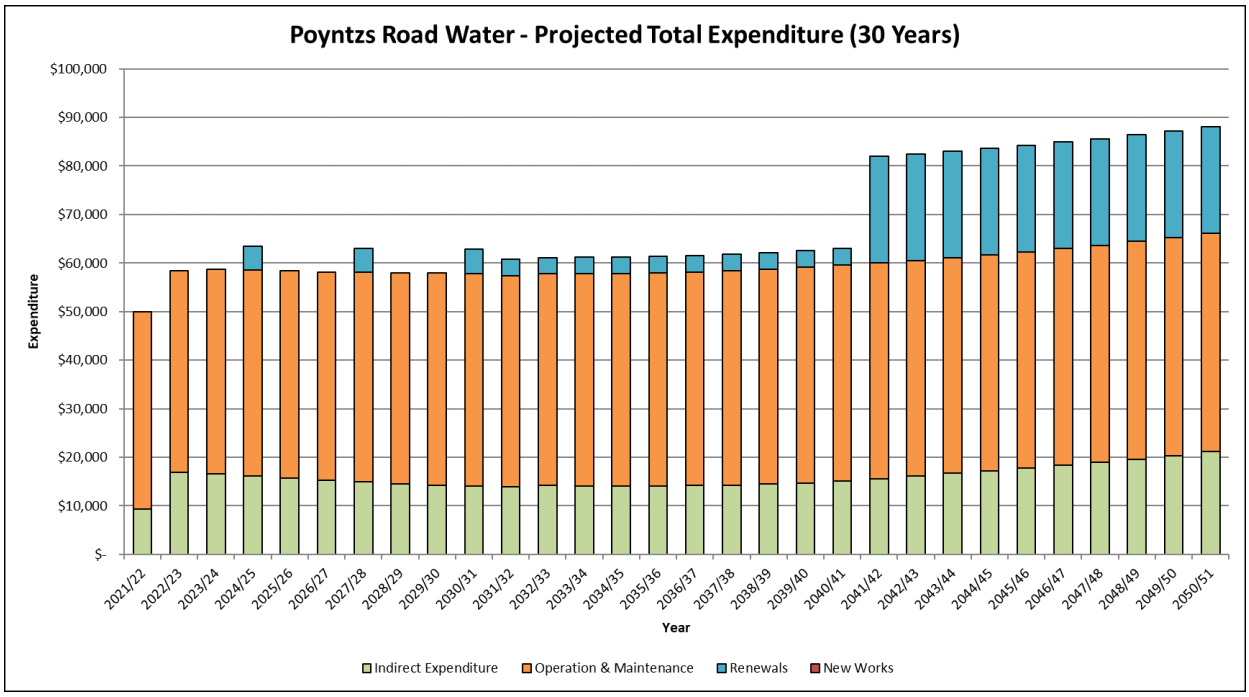
Figure 11: Projected Capital Upgrade Works (not to scale)



6.4 Financial Projections

The following graph summarises the breakdown of projected total expenditure over a 30 year time horizon. It includes both operational and capital expenditure. Operational costs include operations and maintenance, and indirect expenditure. Indirect expenditure includes interest, rating collection costs, costs associated with maintaining the Asset Register, and internal overhead costs. Capital includes expenditure for growth, levels of service and renewals.

Figure 12: Projected Total Expenditure



6.5 Valuation

A full peer reviewed valuation of assets is carried out on a three yearly cycle, using the asset data in our asset management information system. Table 16 below provides a summary of the replacement cost, depreciated replacement cost and annual depreciation for this scheme

Table 16: Asset Valuation

Asset Type	Unit	Quantity	Replacement Cost	Depreciated Replacement Cost	Annual Depreciation
Valve	No.	7	$15,680	$12,749	$157
Main	m	6,174	$251,036	$201,093	$2,510
Hydrant	No.	0	$-	$-	$-
Service Line	Properties	67	$71,371	$58,859	$714
Facilities			**$260,336**	**$110,548**	**$7,672**
Total			**$598,422**	**$383,249**	**$11,052**

6.6 Revenue Sources

Revenue is provided from two key sources; targeted rates and Development Contributions. Development contributions are calculated in accordance with Council's Development Contributions Policy (TRIM 191129168016), while targeted rates are charged in accordance with Council's Revenue and Financing Policy (TRIM 180522056008).

