Draft

Water AMP 2018-2028

Prepared by the
Drainage and Water Unit
Infrastructure Group

PLAN STATUS/DOCUMENT CONTROL

Document Approved by:	*Signature:*	
	Position Title:	
Document Information:	Unit:	Drainage and Water
	Version:	
	Release State:	Internal TDC Use
	Writing Team:	Grant Hall, Drainage and Water Unit Manager Judy Blakemore, Water Services Operations Engineer Gerard Cody, Water Services Reticulation Engineer Selwyn Chang, Water Services Projects Engineer Liberty Guinto, Water Services Strategy Officer

Revision History:

Version	**Date**	**Author**	**Section**	**Description**

Contributions

Function	**Position**

TABLE OF CONTENTS

LIST OF TABLES

List of Figures

EXECUTIVE SUMMARY

The Timaru District Water Supply Activity Management Plan (AMP) 2018-28 is a Plan for how Timaru District Council (TDC) will deliver water supply services in the next 10 years. The AMP is organized in two parts: Part A provides the overview of the Water Supply Activity and describes the general practices, challenges and planned approaches that apply to the District's 12 water supply schemes. Part B provides the specific details on the assets, issues and planned works on each of the schemes.

Part A – Overview and General Activity Management

This AMP is the mid-level plan in the 3-tier hierarchy of TDC's plans relating to the District's water supply services. The higher level plan is the Long Term Plan which provides the overall direction for the water supply activity. It sets out the Vision, Community Outcomes and Priority Areas to be pursued for the District in the next 10 years. The lower level plan is the Annual Plan which translates the AMP into a yearly programme of action.

The AMP is bounded by pertinent provisions of legislations, policies and plans that govern the use of water resources, such as the Resource Management Act, the Local Government Act, the Drinking Water Standards of New Zealand, the Health Act, the Canterbury Water Management Strategy, and the proposed Canterbury Land and Water Regional Plan, among others.

TDC, through the DWU, collaborates with groups that have various roles relevant to the effective delivery of water supply services. Internally, these are the corporate planning and finance units, transport unit, district planning and other units of the regulatory services group, IT unit, and customer services. Externally, TDC collaborates with the Mackenzie and Waimate District Councils through the Downlands Water Supply Joint Standing Committee in the shared governance of the Downlands Water Supply, the Community Boards of Geraldine, Pleasant Point and Temuka, the Environment Canterbury, the Canterbury DHB, and TDC's work/service contractors.

The Activity's Strategic Direction

TDC delivers water supply services for residential, commercial, industrial and stockwater purposes. There are 12 water supplies being managed by TDC consisting of:

Six (6) urban drinking schemes for Geraldine, Peel Forest, Pleasant Point, Temuka, Timaru and Winchester;

Four (4) rural drinking and stockwater schemes for Downlands, Orari, Seadown and Te Moana; and

Two (2) stockwater only schemes for Beautiful Valley and Rangitata-Orari

The AMP is guided by the strategic direction set out in the Timaru District's Long Term Plan 2018-2028 Vision, Outcomes and Priorities. The AMP contributes to the attainment of the District's four Strategic Priorities, namely:

- Investing in community

- Promote integrated, highly liveable communities
- Support areas of economic and District strength
- Ensure critical infrastructure meets future needs

Key Challenges

The following are the key challenges addressed in this AMP:

- Meeting drinking water standards
- Changes in national and regional plans/policies
- Effects of climate change
- Meeting changes in demand
- Asset renewals
- Affordability of the service
- Resilience building

Activity Levels of Service

TDC commits to provide the following Levels of Service:

- Provide safe drinking water
- Maintain excellent water supply network services
- Maintain excellent customer services
- Provide management of efficient use of water as a resource
- Deliver water services according to required environmental standards
- Deliver affordable water supply services

Activity Management

The Activity Management Team is comprised of staff of the Drainage and Water Unit of TDC's Infrastructure Group. In-house personnel perform technical and administrative functions. Contractors are utilised for projects and asset maintenance services.

Activity management covers the following:

Asset Lifecycle Management

Operations cover the day to day activities that Council carries out to utilise the assets in delivering the required levels of service. Operational processes include maintenance or repair activities which are necessary to keep the asset operating. These are implemented through the adopted Operations and Maintenance Strategies.

The Asset Renewal Strategy follows a cyclic process that provides for the progressive replacement of individual assets that have reached the end of their useful life. The rate of asset renewal is intended to maintain the overall condition of the asset system at a standard, which reflects its age profile, and ensures that the community's investment in the District's water supply infrastructure is maintained.

The Asset Development Strategy is usually driven by the need to comply with mandatory requirements (e.g., Health Act's Drinking Water Standards), address growth in demand, to improve system capabilities or levels of services, or respond to other significant issues. For

reticulation assets, the decision to upgrade or build new asset may be driven by the need to ensure security of supply, increase capacity, or to extend the service due to growth and development.

The Asset Disposal Strategy ensures that all pipeline renewals have a corresponding disposal either through the pipes being removed and disposed of at the landfill, or being left in the ground if the services are renewed or the asset is replaced in a new location. Similarly, replacement of components at treatment plants and pump stations usually involves disposal of those items being renewed/upgraded. These are disposed of in an appropriate manner with pumps and metal components sold for scrap metal.

Generally, buried assets remain in the ground unless economic to remove or they pose a potential hazard. In all cases asset disposal processes must comply with Council's obligations which include public notification procedures prior to sale, and use of revenue received from asset disposal.

Demand Management

TDC's goal in managing demand is to deliver the agreed Levels of Service through strategies that are appropriate to the requirements of each scheme. Details are in Part B on approaches for managing demand in each of the schemes.

In general, TDC considers the following as the major drivers of demand for water supply services in the District: a) resource consents and other policy requirements; b) asset integrity; c) climate change; d) population and household changes; b) industrial/commercial development; c) stockwater demand; d) land use change; and e) tourism

The demand drivers are tested for significance through mathematical forecasting of demand. Hydraulic modelling of schemes is also utilized to determine asset capacity and assess the impact of growth, among other things.

Demand management is carried out through asset and non-asset based approaches. Asset-based approaches include timely repair and maintenance of assets, asset renewal or upgrade, etc. Non-asset approaches include leak detection and reduction, pressure management, hosing restrictions, etc.

Risk Management

The Risk Management Plan for the Water Supply Activity is in accordance with TDC's Risk Management Policy which adopted the Joint Australian New Zealand International Standard Risk Management – Principles and Guidelines AS/NZS 31000:2009. Managing risks permeates all aspects of managing TDC's water supply activity to guard against service level failures. For the current AMP period, the following risks remain as priority concerns in managing our water supplies: a) high demand; b) consent restrictions; c) water availability; d) natural disasters; e) financial; f) climate change; g) operational risks.

Most of the treatments for these risks are already existing business practices. Those that require significant cost to implement (e.g., additional treatment, additional capacity, etc) are being programmed. Specific details on risks and treatments associated with individual water supplies are provided in Part B.

Each of TDC's drinking water supply is covered by a Water Safety Plan, as required under the Health Act. The objective of a WSP is to ensure public water suppliers develop operational practices which will reduce the likelihood of contamination and how to respond and minimise contamination events.

A draft Drainage and Water Crisis and Emergency Response Management Plan has been prepared which provides direction for how DWU develops and ensures readiness for events that may cause disruption in water supply services.

Critical water supply assets have been identified. The information is held against the assets in the Infor Asset register and is used in the asset renewal criteria. Part B of this AMP identifies the critical assets associated with individual water supplies and how they are managed. TDC's Land Transport Unit has been notified of the most critical water supply assets for consideration in their risk management/emergency response plan.

Information Management

Information management for water supply services covers the collection and management of asset data and customer service information from various sources and making the information available to users. Information is collected, processed, stored and maintained within various systems that make up the information network. Some component systems are enabled for interfacing to facilitate data accessibility, validation, analysis and reporting. The following are the component systems of the network: a) Asset Information Management System (AIMS) using Hansen 8 Software; b) Corporate Information System using Civica Authority Software; c) Hydraulic models using the InfoWorks Software; d) Geographic Information System (GIS); e) Telemetry (SCADA) using the Abbey System; and f) Water New Zealand Database (WINZ).

Financial Management

The Financial Projections in this AMP are anchored on TDC's corporate Financial Strategy contained in the 2018-2028 Long Term Plan.

TDC does not intend to implement a Development Contributions Policy at this time. TDC has an operative Financial Contributions Policy as set out in Part D, Section 6 of the Timaru District Plan. The existing Financial Contributions Policy allows the Council to apply a charge for water, sewer, stormwater and open space and recreation. The financial contribution is a contribution from developers of cash or kind, or a mix of these. Some schemes do not have a financial contribution but all costs to connect are met by the applicant.

Generally, each water supply is self funding, except with the Timaru, Temuka, Geraldine, Pleasant Point, Winchester, and Peel Forest Water Supplies merged into one Urban Water Supply for funding purposes, with consumer income offsetting expenditure. Each water supply has a set of standard charges based on various units of charging. The standard charges include uniform annual water charge, units of water allocation, connection charges, area charges and extra-ordinary water volume charges.

A 10-year financial projection is prepared for this AMP. DWU asset managers were primarily responsible to develop the expenditure projections from the identified capital and operational

works. Unit costs were based on current year dollar prices. The inflation factor will be applied at corporate stage processing of the whole TDC budget. TDC Finance Unit is responsible to finalize the budget.

Improvement Plan

Council will continue to carry out improvements in its management of the Water Supply Services Activity. Priority areas are asset data quality management, developing a comprehensive demand management strategy, and implementing a more effective information, education and communication programme on efficient use of water by consumers.

Part B – Scheme Activity Management Plans

Part B discusses asset management at scheme level. It provides a detailed description of the assets in each water supply scheme. It outlines the issues to be addressed and the works planned to address these.

B1. Urban Water Supply Schemes

The urban water supply schemes consist of the Geraldine, Peel Forest, Pleasant Point, Temuka, Timaru and Winchester water supplies. They are operated as individual water supplies but funded as a single scheme.

Geraldine Water Supply

The Geraldine Water Supply is predominantly an urban on-demand scheme. Water is supplied for domestic, commercial, industrial and stock drinking water purposes.

The Geraldine Scheme also supplies water to parts of the Te Moana Water Supply.

Significant works within the next ten years include reservoir maintenance, treatment renewal and renewals in the reticulation network. Pressure issues within the reticulation will be addressed with pump installations or pipe upgrade.

Peel Forest Water Supply

Peel Forest Water Supply is a small scheme supplying drinking water in the residential area of the township. The scheme does not supply the picnic area, campground or all of the properties at Peel Forest.

The Peel Forest water supply is classified as an urban on-site storage scheme. The treatment process in the scheme was upgraded in 2016 to improve water quality and meet the criteria of Drinking Water Standards NZ.

Demand increases significantly during holiday periods. Holiday homes have low storage and short term high demand. If excessive demand becomes prevalent, converting the scheme to a restricted supply or an upgrading of the scheme for additional capacity will be considered.

Pleasant Point Water Supply

The Pleasant Point Water Supply is an urban scheme with on-demand and on-site storage supply. The supply is for domestic drinking water purposes only.

Upgrading of the scheme is being undertaken to increase security of supply. This includes a new reservoir by 2017, pump station upgrade, remediation of the raw water reservoir, and network renewals. The scheme upgrade will result in a greater ability to allow on-demand connections within the scheme and the removal of on-site storage tanks as an option to property owners.

Temuka Water Supply

Temuka Water Supply Scheme is an urban on-demand scheme that supplies domestic drinking water only. The Scheme supplies treated water to three distinct networks, namely: the Temuka Water Supply, the Orari Water Supply, and the Winchester Water Supply.

Security of supply is a major issue being addressed in the implementation of the 30-year Temuka Water Supply Strategy. Part of the Strategy was the renewal of the Temuka trunk main in 2016 which addressed a leakage issue. Other works identified in the Strategy which are being considered include investigation of a new source and construction of a new storage.

Timaru Water Supply

Timaru Water Supply Scheme is an urban on-demand scheme that supplies domestic drinking water only. Customers in the Timaru water scheme are domestic and industrial users, with each accounting for approximately half of the total volume of water consumption.

The Timaru Scheme also supplies treated water to the Downlands-Hadlow.

Security of supply is a major issue within the scheme. A long term strategy is being developed to address water use efficiency issues and enable the scheme to sustainably meet current and future demand. Options investigated relate to water take provisions within resource consents, developing new source, improving existing sources, and reducing demand.

Winchester Water Supply

The Winchester water supply is a small on-demand scheme supplying the Winchester township. Customers of the Winchester Scheme are predominantly domestic or related to a domestic and farming population.

The scheme's source and treatment plant were decommissioned in September 2016. Winchester is now supplied treated water from the Temuka Water Supply.

B2. Rural Water Supply Schemes

Downlands Water Supply

The Downlands Water Supply Scheme is jointly owned by the District Councils of Timaru, Waimate and Mackenzie. The proportions within each territorial jurisdiction are Timaru District (82%), Waimate District (14%) and Mackenzie District (4%). There is a Downlands Joint Standing Committee, with representation from the three Councils, who acts as the

policy governing body for the scheme. The Committee has appointed TDC as Downlands Scheme Manager responsible for the management and operation of the scheme.

The Downlands Water Supply Scheme is primarily a stock water scheme which also supplies domestic drinking water to rural properties within the scheme boundaries. It is a restricted supply which requires on-site storage. Increasing supply to meet increased demand, security of supply and meeting drinking water standards are the priority focus for the Downlands Scheme in the next 10 years. Major programmed capital works include upgrading of the Te Ngawai trunk main and intake, upgrading of the treatment plant, and increasing storage capacity (raw and treated water).

Orari Water Supply

The Orari water supply is restricted for domestic and stock water use. The scheme does not produce its own water; it is entirely supplied from the Temuka Water Supply with water that is already treated. Customers of the Orari Scheme are predominantly domestic or lifestyle property owners. The scheme has minimal stock water demand.

There are no significant issues identified with the scheme. Demand has remained unchanged. Some renewals of defective/expiring water mains have been programmed within the AMP period.

Seadown Water Supply

The Seadown scheme supplies both stock and drinking water. Connections to troughs are on demand while domestic connections are generally restricted. Seadown has issues with supply to farm properties with connections directly to troughs instead of reticulated tanks. Water wastage from troughs is very high and could reduce the LOS during high demand. This gives issues with water conservation and quantity.

TDC is carrying out sustainable water management strategy to this scheme. Seadown Rural Water Supply Model Review and Analysis is being undertaken to identify feasible options to be assessed and approved by the Council. TDC will be assessing whether to keep the current set-up of the scheme or to convert to a restricted supply.

Te Moana Water Supply

The Te Moana supply is a restricted water supply based on units of supply of 1,000 L/day. Customers of the Te Moana Scheme are predominantly domestic or farming. The Te Moana scheme has reached its original capacity so additional water is being purchased from Geraldine to supplement the main intake.

The security of water supply in the scheme is being addressed through the programmed works in this AMP period which include the establishment of a new source, a new treatment plant, pump station upgrade and watermain upgrade.

B3. Stock Water Only Schemes

Beautiful Valley Stockwater Scheme

The Beautiful Valley Stockwater Scheme is a piped stockwater supply. It also caters for garden and shed use but not for domestic use. Therefore there is no treatment provided.

The scheme is very small (41 rating units and 1800 hectares design area) and no additional water is available at the source. The scheme has no expansion capacity and there are no plans to cater for additional demand.

Improvement of the intake is programmed in Year 7 of this AMP.

Rangitata-Orari Stockwater Races

The Rangitata-Orari (RO) water race is a stock water supply. The water flows from the Orari River and is fed into a network of open water races some 170 km long.

Some significant modifications to the water race network have occurred as a result of the establishment of the Rangitata South Irrigation (RSI) Scheme in the area which is upgrading then utilizing parts of the races for conveying irrigation water. A large number of RO ratepayers are also shareholders in the RSI. There are also a number of RO ratepayers who are not irrigation shareholders and who wish to remain on the RO stockwater scheme, and a number of ratepayers who wish to permanently withdraw from the scheme. The final scope of the Scheme is still to be established through the on-going discussions between Council and RSI. This will determine the future demand in the scheme.

PART A – OVERVIEW AND GENERAL ACTIVITY MANAGEMENT

A1 INTRODUCTION

A1.1 ABOUT THIS PLAN

The Timaru District Water Supply Activity Management Plan (AMP) 2018-2028 brings together in one place the Council's strategic approach to the delivery of the Water Supply Activity (the 'Activity') which then forms part of Council's Long Term Plan.

In line with Council's Activity Management Planning Policy, preparation of the 2018-2028 Water Supply AMP commenced with an assessment against the Asset Management Maturity Index[1] to determine the current and aspirational level of maturity for this activity.

The diagram below shows the results of the assessment in 16 areas of management of the Activity. Overall, current score is 63 which is a Core Plus level (i.e. between Core and Intermediate) and the assessed aspirational score is 78 which is an Intermediate maturity level.

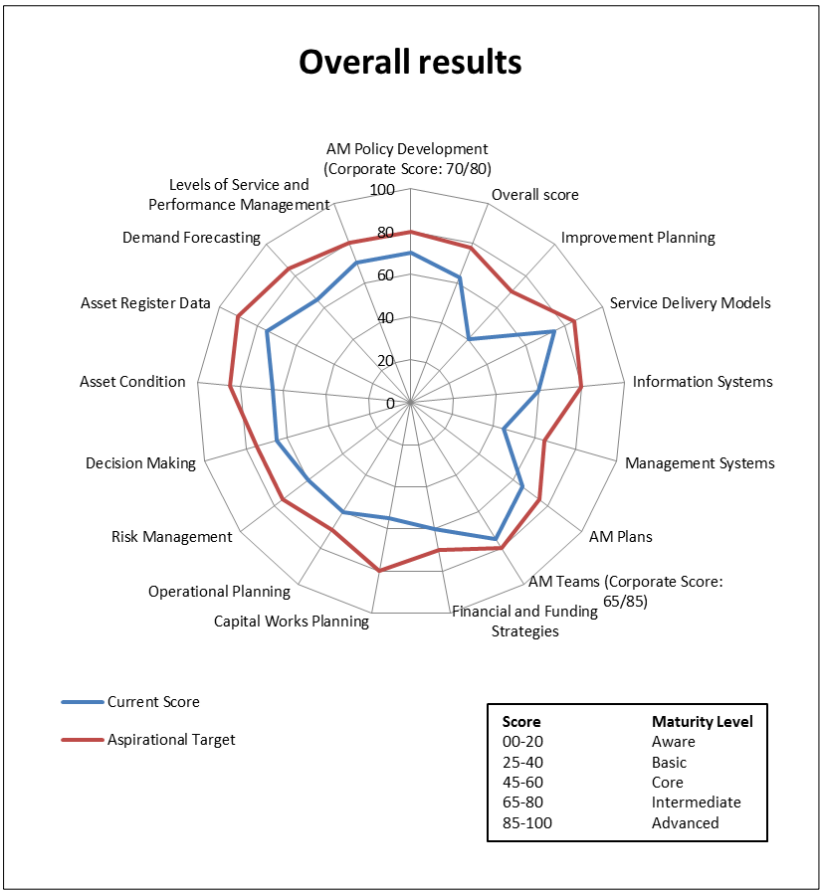


Figure 1: Water Supply Activity Maturity Assessment Results

[1] The Asset Management Maturity Index is adopted from the International Infrastructure Management Manual 2015 edition, produced by the Institute of Public Works and Engineering Australasia (IPWEA)

This AMP reflects current practices in carrying out the various aspects and components of the Activity and includes an Improvement Plan to progressively achieve the aspirational activity management level.

AMP structure and content

The AMP structure and content is based on the framework prescribed in the International Infrastructure Management Manual which gives emphasis on risk and demand management as key drivers of asset/activity planning (see Figure 2).

This AMP is organized into two main parts:

Part A provides the overview of the Activity in relation to TDC's vision and strategic direction, and the Activity's contribution to the community outcomes defined in Council's Long Term Plan. Part A sets out the general information that applies to the Activity as a whole. These include the Activity Level of Service, key challenges, and the strategies, approaches and practices in managing demand, risk and the life cycle of the assets. Information system management, financial planning considerations and the Activity Management Improvement Plan are also contained in Part A.

Part B contains the detailed plan for each of the 12 water supply schemes. It covers specific information on the facility and reticulation assets held for each scheme, the condition and performance of these assets, demand drivers and forecasts, management of identified risks, key projects for the next 10 years and the associated budget requirement.

This AMP, as well as previous AMPs, serves as a repository of information that will assist staff to gain knowledge of the history of the Activity including awareness of how business practices have evolved, and gain insight into the improvements that have been carried out. The documentation in the AMP mitigates the risk associated with staff leaving the organisation, as it assists in institutional knowledge being passed on, for continuity of organisational culture.