A further revenue source is the district wide rate that has been set up specifically to fund installation of UV disinfection at all schemes that do not already have it, although it is noted this is simply an alternative type of targeted rate, rather than a separate type of funding source.

7 Improvement Plan

7.1 2021 Improvement Plan

Table 16 details the scheme specific improvements and relevant district wide improvements recommended to address the management issues identified in Section 3. Each improvement item has been tagged to either a capital project or, a process improvement project to help manage and track Councils response. Short term indicates within the first three years of the LTP, long term, out beyond that timeframe.

If the table is empty, this indicates that all improvements required are either district wide improvements (covered by the Overview AMP), or covered by a capital project or projects, covered in the Capital Works section.

Table 17: 2021 AMP Improvement Plan

Project Ref	AMP Section	Project Description	Priority	Status	Estimated Cost
NA	NA	NA	NA	NA	NA

APPENDIX 'A'. PLANS

Figure 13: A1 - Plan of Serviced Area

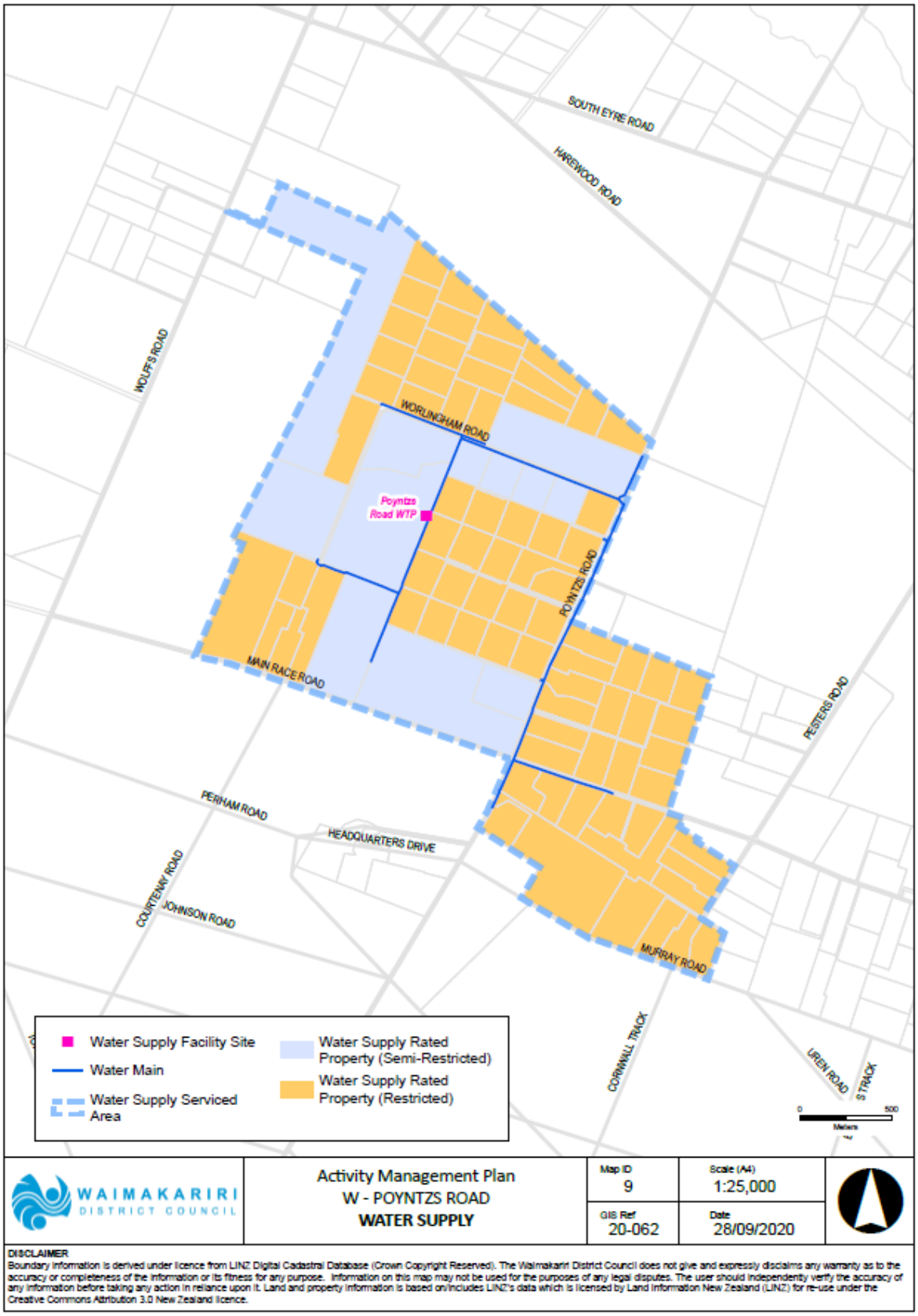


Figure 14: Poyntzs Road Water Supply Statistics

Poyntzs Rd Water Supply Statistics

Poyntzs Rd | 19/20 | Last Update Jun-20

Note that shading indicates the relative quantity measured for the ten year period (i.e. the lowest value has no shading, the highest has complete shading.)

		July '09 - June '10	July '10 - June '11	July '11 - June '12	July '12 - June '13	July '13 - June '14	July '14 - June '15	July '15 - June '16	July '16 - June '17	July '17 - June '18	July '18 - June '19	July '19 - June '20	5 yr Average	10 yr Average
Nightly Flow	L/s	-	-	-	-	-	-	-	-	0.22	0.70	-	0.46	0.46
Average Daily Flow	m^3/day	118	114	128	132	126	137	136	111	114	119	128	121	124
Peak Daily Flow	m^3/day	193	211	222	236	209	229	275	185	204	206	166	207	214
Peak Weekly Flow	m^3/day	169	176	213	217	184	193	209	163	173	188	148	176	186
Peak Monthly Flow	m^3/day	160	165	192	197	164	180	187	158	158	180	135	164	172
Peak Hourly Flow	L/s	-	-	-	-	-	-	-	-	1.7	-	-	1.7	1.7
Peak Month		Feb	Dec	Jan	Jan	Feb	Jan	Dec	Feb	Dec	Feb	Dec		
Peak Week		Week 2	Week 53	Week 4	Week 3	Week 5	Week 53	Week 1	Week 10	Week 49	Week 8	Week 36		
Peak Day		7/01/2010	7/02/2011	18/01/2012	14/01/2013	28/01/2014	27/12/2014	12/12/2015	28/02/2017	3/12/2017	10/02/2019	9/11/2019		
Peaking Factor		1.6	1.8	1.7	1.8	1.7	1.7	2.0	1.7	1.8	1.7	1.3		
Total Annual Volume	m^3	43,420	41,987	46,995	48,277	46,196	50,174	49,812	40,624	41,941	43,679	46,799	44,571	45,648
Resource Consent	m^3/day	656	656	656	656	656	656	656	656	656	656	950	715	685
Well Pump Capacity	m^3/day	-	-	-	-	-	458	458	458	458	458	458	458	458
Surface Pump Capacity	m^3/day	570	570	570	570	570	605	605	605	605	605	605	605	591
On-Demand Connections		-	-	-	-	-	-	-	-	-	-	-		
Restricted Connections		73	73	75	76	80	82	82	84	86	86	87		
Total Connections		73	73	75	76	80	82	82	84	86	86	87		
Average Daily Demand	L/con/day	1,621	1,567	1,707	1,731	1,573	1,667	1,655	1,318	1,329	1,384	1,466	1,430	1,540
Peak Daily Demand	L/con/day	2,644	2,890	2,960	3,103	2,610	2,787	3,354	2,201	2,373	2,394	1,907	2,446	2,658
Allocated Water Units	m^3/day	454	454	458	458	466	457	464	467	471	467	437		
Average Daily Flow per Unit	L/unit/day	261	252	280	287	270	299	293	237	243	255	292	264	271
Peak Daily Flow per Unit	L/unit/day	425	465	485	515	448	500	593	396	433	441	380	449	466
On-Demand Rating Charges		-	-	-	-	-	-	-	-	-	-	-		
Restricted Rating Charges		-	-	-	-	-	-	-	-	-	-	-		
Total Rating Charges		-	-	-	-	-	-	-	-	-	-	-		
Data Quality		low	low	low	low	low	low	low	high	high	N/A	0		