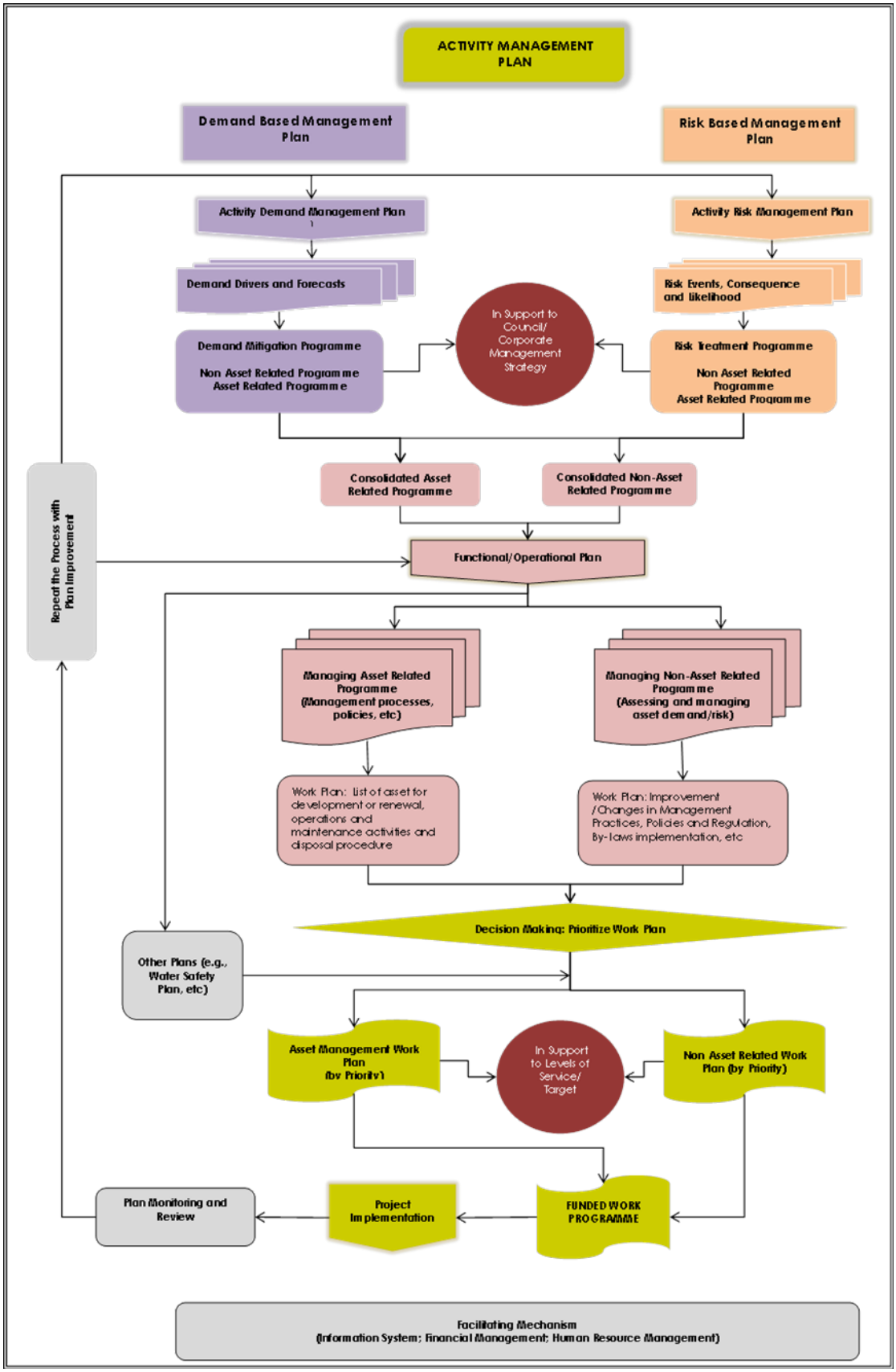


Figure 2: Activity Management Planning Framework

A1.2 OBJECTIVE OF THE PLAN

The objective of this AMP is to address how Levels of Service will be met, as well as how present and future needs will be cost-effectively managed. This will be achieved through a systematic approach in managing the assets and in responding to the changing needs and expectations of the Timaru District water consumers, ensuring that legislation and policies are being complied with, and that there is effective and efficient targeting of priority works.

A1.3 RELATIONSHIP WITH OTHER PLANS, POLICIES AND STRATEGIES

Internal Plans and Strategies

The Long Term Plan (LTP) process illustrated in Figure 3 below provides an overview of the planning for the water supply activity. Council's Strategic Framework sets out the Vision, Outcomes and Priorities to be pursued for the District in the next 10 years. The LTP provides the general planning parameters in terms of the key issues for Council over the next 10 years, projected growth and development of the District, infrastructure strategy and financial strategy.

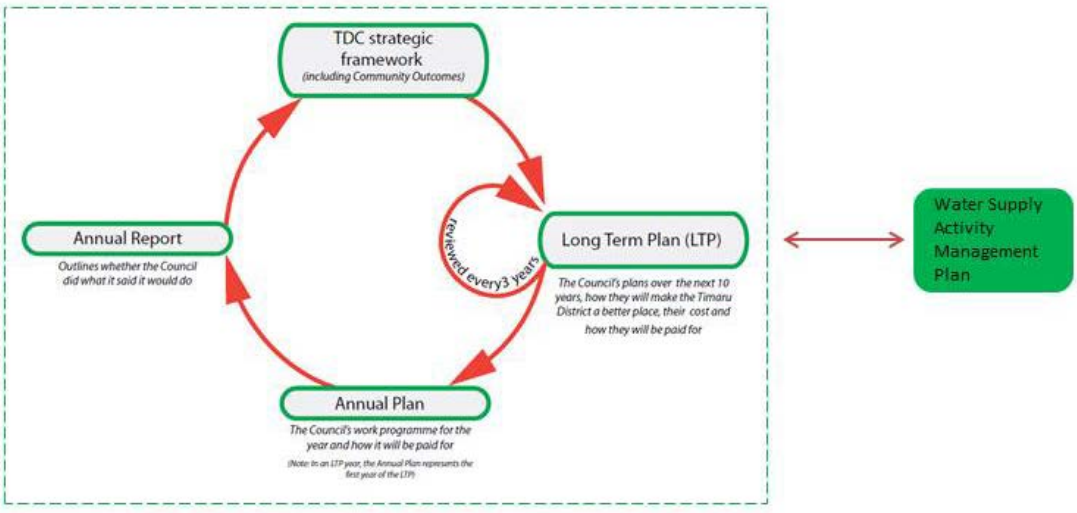


Figure 3: TDC Long Term Plan Cycle

The Water Supply AMP informs the LTP in how Council will deliver water supply services. It has the same 10-year coverage period as the LTP. Works to be carried out in the first 3 years are identified in detail. The remaining 7 years are provided in outline with indicative levels of funding requirements.

The Annual Plan translates the LTP (and AMP) into a yearly programme of action. It contains a confirmed list of works that address specific issues on asset condition and performance, demand and risk. Performance against the Annual Plan is reported yearly in Council's Annual Report, highlighting the Activity's contribution to the Community Outcomes set out in the LTP.

The Growth Management Strategy and the District Plan Review documents prepared by Council's Planning Unit were considered in this AMP in terms of information which, for example, may influence changes in demand for water arising from development. The District Plan also provides guidance on financial contributions relating to the provision of water supply infrastructure.

External Plans, Policies and Strategies

TDC recognises the role of other bodies involved in the water sector. This AMP is guided by pertinent policies, requirements and strategies in the following documents governing the operation and management of public water supplies:

1. Canterbury Regional Policy Statement (CRPS 2013)

   The Canterbury Regional Policy Statement sets the framework for resource management in Canterbury. It provides an overview of the significant resource management issues facing the region, and sets out objectives, policies and methods to address those issues. Its goal is the integrated management of the region's natural and physical resources.

   Territorial authorities must give effect to the CRPS through their District Plan. The District Plan, as stated above, may influence changes in demand for water arising from land use changes.

2. Canterbury Land and Water Regional Plan (LWRP)

   The LWRP, which establishes rules for land and water management throughout Canterbury, has been fully operative from 1 February 2017.

   The plan is in 16 sections. Those relevant to TDC are sections 1 and 2, introducing the plan and how it operates; Sections 3-5 the Objectives, Policies and Region-Wide rules; and Section 14 – the rules within the Orari-Temuka-Opihi-Pareora (OTOP) Zone. All TDC water supplies are within the OTOP Zone.

   A major focus of the plan is to halt deterioration of the land and waterways, until the subsection Zone rules set out how each community wishes to best manage the resources within their zones. The OTOP Zone chapter is due for release in 2017/18.

3. Canterbury Water Management Strategy (CWMS)

   The Canterbury Management Strategy commenced in 2010. It provides for a community-led collaborative approach to environmentally sustainable water management in the Canterbury region. It is implemented through water zone committees who work collaboratively to develop effective water management solutions that deliver economic, social, cultural and environmental outcomes in consultation with the local community. TDC is a member of the Orari-Temuka-Opihi-Pareora Zone Committee.

4. Opihi River Regional Plan 2000 (ORRP)

   This Plan provides outline in terms of water allocation and discharge of water to water bodies within the Opihi Catchment. This is planned to be amended and incorporated within the review of the OTOP Zone in 2017/18.

5. The Pareora Catchment Environmental Flow and Water Allocation Regional Plan

   This Plan, developed in 2012, sets out how water quantity will be managed primarily through low flow restrictions with limited water harvesting. The plan encourages TDC to release water from the Pareora Pipeline in the spring to sustain the flow within the Pareora River.

6. The National Policy Statement for Freshwater Management 2014 (NPS-FM)

The National Policy Statement for Freshwater Management 2014 (NPS-FM) sets out central government direction on how local government will manage fresh water.

The NPS-FM took effect on 1 August 2014, superseding NPS-FM 2011. It directs regional councils to consider specific matters about fresh water when they are developing regional plans for fresh water. Decision-makers under the RMA must have regard to the NPS-FM in consenting decisions. The Freshwater NPS is intended to drive national consistency in local RMA planning and decision-making while allowing for an appropriate level of regional flexibility. The NPS-FM sets in place a strengthened limits-based regime for water management.

A proposal for amendment of the NPS-FM is one component of central government's clean water reforms launched in 2017. The suite of reforms also includes a target that 90 per cent of the country's rivers and lakes are swimmable by 2040, greater information on water quality for swimming, and details of proposals to exclude stock from waterways.

The proposed NPS-FM amendments cover the following areas:

- swimming and recreational values
- monitoring macroinvertebrates
- maintain or improve overall water quality
- managing nitrogen and phosphorus
- economic well-being
- the effect of national bottom lines on infrastructure
- coastal lakes and lagoons
- Te Mana o Te Wai.

7. Resource Management (National Environmental Standard for Sources of Human Drinking Water) Regulations 2007 (NES)

The NES is a regulation made under the Resource Management Act (1991) that sets requirements for protecting sources of human drinking water from becoming contaminated. It came into effect on 20 June 2008.

Under the NES, Regional Councils are required to ensure that effects of activities on Drinking Water Sources are considered in decisions on Resource Consents and Regional Plans. ECan does this by including Community Drinking Water Protection Zones in the LWRP.

A1.4 RELATIONSHIP WITH LEGISLATION

1. The Local Government Act 2002 (LGA)

   This Act defines the purpose of local government as including meeting current and future needs of communities for good quality local infrastructure that is most cost effective for households and businesses, where good quality infrastructure means efficient, effective and appropriate to present and anticipated future circumstances. Part 6 of the Act prescribes the processes and content of the Long Term Plan, Annual Plan, Annual Report and Infrastructure Strategy. Part 7 sets out specific obligations and restrictions in relation to the delivery of water services. Schedule 10 of the Act outlines the requirements for Council's long term plans. AMPs provide key inputs to long term plans for infrastructure activities managed by local authorities such as water supply services.

2. The Health Act 1956

   This Act places obligation on Council to improve, promote and protect public health within the District. The provision of water services conserves public health and helps to protect land and waterways from contamination.

   In 2007 amendments to the Health Act imposed a range of duties on drinking water supplies, including duties to monitor drinking water, and take all practicable steps to comply with the Drinking Water Standards for New Zealand (DWSNZ). Water Safety Plans are required to be developed and implemented by all drinking water suppliers providing drinking water to over 500 people.

   The DWSNZ contain comprehensive information for owners and operators to assist in the management of public and private drinking-water suppliers. The DWSNZ specifies the maximum acceptable value of determinants within drinking water along with the compliance criteria (sampling and monitoring) and reporting requirements, and remedial actions.

3. The Resource Management Act 1991 (RMA)

   This Legislation promotes the sustainable management of natural and physical resources.

It describes the functions of Regional Councils and Territorial Authorities under this Act, including the establishment, implementation and review of objectives, policies and methods to achieve integrated management of the resources. The RMA requires local authorities to recognise national environmental standards, national policy statements and

regional plans, and prepare, implement and administer district plans. Compliance with the RMA is achieved through resource consents compliance.

4. The RMA (Energy and Climate Change) Amendment Act 2004

This Act amended the RMA (1991). It requires Local Authorities to plan for the effects of climate change.

5. The Building Act 2004

This Act provides a regulatory framework for building work, establishes a licensing regime and sets performance standards to ensure buildings have attributes that contribute to the health, safety, physical independence and wellbeing of people, including provision of safe water supply.

6. Fire Service Act 1975/Firefighting Code of Practice

The Fire Fighting Code of Practice SNZ PAS 4509:2008 is prepared and issued by the New Zealand Fire Service (NZFS) pursuant to the Fire Service Act. It defines various water supply classifications from FW1 – FW7 (ranging from single family dwellings to hotels/businesses to supermarkets/industrial areas) by the fire hazards present and then states minimum water flows, storage volumes and pressures required. The water supply classification can change within a town between the residential properties (FW2), industrial areas (FW6/7) and depending on the floor area (fire cell) of commercial/public properties. Therefore, the demands on the water supply differ between these areas.

Adoption of the Code of Practice is not mandatory, but TDC uses it as a best practice guide and will identify and promote where applicable improvements to comply with the Code of Practice. The statutory onus on the adequacy of water supply for fire fighting rests with NZFS to advise Council where it believes Council water supply is inadequate and where it expects Council to take action.

7. Timaru District Consolidated Bylaw 2013

Section 146 of the Local Government Act 2002 provides that a Territorial Authority may make Bylaws in its district for purposes of regulating, managing, protecting or for preventing the use of the land, structures, or infrastructure associated with water supply services. Chapter 15 of the Timaru District Consolidated Bylaw 2013 applies to water supply and other water services provided by the Council.

8. Non-Financial Performance Measures Rules 2013

Pursuant to and in accordance with Section 261B of the Local Government Act 2002, the Secretary of Local Government issued the Non-Financial Performance Measures Rules 2013. It requires local authorities to incorporate the mandatory non-financial performance measures commencing in the development of their 2015-25 Long Term Plan, and to report on these measures in their annual reports.

9. Health and Safety at Work Act 2015

The main purpose of the Act is to provide for a balanced framework to secure the health and safety of workers and workplaces.

It provides that regard must be had to the principle that workers and other persons should be given the highest level of protection against harm to their health, safety, and welfare from hazards and risks arising from work or from specified types of plant as is reasonably practicable.

10. Civil Defence Emergency Management Act 2002

This Act requires a local authority to ensure it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency; and to plan and provide for civil defence emergency management within their own district. These duties are in addition to the requirement to be part of, and carry out the functions and obligations of a member of, a CDEM Group.

A1.5 KEY RELATIONSHIPS

Within the TDC organisation, the Drainage and Water Unit (D&W), as part of the Infrastructure Group, and as the primary implementer of this Activity, reports to and liaises with the Infrastructure Committee of the Council on governance and policy concerns requiring resolution or approval at the Council Committee level. The Infrastructure Committee is composed of elected members of the Council.

D&W also collaborates with other units within TDC with various roles relevant to the effective delivery of water supply services. These include the corporate planning and finance units, the land transport unit, district planning and building units, IT unit, and customer services.

Externally, TDC shares governance of the Downlands Water Supply with the District Councils of Mackenzie and Waimate. There is a Downlands Water Supply Joint Standing Committee comprising of 5 representatives appointed by TDC and 3 members appointed by the Mackenzie and Waimate District Councils to oversee the governance of the scheme.

TDC maintains relationships with the community boards of Geraldine, Pleasant Point and Temuka. The boards provide a venue for discussing community issues that may include water concerns.

TDC also maintains relationships with the Regional Council and the Canterbury District Health Board for coordination and guidance in complying with resource consents and drinking water standards, respectively.

Works and/or services contracting is a service delivery mode used by TDC for major water supply projects and maintenance. Regular liaison with contractors helps ensure effective and efficient delivery of services.

Stakeholders

Table 1 below lists individuals and/or groups that have direct or indirect use of TDC's water supply services are considered as stakeholders in our Activity due to the interests they represent as consumers, regulators or as advocates for the environment and other socio-cultural matters. They include the following and their interests are considered in this AMP:

Table 1: Water Supply Stakeholders

Key Stakeholders	Main Interests
Timaru District Council	Service provider
External	
Residents and ratepayers	Public health and safety, service reliability, environment, cost
Local industries, e.g. • Meat slaughter and processing • Vegetable processing • Fish processing • Breweries • Wool scours • Rendering • Hide processing	Public health and safety, service reliability, environment, cost
Local businesses, e.g. • Restaurants • Food outlets • Hotels and Motels • Retailers • Petrol Stations • Workshops • Dry Cleaners • Cool Stores • Fuel Storage	Public health and safety, service reliability, environment, cost
Community facilities • Schools • Hospitals • Parks, Gardens and Walkways • Libraries, Museum, Gallery	Public health and safety, service reliability, environment, cost
Regional Council (ECan)	Public health and safety, environment
Waimate District Council Mackenzie District Council	Public health and safety, service reliability, environment, cost, Downlands Water Supply Management

Key Stakeholders	Main Interests
Government agencies • Ministry of Health • Ministry for the Environment • Department of Conservation • Office of the Auditor General • Audit New Zealand • Community Public Health (Drinking Water Assessor)	Public health and safety, service reliability, environment, cost
Te Runanga O Arowhenua	Environment, cultural, heritage
Central South Island Fish and Game	Public health and safety, service reliability, environment, cost
Community Groups such as • Catchment Groups • Royal Forest and Bird Society • Federated Farmers • NZ Council of Women	Public health and safety, service reliability, environment, cost
Suppliers	Procurement, technical support
Consultants	Procurement, technical support
Internal	
Councillors and Sub-committees	Public health and safety, service reliability, environment, cost
Community Boards	Public health and safety, service reliability, environment, cost
Executive	Public health and safety, service reliability, environment, cost
Community Services	Customer service
Corporate Services	Financial, IT, property, personnel management
Infrastructure	Public health and safety, environment
Environmental Services	Public health and safety, planning, building

A2 STRATEGIC DIRECTION

This AMP is guided by the strategic directions set out in the Timaru District's Long Term Plan 2018-2028.

A2.1 VISION, OUTCOMES AND PRIORITIES FOR TIMARU DISTRICT

TDC has a four-pronged Vision for the District stated as follows:

> *Lifestyle* - fantastic sustainable lifestyle second to none. We live in a pretty special place. We want to keep it that way. We want to make it even better for ourselves, our children, their children.

Economy - thriving and innovative economy where opportunities abound. Our economy is essential to our future. We need it to grow innovatively and sustainably.

Identity - strong and enviable reputation and identity. We want to forge and strengthen a reputation and identity that other districts may aspire to.

Leadership - inspiring, people-focused leadership. We want a district where we build on our strengths, minimise our weaknesses, challenge our threats and grasp our opportunities. This takes leadership.

There are six community outcomes that Council aims to achieve:

1 High quality infrastructure to meet community and business needs
2 Smart economic success supported and enabled
3 Communities that are safe, vibrant and growing
4 People enjoying a high quality of life
5 A strong identity forged and promoted
6 A valued, healthy and accessible environment

Council has identified four priority areas it believes are essential to enable it to work towards the Vision and Community Outcomes:

1 Investing in community
2 Promote integrated, highly liveable communities
3 Support areas of economic and district strength
4 Ensure critical infrastructure meets future needs

A2.2 ACTIVITY CONTRIBUTION TO DISTRICT VISION, OUTCOMES AND PRIORITIES

Table 2: Water Supply Activity Contribution to Outcomes and Strategic Priorities

Vision	Community Outcomes	Activity Contribution to Outcomes	Activity Support to Strategic Priorities	
			Strategic Priorities	**Activity Service Statement**
Lifestyle We live in a pretty special place. We want to keep it that way. We want to make it even better for ourselves, our children, their children. **Economy** Our economy is essential to our future. We need it to grow innovatively and sustainably **Identity** We want to forge and strengthen a reputation and identity that makes us the envy of other places. **Leadership** We want a district where we build on our strengths, minimise our weaknesses, challenge our threats and grasp our opportunities. This takes leadership.	(1) High quality infrastructure to meet community and business needs	(Primary) Provision of quality water systems that meet the District's needs	(1) Investing in community (2) Promote integrated, highly liveable communities (3) Support areas of economic and District strength (4) Ensure critical infrastructure meets future needs	(1) Provide good quality potable water to the District communities (2) Provide sustainable water quantities for urban, business and rural needs (3) Plan for water supply infrastructure to meet future community needs (4) Plan for adequate water availability in emergency situations
		(Primary) Provision of water systems that cater for future growth and development.		
	(2) Smart economic success supported and enabled	(Primary) Provision of cost-effective water services.		
	(3) Communities that are safe, vibrant and growing	(Primary) Provision of safe drinking water that protects and maintains public health and the environment.		
	(4) A valued, healthy and accessible environment			
	(5) People enjoying a high quality of life	(Primary) Provision of water systems that showcase excellent customer service standards.		
	(6) A strong identity forged and promoted	(Secondary) Support to quality of life that Timaru District can be proud of		

A3 KEY CHALLENGES IN THE NEXT 10 YEARS

1. Meeting the drinking water standards

TDC is required to take all practicable steps to comply with the Drinking Water Standards for New Zealand (DWSNZ) for all drinking water supplies. In order to comply, an approved Water Safety Plan (formerly a Public Health Risk Management Plan) must be implemented addressing identified public health risks within agreed timelines. Some high and extreme risks have been identified in a number of TDC operated water supplies, largely requiring upgrading of water treatment processes and construction of water treatment infrastructure. Some upgrades of water treatment facilities have already been completed. The requirements for upgrading of the remaining drinking water supplies must be considered.

Stage 2 of the Government Inquiry into the Havelock North Drinking Water have recommended changes in the statutory and regulatory regimes governing the delivery of drinking water supplies throughout New Zealand. There are likely to be more stringent treatment standards and regulatory controls, which ultimately will have funding and cost implications to Timaru's public drinking water supplies.

2. Changes in national/regional plans and policies

Water is a highly regulated resource, with national and regional policies, standards and plans directing how Council can utilize it (i.e., quantity of takes, quality of drinking water supplies, etc). These regulations are continually evolving with associated changes in requirements that impact on Council's operation of its water supplies. An example is the Canterbury Land and Water Regional Plan which replaced the Canterbury Natural Resources Regional Plan. More stringent water management under the LWRP may result in additional consent requirements for TDC's water supplies. TDC must consider the potential implications of these changing regulatory requirements.

3. Effects of climate change

The increased frequency of droughts diminishes the availability of source water, with associated water take restrictions; while the increased frequency of high intensity rainfalls impacts on raw water quality and the need for more complex treatments. TDC needs to continue to investigate options regarding available sources and their management.

4. Meeting changes in demand

Meeting the water supply requirements of consumers is the paramount objective of TDC's water supply services. However, there are many competing considerations for the use of water, such as recreation to industry use. These competing demands place pressure on water resources in the Timaru District. The schemes managed by TDC are subject to resource consent conditions which limit the amount of water that can be taken

from the source. Significant growth in demand for TDC's water supplies may result in the need for substantial infrastructure upgrades.

While population and household growth in the District is not expected to have significant impact on water supply requirements over the next 10 years, land use change and industry growth may potentially have major impacts in terms of infrastructure and the quantity of water required.

There are six water supply schemes that supply water for stock use. Three of these schemes have on-farm flow control (restrictors) and currently have limited ability to meet any future increases in agricultural demand. TDC continues to investigate options to improve delivery mechanisms in rural schemes.

TDC needs to consistently advocate for improved consumer use of water to ensure that the Council's water supplies continue to meet demand now and in the future.

5. Asset renewals

Plant facilities and a significant amount of the TDC water supply network will need replacing based on age and performance issues. An assessment based on the remaining life of the pipe assets indicates there are significant renewal costs in the next ten years. It is crucial that the data generated from pipe sampling and estimates of remaining life methodologies are robust in order to mitigate pipes failing before the expected expiry date.

6. Affordability of the service

The cost of providing water is likely to increase over the next 10 years as the above issues are addressed. Consumers expect good quality water to be available on demand in reasonable quantities at a reasonable price. Balancing cost and affordability is a major challenge and TDC must continue to investigate options in order to provide the most cost effective service.

7. Resilience building

There is a growing focus on resilience in asset management driven primarily by increased awareness of the many hazards made apparent by recent major natural disasters and events, such as the earthquakes in Christchurch (2011) and Kaikoura (2017), the flooding in the Bay of Plenty (2017), and the contamination of drinking water in Havelock North (2017). An increased understanding of the vulnerability of the Timaru district's public water supply services is necessary, not only to natural disasters but also to other factors such as an economic crisis, decline in population, etc. TDC must then invest in the right solutions towards building or strengthening the asset and organizational capacity of TDC to withstand disruption, act effectively and adapt to change.

A4 PLANNING ASSUMPTIONS

Table 3: Water Supply Planning Assumptions 2018-2028

Assumption That these conditions hold true in the next 10 years (2018-2028)	**Confidence Level**			**Risk/Uncertainty**	**Risk Level**			**Consequence of variation to assumption**	**Mitigation**
	High	Med	Low		High	Med	Low		
1. Council Political Structure and Asset Ownership There will be no changes to the Council's political structure. Council will remain involved in the water supply activity and continue to own and control all water supply assets.	✓			Changes in Council's political structure are made. Changes in ownership or control of water supply assets are required.			✓	May adversely affect the level of service provided to the community and TDC's ability to recover capital costs.	Any changes in political structure will occur through either representation review processes or formal processes driven either by the community, Council or central government. Changes in control or ownership of strategic assets must occur as part of an LTP development or amendment, with a formal process required through the Local Government Act.
2. Useful Life of Significant Assets It is assumed that asset information is reliable and		✓		Significant assets fail sooner or later than estimated.			✓	Renewals program is inaccurate and may have significant financial repercussions.	Asset life is based on the estimates of engineers and valuers. These are regularly reviewed through asset monitoring

reflects the condition and performance of the assets. It is assumed that no significant assets will fail before the end of their useful lives as determined by the depreciation rates included in the accounting policies.									and testing. In the event of assets wearing out earlier than anticipated, capital projects could be brought forward. This may affect borrowing and depreciation expenses. Negative impacts are likely to be at least partially offset by some assets lasting longer than estimated. Mitigation may also involve reprioritisation of the capital expenditure programme.
3. Levels of Service Levels of service will not significantly change.		✓		Communities demand or legislations impose increased levels of service.		✓		Increased or improved levels of service may require additional resources for TDC to provide them.	Regular monitoring of existing service provision and review of levels of service through activity management planning and corporate planning processes. Significant changes in service levels will generally require increases to fees or rates, depending on how the service involved is funded, and will be confirmed with the community via

									consultation.
4. Demand Factors The District's population and household numbers are projected to increase, represented by Statistics NZ's medium projection scenario. The rate of the District's growth and development will be as projected in the Council's Growth Management Strategy. The demand for water will be within these projected levels.		✓		Population and demographic changes and other factors such as industrial demand are higher or lower than expected.			✓	Significant and consistent variation from projected levels may adversely affect TDC's ability to meet levels of service at an affordable cost. The activity may be over invested in infrastructure if growth rates are significantly slower than projected.	Council will continue to monitor changes in the District's population, household numbers, demography, and growth and development. Generally, small increases in population can be managed within the existing level of service. Declines in population will not necessarily result in a lower number of ratepayers as the number of people per household is declining. Where growth requires additional infrastructure (e.g. subdivisions), Council can currently require financial contributions for this work. Costs over this amount may result in additional Council expenditure which is likely to be funded out of debt.

5. Legislative Demands Government legislation relating to water supply activity will change over the period of this plan. Fire-fighting Code of Practice (COP) SNZ PAS 4509: 2008 remains non-mandatory.	✓			The impact of government legislation is more or less than expected. New legislation is introduced that alters the nature and scope of Council's provision of water supply services. COP becomes mandatory resulting in significant reticulation upgrades	✓			Compliance with new legislation may have an impact on infrastructure and/or operating costs of providing water supply services. Higher cost requirement may lead to additional cost to residents or rate payers.	Monitoring of legislative changes. Consideration of progressive upgrades to meet COP requirements when renewals are programmed.
6. Climate Change Climate change will impact on Council's operations and will require an appropriate response to adapt and prepare for potential adverse effects on water availability and quality.		✓		Effects of climate change are more or less severe than expected.		✓		May create additional treatment costs to improve water quality or require additional storage facilities to secure water. These will place pressure on Council finances.	Monitoring of water sources. Building appropriate mitigation responses into infrastructure development. The Council will continue to monitor climate change science and the response of central government and adapt its response where required.
7. Resource Consents Resource consents will be	✓			Resource consent is not renewed or conditions imposed are			✓	The non-renewal of resource consents would have significant impacts on costs and the ability	Appropriate planning for resource consent renewals should ensure

renewed with similar conditions.				unacceptable.				to provide water supply services. A major non-renewal may mean an entirely new approach to the activity would be required.	that they are obtained. Monitoring of compliance with existing resource consent conditions will provide a record of compliance for future processes and renewals. The renewal of consents is dependent upon the legislative and environmental standards and expectations that exist at the time.
8. Availability of Contractors and Materials Contractors and materials will be available to undertake the work required to agreed standards, deadlines and cost.		✓		Projects could be delayed if there is a shortage of contractors or materials or contractors cannot deliver to agreed standards, costs and timeframes		✓		Might increase cost and/or delay projects or mean something is delivered to a lesser level of service.	Spread capital projects as much as possible. Continue to engage with contractors. Ensure robust contracts are in place. Look at alternative resources.
9. Natural Hazards/Local Disaster There are no significant local disasters during the term of this plan.		✓		Natural disasters occur that have a significant impact on the district and Council services.		✓		A disaster event can potentially cause significant unbudgeted costs, beyond the capacity of the Council to cope.	Water Safety Plans and Contingency/Emergency Response Plan are in place. Council is a member of the Local Authority

									Protection Programme Disaster Fund Trust (LAPP) and has a variety of insurance cover which would cover some emergency works. Assets are revalued at actual replacement cost to provide appropriate levels of insurance cover rather than based on deemed cost. Council also has a Disaster Relief Fund for the replacement of infrastructural assets excluding roading in the event of a natural disaster. Central government has a role in disaster recovery after a natural disaster.
10. Costs, Inflation and Currency and Oil Price Fluctuations Costs will remain stable. The inflation factor used in cost projections is based on the Local Government Cost Index as used in the Long Term Plan (LTP).			✓	Costs are higher than anticipated. The rate of inflation differs from that assumed. Exchange rates fluctuate more than expected.		✓		Variability in costs may impact on the ability of Council to complete programmed work within budget. A significant change in inflation will result in changed revenue and expenditure. This could be significant and may adversely affect the ability of the Council to	The Council will review its budget annually through the LTP/Annual Plan process and may adjust work programmes/budgets where necessary. Council purchases goods predominantly from New

Currency fluctuations will not cause significant variability in water supply activity costs. Exchange rates are forecast to remain unchanged from current rates. Oil prices will continue to fluctuate due to international influences and exchange rate movement.				Oil prices fluctuations are greater than expected.				set rates at a level that is affordable to the community. Variability of prices from international suppliers could cause variability in Council costs.	Zealand suppliers with contracts in New Zealand dollars. Currency exchange rates and oil prices will be continually monitored. Work programmes may need adjustment depending on the scale of any changes.
11. Asset Depreciation and Revaluation Asset depreciation rates will not change as shown in the Accounting Policies. Council has adopted deemed cost as its approach to revaluation of significant assets.	✓			Further work on planned capital works may alter the depreciation expense. Minimal risks as asset revaluations will not occur in the future for water supply plant and equipment.			✓	Increased depreciation costs would result from assets that have shorter useful lives.	Asset life is based on the estimates of engineers and valuers. These are regularly reviewed through asset monitoring and testing. Negative impacts are likely to be at least partially offset by some assets lasting longer than estimated. Revaluation affects the carrying value of fixed and infrastructural assets and the depreciation charge in the years subsequent to the revaluation. Council's

									deemed cost approach to revaluation applies to water supply assets and no annual revaluation is required.
12. Funding Sources and Rating Base Funding sources and the number of rating units for the water supply activity will not change significantly.		✓		Projected revenue from user charges or financial assistance is not achieved. Levels and sources of funding differ from those forecast. Rating units could grow at an increased rate or could contract.		✓		Revenue could reduce without the ability to reduce expenditure proportionately. This could result in projects being revised or alternative funding sources used. An increase in the overall rating base could result in a decrease in rates for rating units as the total rates are spread across a larger base. If the rating base was to reduce, there could be an increase in rates.	Levels of revenue from user charges have been set at realistic levels in accordance with the ratios outlined in the Revenue and Financing Policy. There is a concentration of risk associated with a small number of industrial consumers for some revenue streams (e.g. extraordinary water charges). Regular liaison is maintained with these consumers. Funding for projects and assets is considered before the commencement of each project or asset. A significant impact from changes in funding or funding sources may result in a revised capital

									work programmes, or changes in the level of user fees and charges, borrowing or rating requirements. The rating base is reviewed annually when determining the rates for the year.

A5 THE ACTIVITY

A5.1 ACTIVITY DESCRIPTION

The Water Supply Services Activity covers the safe and effective taking of water from the source; and its treatment, storage and distribution to urban and rural parts of the District. The type of supply can be On-Demand or Restricted. Refer to Table 4 for the definition of urban and rural water supplies.

Water is supplied for residential, commercial, industrial and stockwater purposes. Water is not supplied for irrigation or horticultural purposes.

This AMP covers the 12 water supply schemes being managed by TDC, namely:

Urban Drinking Water Supply Schemes

1) Geraldine Water Supply Scheme

2) Peel Forest Water Supply Scheme

3) Pleasant Point Water Supply Scheme

4) Temuka Water Supply Scheme

5) Timaru Water Supply Scheme

6) Winchester Water Supply Scheme

Rural Drinking Water and Stockwater Supply Schemes

7) Downlands Water Supply Scheme

8) Orari Water Supply Scheme

9) Seadown Water Supply Scheme

10) Te Moana Water Supply Scheme

Stockwater-only Schemes

11) Beautiful Valley Stockwater Scheme

12) Rangitata-Orari Stockwater Scheme

Refer to Part B for the detailed description of the schemes.

This AMP does not cover the water supplies for the Stratheona Huts and Rangitata Huts which are managed by TDC's Property Unit.

Table 4: Urban and Rural Water Supply Definitions

Supply Type	Definition	Application
On demand	- a supply of water which is available on demand directly from the point of supply subject to an agreed level of service	Urban Schemes
	- water is supplied at pressure to the property boundary and is sufficient for domestic and industrial use	
	- water is supplied at pressure and flows sufficient for fire fighting	
	- supply is for domestic, business and industrial purposes	
Restricted	- a small continuous flow of water supplied by a flow control device/restrictor across an air gap separation	Mainly Rural Schemes, but also on the fringes of Urban Schemes
	- supply is an agreed volume of water over a 24 hour period to a storage facility	
	- supply is for domestic and stock purposes	
The Downlands Water Supply covers the Timaru, Waimate and Mackenzie Districts but is managed by the Timaru District Council. It is owned on the following basis: TDC 82%, WDC 14% and MDC 4%. Policy is determined by a Joint Standing Committee. The assets and values given in this document relates to100% of the Downlands scheme.		

A5.2 ACTIVITY RATIONALE

TDC's involvement in water supply services emanates from the purpose of local government, as stated in the Local Government Act 2002, which "provides for local authorities to play a broad role in meeting the current and future needs of their communities for good quality local infrastructure, local public services and performance of regulatory functions." (Part 1, Section 3d).

Water supply services are vital to the quality of life and public health of Timaru District's residents. It is seen as being for the collective benefit of the Community for Council to act on behalf of the users to provide water supply services, and there is also a community health factor benefit.

A5.3 SIGNIFICANT EFFECTS OF THIS ACTIVITY

This Activity is intended to have significant positive effects. These are the benefits to the community of having:

- systems that ensure safe collection, storage, treatment and distribution of water
- high quality water that is essential to operate businesses and provide critical public services (e.g., hospitals) in the District

- potable water supplies that sustain healthy living
- infrastructure services that deliver stock water requirements and promote agricultural growth
- firefighting assistance in most urban reticulated areas for public protection and safety

Conversely, issues may occur while carrying out this activity, potentially resulting in negative impacts:

Negative Effect	Mitigation
Potential depletion of resources due to high consumption	Manage the activity while recognising that preservation of the District's water resources is an important sustainable development issue
Potential negative financial impact on consumers due to the reliability of supply	Manage the activity for increasing operational efficiency and to maintain affordability

A5.4 Activity Contribution to Sustainable Development

The Principles Relating to Local Authorities stated in Section 14 of the Local Government Act 2002 provides that: "in taking a sustainable development approach, a local authority should take into account -

- the social, economic, and cultural interests of people and communities;
- the need to maintain and enhance the quality of the environment; and
- the reasonably foreseeable needs of future generations."

The IIMM 2015 defines sustainability as "the capacity to endure; in the context of AM it is about meeting the needs of the future by balancing social, economic, cultural and environmental outcomes or needs when making decisions today."

The principle of sustainability is reflected in the statement of the Activity Rationale (Section 2.2) which, in line with the purpose of local government, seeks to meet current and future needs of communities. Specifically, the following practices demonstrate specific ways by which TDC is actively integrating sustainability in various aspects of delivering water supply services:

1) Section 14 of the LWRP, the section which covers all TDC takes is due to be reviewed in 2017/18. Included in the review will be sub-regional rules which may differ from the regional rules set out in the LWRP. To facilitate the review a number of additional catchment groups are being established. TDC participates in the review via these community groups to determine the rules for managing the

environmental flow requirements to sustain and ultimately improve the health of the rivers.

2) Promoting sustainable consumption of water through consumer education and other technical assistance provided by TDC.

3) Leakage reduction in the network system.

4) Utilise water disinfection treatment processes which have less reliance on chemical inputs.

5) Application of asset management practices to facilitate asset renewal at the most appropriate time considering age, material type, maintenance history, and other asset condition factors.

6) Carbon footprint reduction through lower energy use (e.g., preference to gravity over pumps in water scheme designs).

7) Equitable use of water resources through metering of large users.

A6 Levels of Service

A6.1 Key Service Drivers

The Water Supply Activity Levels of Service are primarily driven by the need to meet legislative requirements, fulfil customer expectations and maintain affordability of the service.

Key Legislation

1. Local Government Act 2002

   The Act defines good quality local infrastructure as efficient, effective and appropriate to present and anticipated future needs. TDC ensures it adheres to this mandate through the life cycle management of the water supply assets.

2. Resource Management Act

   TDC ensures it obtains consents for the take of water, and the installation and management of infrastructure. These consents have a wide range of conditions that TDC adheres to.

3. Health Act

   TDC takes all practicable steps to comply with the Health Act by having an approved Water Safety Plan on every drinking water supply scheme and implementing these.

4. Local Government Non-Financial Performance Measures Rules

These Rules set out mandatory performance measures that Council needs to monitor, measure and report on in its Annual Report. There are 7 performance measures for reporting on water supply services specified in these rules.

Customer Expectations and Affordability

Consumers expect that TDC's water supply services will match the demands and growth of the Timaru District. There is often an expectation that water supply services will be available for new development areas and for expansion of delivery areas on the periphery of existing networks.

Consumers generally need to feel that they are getting value for the rates and charges they pay. When rates and charges increase, the community consequently expects that there will be an improvement in the services they receive, either in the form of reduction in issues or higher quality of customer care.

The next section discusses Council's process for customer engagement.

A6.2 CUSTOMER RESEARCH AND EXPECTATIONS

How do we engage with our customers?

The decisions that Council makes affect communities. Some decisions are more significant than others, depending on the issue. Smaller operational decisions typically require little, if any, engagement with the community. More significant decisions may require a robust decision-making process and extensive consultation with the community.

As required under the Local Government Act, TDC has developed and adopted a Significance and Engagement Policy which provides a framework to identify the level of significance of an issue, give some clarity to communities about expectations of engagement on issues, and to ensure a local authority has identified its strategic assets. (The full policy can be read on the TDC website.)

Within the Long Term Plan process, community engagement is through the LTP Consultation Document (CD). The CD contains the key issues, preferred options and alternatives that Council requests the community to provide feedback on. For this LTP period, Water Metering and Pricing of urban water supplies was a major issue included in the CD.

Other means to gather customer feedback include the following:

1) Customer service desk – for lodging service requests and feedback on services
2) TDC website – an option to carry out water services transactions and/or provide feedback online. Council also promotes the use of the smartphone application "Snap-Send-Solve" for instant reporting of issues by anyone in the community.
3) Social media – TDC's Facebook page provides an interactive means of communication on projects, notifications, etc.
4) Noticeboard – Council publishes a weekly Noticeboard in the Courier Newspaper and Timaru Herald. This includes information on Council services, public notices, meetings and other information.

5) Council or Community Board meetings – opportunity for members of the public to ask questions of, or put a particular case to the Council or the Community Board on policy matters or matters relating to a particular ward, including water supply concerns
6) Inspections – visit by TDC technicians/officers/agents. It provides an opportunity for customer feedback
7) Annual Plan consultations – for gathering comments, suggestions and other submissions on proposals contained in the plan
8) Community survey - a 2-yearly survey of user and the general public satisfaction with TDC's services including water supply
9) Specialised stakeholder meetings – needs-based meetings with identified stakeholder and special interest groups regarding particular water supply issues
10) Specialised customer survey/research – needs-based study of consumers who may be affected by particular water supply issues

We will continue to rely on these mechanisms to get customer feedback on the performance of the water supply services and determine any gaps in the levels of service.

A6.3 LEVELS OF SERVICE

The Levels of Service (LOS) for this Activity are the standards of service that TDC will provide to the community (Table 5).

Table 5: Community Outcomes and Water Supply Activity Levels of Service

COMMUNITY OUTCOMES	WATER SUPPLY ACTIVITY CONTRIBUTIONS TO OUTCOMES	CUSTOMER CORE VALUES	LEVEL OF SERVICE
High quality infrastructure to meet community and business needs	Provision of quality water systems that meet the District's needs.	Quality	Provide Safe Drinking Water
		Reliability	Maintain excellent water supply network services
	Provision of water systems that cater for future growth and development.	Efficiency	Provide management of the efficient use of water as a resource
Smart economic success supported and enabled	Provision of cost-effective water services.	Affordability	Deliver affordable water supply services
Communities that are safe, vibrant and growing	Provision of safe drinking water that protects and maintains public health and the	Safety	Deliver water services according to required environmental standards
A valued, healthy			

COMMUNITY OUTCOMES	WATER SUPPLY ACTIVITY CONTRIBUTIONS TO OUTCOMES	CUSTOMER CORE VALUES	LEVEL OF SERVICE
and accessible environment	environment.		
People enjoying a high quality of life	Provision of water systems that showcase excellent customer service standards.	Responsiveness	Maintain excellent customer service
A strong identity forged and promoted	Support to quality of life that Timaru District can be proud of.	All of the above	All of the above

The Level of Service represents a balance between the desired service standard and the cost of providing it. These were established formally with the development of Council's Long Term Council Community Plan in 2003, and are reviewed during each of the 3-yearly updating cycles of the Long Term Plan.

There are no significant changes in LOS in this AMP.

Performance Measures and Targets

Performance measures and targets have been defined for each LOS. These consist of a mix of customer and technical performance measures, the core of which are monitored for the Annual Report. The technical measures relate to legislative compliance and asset performance while the customer performance measures relate to quality of service and value for money.

A number of the technical measures are held for internal monitoring by D&W of its organizational performance, as the primary manager of this Activity. These internal measures are not included in the Annual Report to the public.

Local Government Mandatory Non-Financial Performance Measures

The *Non-financial Performance Measures* mandated by the Local Government Minister have been incorporated in the AMP since the last LTP updating cycle in 2015. Council is required to report to the Local Government Minister on these performance measures.

Analysis of Performance

Key performance data are analysed for significant variation from the LOS.

Key performance data are also trended and analysed to identify any recurrent issues and use the information to plan the necessary work/intervention.

Necessary works to address LOS issues are reflected in the activity work and financial plan.

Refer to Table 6 below for a summary of information on the Water Supply Activity levels of service, performance measures and yearly targets.

Table 6: Water Supply Activity Levels of Service, Performance Measures and Targets 2018-2028

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
(1) Provide Safe Drinking Water	(LTP) Mandatory PM 1 (safety of drinking water): The extent to which the local authority's drinking-water supply complies with: a) Part 4 of the drinking-water standards (bacteria compliance criteria), and	Bacterial compliance – all schemes	Bacterial compliance – all schemes	Bacterial compliance – all schemes	Bacterial compliance – all schemes
	b) Part 5 of the drinking-water standards (protozoal compliance criteria)	Protozoal compliance – 1. Downlands – Pareora 2. Pleasant Point 3. Seadown 4. Temuka* 5. Geraldine 6. Timaru** 7. Peel Forest	Protozoal compliance – 1. Downlands – Pareora 2. Pleasant Point 3. Seadown 4. Temuka* 5. Geraldine 6. Timaru** 7. Peel Forest 8. Te Moana	Protozoal compliance – 1. Downlands - Pareora - Springbrook 2. Pleasant Point 3. Seadown 4. Temuka* 5. Geraldine 6. Timaru** 7. Peel Forest 8. Te Moana	Protozoal compliance – 1. Downlands - Pareora - Springbrook - Tengawai - Waithohi - Camerons 2. Pleasant Point 3. Seadown 4. Temuka* 5. Geraldine 6. Timaru** 7. Peel Forest 8. Te Moana Protozoal compliance by all treatment plants (all schemes) by 2023/24

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
	(Int) Comply with Water Safety Plan (WSP)	Annual review of all WSPs compliance	Annual review of all WSPs compliance	Annual review of all WSPs compliance	Annual review of all WSPs compliance
(2) Maintain excellent water supply network services	(LTP) Mandatory PM 2 (maintenance of the reticulation network): The percentage of real water loss from the local authority's networked reticulation system (including a description of the methodology used to calculate this)	% real water loss from network system is calculated and reported % real water loss from network system reduces	% real water loss from network system is calculated and reported % real water loss from network system reduces	% real water loss from network system is calculated and reported % real water loss from network system reduces	% real water loss from network system is calculated and reported % real water loss from network system reduces
	(Int) Total network water loss	Report and trend: • Infrastructure Leakage Index (ILI) for urban schemes • Losses per km for rural schemes	Report and trend: • Infrastructure Leakage Index (ILI) for urban schemes • Losses per km for rural schemes	Report and trend: • Infrastructure Leakage Index (ILI) for urban schemes • Losses per km for rural schemes	Report and trend: • Infrastructure Leakage Index (ILI) for urban schemes • Losses per km for rural schemes
		Complete 25% of Rural Jet/Tank Inspection	Complete 25% of Rural Jet/Tank Inspection	Complete 25% of Rural Jet/Tank Inspection	Complete 25% of Rural Jet/Tank Inspection annually
		Develop Leak Detection Programme and report on estimated leakage	Implement Leak Detection Programme and report on estimated	Implement Leak Detection Programme and report on estimated	Implement Leak Detection Programme and report on estimated

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
		reduction (volume/year)	leakage reduction (volume/year)	leakage reduction (volume/year)	leakage reduction (volume/year)
	(Int) Water supply pressure provided at service connection for urban schemes	Report on notifications of inadequate water supply at point of supply for urban schemes	Report on notifications of inadequate water supply at point of supply for urban schemes	Report on notifications of inadequate water supply at point of supply for urban schemes	Report on notifications of inadequate water supply at point of supply for urban schemes
	(Int) Flow at service connection for rural schemes	Report on notifications of inadequate water supply at the point of supply for rural schemes	Report on notifications of inadequate water supply at the point of supply for rural schemes	Report on notifications of inadequate water supply at the point of supply for rural schemes	Report on notifications of inadequate water supply at the point of supply for rural schemes
	(LTP) Outages to urban and rural scheme properties Note: Removed from 2018 LTP	All outages >8 hours reported to Medical Officer of Health (MoH)	All outages >8 hours reported to Medical Officer of Health (MoH)	All outages >8 hours reported to Medical Officer of Health (MoH)	All outages which impact consumers >8 hours reported to Medical Officer of Health (MoH)
(3) Maintain excellent customer service	(LTP) Mandatory PM 3 (fault response times): Where the local authority attends a call-out response to a fault or unplanned interruption to its networked reticulation	Urban Urgent: Attendance < 1 hr Resolution < 4 hrs	Urban Urgent: Attendance < 1 hr Resolution < 4 hrs	Urban Urgent: Attendance < 1 hr Resolution < 4 hrs	Urban Urgent: Attendance < 1 hr Resolution < 4 hrs

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
	system, the following median response times measured: (a) Attendance for urgent call-outs***: from the time that the local authority receives notification to the time that service personnel reach the site, and (b) Resolution of urgent call-outs: from the time that the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption. (c) Attendance for non-urgent call-outs: from the time that the local authority receives notification to the time that service personnel reach the site, and (d) Resolution of non-urgent call-outs: from the time that the local authority receives notification	Rural Urgent: Attendance < 4 hrs Resolution < 8 hrs All non-urgent callouts: Median attendance & resolution times are to be reported	Rural Urgent: Attendance < 4 hrs Resolution < 8 hrs All non-urgent callouts: Median attendance & resolution times are to be reported	Rural Urgent: Attendance < 4 hrs Resolution < 8 hrs All non-urgent callouts: Median attendance & resolution times are to be reported	Rural Urgent: Attendance < 4 hrs Resolution < 8 hrs All non-urgent callouts: Median attendance & resolution times are to be reported

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
	to the time that service personnel confirm resolution of the fault or interruption.				
	(LTP) Response time to fault or unplanned interruption Note: Removed from 2018 LTP	≥85% of service requests are responded within the given time in the maintenance contract	≥85% of service requests are responded within the given time in the maintenance contract	≥85% of service requests are responded within the given time in the maintenance contract	≥85% of service requests are responded within the given time in the maintenance contract
	(LTP) Mandatory PM 4 (customer satisfaction): The total number of complaints received by the local authority about any of the following: (a) Drinking water clarity (b) Drinking water taste (c) Drinking water odour (d) Drinking water pressure or flow (e) Continuity of supply	1) Report on total number of complaints per 1000 connections 2) Complaints on water clarity, taste and odour ≤ 5 per 1000 connections 3) Complaints on water pressure or flow, and continuity of supply ≤ 20 per 1000 connections	1) Report on total number of complaints per 1000 connections 2) Complaints on water clarity, taste and odour ≤ 5 per 1000 connections 3) Complaints on water pressure or flow, and continuity of supply ≤ 20 per 1000 connections	1) Report on total number of complaints per 1000 connections 2) Complaints on water clarity, taste and odour ≤ 5 per 1000 connections 3) Complaints on water pressure or flow, and continuity of supply ≤ 20 per 1000 connections	1) Report on total number of complaints per 1000 connections 2) Complaints on water clarity, taste and odour ≤ 5 per 1000 connections 3) Complaints on water pressure or flow, and continuity of supply ≤ 20 per 1000 connections

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
	(f) The local authority's response to any of these issues - expressed per 1000 connections to the local authority's networked reticulated system	4) Complaints on TDC's response ≤ 1 per 1000 connections	4) Complaints on TDC's response ≤ 1 per 1000 connections	4) Complaints on TDC's response ≤ 1 per 1000 connections	4) Complaints on TDC's response ≤ 1 per 1000 connections
	(LTP) Water supply services overall satisfaction level (Determined from 2-yearly community survey. The latest survey was done in 2016.) Note: removed from 2018 LTP	≥85% of the District's residents are satisfied with water supply services	No survey this year	≥85% of the District's residents are satisfied with water supply services	≥85% of the District's residents are satisfied with water supply services (in 2-yearly survey continuing from 2021)
	(LTP) Water supply services user satisfaction level (Determined from 2-yearly community survey. The latest survey was done in 2016.)	≥85% of users are satisfied with water supply services	No survey this year	≥85% of users are satisfied with water supply services	≥85% of users are satisfied with water supply services (in 2-yearly survey continuing from 2021)
(4) Provide management of efficient use of water as a resource	Mandatory PM 5 (demand management):	Calculated and reported. 300 li/day/resident	Calculated and reported.	Calculated and reported.	Calculated and reported. 20% reduction in average consumption of

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
	(LTP) The average consumption of drinking water per day per resident within the territorial authority district.				drinking water per day per resident
	(Int) Water resource use efficiency -	Annually report and trend water use	Annually report and trend water use	Annually report and trend water use	Annually report and trend water use
	(Int) Reliability of supply	Report on number of days of water restriction/year	Report on number of days of water restriction/year	Report on number of days of water restriction/year	Report on number of days of water restriction/year
(5) Deliver water services according to required environmental standards	(LTP) Compliance with resource consent conditions****	Compliance with all consent conditions****	Compliance with all consent conditions****	Compliance with all consent conditions****	Compliance with all consent conditions****
(6) Deliver affordable water services	(LTP) Customer satisfaction with value for money of water supply services (Determined from 2-yearly community survey. The latest survey was done in 2014.) Note: Removed from 2018 LTP	≥85% of users think water supply services are good value for money	No survey this year	≥85% of users think water supply services are good value for money	≥85% of users think water supply services are good value for money (in 2-yearly survey continuing from 2021)
	(LTP) Operating cost of	Actual operating cost	Actual operating cost	Actual operating cost	Actual operating cost

Levels of Service	Performance Measure (PM)	Target			
		2018/19	2019/20	2020/21	2021/28
	combined water supply services Note: Removed from 2018 LTP	within budget	within budget	within budget	within budget
	(Int) Economic sustainability	Calculate and report on water charges as a percentage of the median income of Timaru households	Calculate and report on water charges as a percentage of the median income of Timaru households	Calculate and report on water charges as a percentage of the median income of Timaru households	Calculate and report on water charges as a percentage of the median income of Timaru households

Int = Internal performance measure held by Drainage and Water Unit but not reported in TDC's Annual Report
LTP = Performance measure that is reported in TDC's Annual Report
* Temuka Treatment Plant supplies Temuka, Orari and Winchester
**Timaru Treatment Plant supplies Hadlow which is part of Downlands Water Supply
***An urgent callout is one that has P1 priority rating and leads to a complete loss of drinking water supply
****Excluding minor non-compliances

A6.4 SERVICE DELIVERY

TDC owns all the infrastructure assets although the Downlands Water Supply assets are shared jointly with Timaru, Waimate and Mackenzie District Councils on an 82:14:4 ratio respectively.

Core service functions of asset operation and management, inspection, project supervision and customer services are carried out in-house by staff of TDC's D&W, as shown in the organizational chart in Figure 4 below.

To augment in-house capacity, TDC uses private contractors on a needs basis to carry out identified tasks such as: i) maintenance and repair of the water pipes network; ii) physical works to build or renew assets; iii) some pre-engineering/engineering designs; and iv) special studies in support of planning/policy development. In general, contracting of works/services to the private sector is permissible and justified for reasons of cost effectiveness and when a specialist skill is required.

LGA Sec17A review

As required by legislation, TDC carried out a preliminary review of the effectiveness of existing service delivery arrangements on Council activities to determine which activities will require full Section 17A review prior to August 2017.

In the case of the Water Supply Activity, it was recommended that a Section 17A review will not be undertaken as the exception clauses of Section 17A apply, namely:

- The significant combined contract ($13.44M) for the water supply network repairs and maintenance will not be expiring in the next 2 years (as at October 2016);
- The *Agreement in Relation to a Joint Committee* governing the Downlands Water Supply Scheme is unlikely to be reviewed within 2 years (as at October 2016); and
- Having considered the variety of governance, funding and service delivery options listed in Clause 4 of Section 17A, the cost of carrying out a review of the water supply service may be affordable but the potential incremental benefits of the review are unlikely to be substantial enough to outweigh the costs (direct and indirect).

Section 17A provides that a review be carried out every six years. (Refer to document #965212 for details on the Water Supply Activity Stage 1 Review.)

Contract Management

TDC's civil works procurement and contract administration follows the provisions of NZS3910: 2013 NZ Standard Conditions of Contract for Building and Civil Engineering Construction. Relevant provisions of NZS3910 are also used to procure and administer service contracts, such as for maintenance works, consulting services, etc.

The maintenance of the reticulation is contracted out in a single contract, currently Contract 2080 (document #812087). The Maintenance Contract requires the contractor to have qualified staff to deal with all systems malfunctions within the specified response times. When urgent repairs are required, the Maintenance Contractor is authorised to undertake all work as necessary to make the asset safe, or to stabilise the site/situation.

The operation and maintenance of the Rangitata-Orari water races is contracted out in a single contract, currently Contract 2218 (Document #1081488).

Although the facilities' operations are carried out by TDC in-house operators, assistance for specialist work is often contracted out. A variety of engineering firms assist and Industrial Controls South Canterbury do most of the electrical work.

The D&W has a register of Approved Contractors (TRIM document #444130) who are authorised to work on the TDC reticulation once appropriate approvals are obtained, either through the service consent or engineering plan approval processes. New connections where the consumer meets all the costs must be done by any approved contractor.

A Contractors Liaison Meeting is held annually to discuss issues and provide an indication of Council's yearly work programme.

Service Quality Standard

Activity management practices are carried out to TDC's standard of service quality, policies and approved procedures; and in accordance with Council's adopted industry-recognised or accepted technical standards of practice, as contained in the following key documents:

- TDC Drainage and Water Code of Practice
- TDC Operations Manuals (by water supply scheme)
- TDC Drainage and Water Unit Health and Safety Manual
- TDC Corporate Management Policies
- NZ Engineering Standards
- NZ Water Industry Code of Practice on Water Meter
- NZ Water Industry Code of Practice on Backflow Prevention
- Local and international best practices (e.g., International Infrastructure Management Manual 2015)
- Other industry-recognised standards

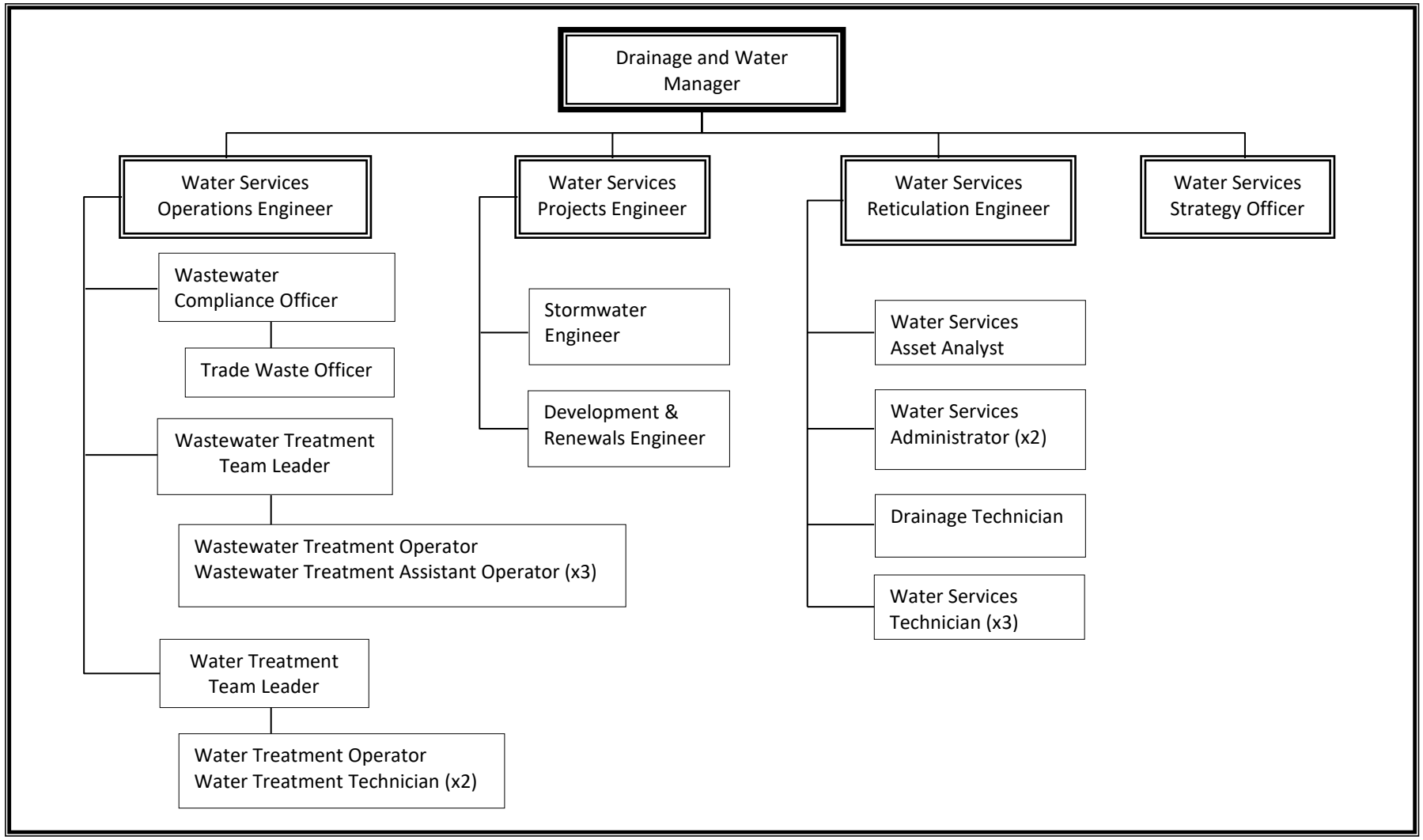


Figure 4: Drainage and Water Unit Organizational Structure

A7 Demand Forecasting and Management

A7.1 Assessment of Demand Drivers

1 Resource Consents, Drinking Water Standards and Other Policy Requirements

Resource consent requirements, the Drinking Water Standards, and other mandatory requirements for water supplies discussed in Section A1.4 impact on the quality, quantity, delivery and use of water. These are assessed for relevance and effect on service delivery in each water supply scheme, and appropriate demand strategies developed.

Many of the current TDC consents have some capacity for growth although this is being gradually reduced when consents are renewed by the imposition of total annual volumes for abstraction.

Summary of TDC's Resource Consents to Take Water

SCHEME	SOURCE	CONSENT VOLUME (m3/day)	EXPIRY	RESTRICTIONS
1. Beautiful Valley		Ave 128 over 7 days	2034	Nil
2. Downlands	Te Ngawai	6,825	2030	Nil
	Waitohi	1,300	2030	Nil
	Camerons (Timaru-Pareora Pipeline)	NA	NA	Nil
	Pareora PS	Ave 300 over 7 days	2035	Nil
	Springbrook	Ave 380 over 7 days	2035	Nil
3. Geraldine		Ave 6,000 over 7 days	2027	By 3,000 m3/day when Temuka River low and Dobies Creek flowing
Geraldine and Te Moana	Geraldine Te Moana (Nil)	Ave 7058 over 7 days	2027	By 50% (3,000 m3/day) when Temuka River low and Dobies Creek flowing
4. Orari	Temuka Treated Water	NA	NA	NA
5. Peel Forest	-	130	2046	Nil
6. Pleasant Point	-	1,850	2034	By 50%(925 m3/day) when Lake Opuha is low
7. Rangitata – Orari	Orari River		2044	
8. Seadown	-	Ave 1,227 over 122 days	2030	By 27%(892 m3/day) when Lake Opuha is low
9. Te Moana	-	Ave 1,058 over 7 days	2034	Nil
10. Temuka	Spring	3,000	2030	Nil
	Temuka Wells	4,500	2030	Nil
	Orari Well	2,160	2028	By 50%(1080 m3/day) when Temuka low and

SCHEME	SOURCE	CONSENT VOLUME (m3/day)	EXPIRY	RESTRICTIONS
				Dobies Creek flowing
11. Timaru	Pareora River	18,576	2024	Residual flow in Pareora River is required. Volume available may be reduced by 65% (6,500 m3/day).
	Opihi	Ave 28,409 over 7 days	2030	By 50% (14,205 m3/day) when Lake Opuha is low
12. Winchester		Ave 752 over 7 days	2044	By 50% (376 m3/day) when Temuka River is low
100 l/s	Opihi Waitohi and Seadown	12,240	2030	By 100% when Opuha is low

The 2008 Revised Version of the 2005 DWSNZ enables UV to meet the requirements, provided turbidity remains under 1 NTU. UV has been installed in Geraldine, Pareora, Pleasant Point, Seadown and Temuka. Compliance with the DWSNZ will require significant treatment upgrades for the remaining water supplies. Disinfection processes will not be adequate.

Ozone is used in Timaru but compliance in cold periods and during plant set up is difficult to prove.

2 Asset Integrity

Asset integrity refers to the ability of the asset to efficiently and effectively perform its function. Poor asset condition and performance could lead to significant system losses resulting in high demand.

3 Climate Change

Changes in weather patterns or climate change may cause water take restrictions, reduce raw water quality meaning more complex treatment processes, diminish the availability of source water, cause more frequent river ‘freshes’ and force changes in water use. Demand management strategies are developed for each water supply to help deal with these issues.

4 Population Change

Population growth leads to higher demand for water. The District’s Population is projected to increase to 49,200 (+8.8%) by 2028, peaking in 2038 at 50,200. This represents the Stats NZ **medium** projection scenario. The impact of the projected change in population on the demand for water will be assessed through the hydraulic model. Significant implications on design capacities of assets and/or levels of service will be addressed to meet the requirements.

5 Household Change

Similarly, demand for water normally increases with growth in number of households served. The District's households are projected to grow to 21,200 in 2028 (+9.8%), rising to 21,600 households in 2038. This represents the Stats NZ **medium** projection scenario. As with population, the impact of household growth on the capacity of the water supply infrastructure will be assessed through the hydraulic model to determine any significant implications that will need to be addressed.

6 Industrial/Commercial Development

The Timaru urban area has experienced sustained economic growth over the past few years. This has been observed to occur mainly as industrial growth in the Washdyke area and commercial growth.

In terms of implications to demand for water supply services, any proposed major new "wet" industry would be specifically assessed to determine the capacity of the existing infrastructure to supply water. A single industry could create significant additional demand. Conversely, closure of any of the existing major industries could have a significant effect on the cost to supply water to the community. As there are fixed costs regardless of the total volume of water supplied, departure by large industries will reduce revenue that may lead to increased charges borne by remaining users

7 Agriculture (Stock Water)

Of the District's 12 schemes, there are 6 which supply water for stock purposes. Further intensification of dairying will have implications on demand for irrigation water for fodder production. This trend can have significant adverse impact on TDC's water supplies that are allocated from the same source as irrigation schemes.

Based on the traditional mixed sheep and beef farming, TDC schemes provide design water allocation volumes of 56 or 72 litres/ha/day. Additional water is not available if a property requires a water allocation greater than the scheme design. The exception is a temporary increase for dairying support. There are properties where there is a historical greater allocation as the farm had a large demand prior to changing from a demand to a restricted scheme.

The assessed stockwater demand by 2030 is as follows:

Table 7: Assessed Stockwater Demand by 2030

WATER SUPPLY SERVICES	SCHEME DESIGN (L/ha/day)	2030 Demand (L/ha/day)
1. Beautiful Valley	72	95-170
2. Downlands	56	80-150
3. Geraldine	No allocation for Agriculture use	
4. Orari	56	Not assessed
5. Peel Forest	No allocation for Agriculture use	
6. Pleasant Point	No allocation for Agriculture use	
7. Rangitata – Orari	Water Race	Not assessed
8. Seadown	Trough	60-130

WATER SUPPLY SERVICES	SCHEME DESIGN (L/ha/day)	2030 Demand (L/ha/day)
9. Te Moana	56	140-180
10. Temuka	No allocation for Agriculture use	
11. Timaru	No allocation for Agriculture use	
12. Winchester	No allocation for Agriculture use	

8 Land Use Change

Global commodity markets are driving changes in land use in the rural sector. There has been a significant increase in dairy farming with many dry stock farm conversions to dairy. This does not directly impact on demand as Council does not supply water for irrigation. However, dairy farms require treated water for washing of vats and the milking parlour which may impact on demand as conversions continue.

The development of an increasing number of lifestyle blocks on the fringes of urban areas creates a different demand on water supplies. These properties use water allocations that were originally for stock-water, or the houses have to rely on rainwater for the domestic supply. This increases the demand on Council to supply drinking water for these properties as these consumers generally do have expectations for an increase in the LoS.

Re-zoning areas from rural to urban or to industrial will impact on the water supply. The reticulation will need to be developed to ensure appropriate volumes of water and reticulation are available. Prior to re-zoning, an area to urban the requirement for this land is assessed in detail. In fill housing is encouraged as this has a much lesser impact with little reticulation modifications needed to supply an increased volume.

We are closely monitoring this indicator through the Council's District Plan. Demand implications are assessed when cases are identified.

9 Firefighting

Fire fighting per se does not drive demand. Provision of adequate capacity in the networks to supply sufficient fire fighting flows has driven the minimum size of the reticulation. Council will continue to ensure adequate infrastructure is installed to meet reasonable fire fighting requirements in the Timaru, Temuka, Geraldine and Pleasant Point gazetted fire districts. The remaining water supply schemes do not supply fire fighting water (although some have water connections available for tanker filling).

There may be a demand from some properties with sprinkler systems installed to maintain a relatively high pressure in the network, contrary to good leak management practices.

It is possible that the requirements for fire fighting may reduce over time as changes in fire fighting technology occur, for example, development of foam and non-water products for extinguishing fires. This may alter the Fire Fighting Code of Practice

and hence the design requirements. The NZFS's push for house sprinkler systems may influence future water supply service levels.

Areas identified as not meeting the Fire Fighting Code of Practice will be included in capital upgrade programmes as appropriate.

10 Tourism

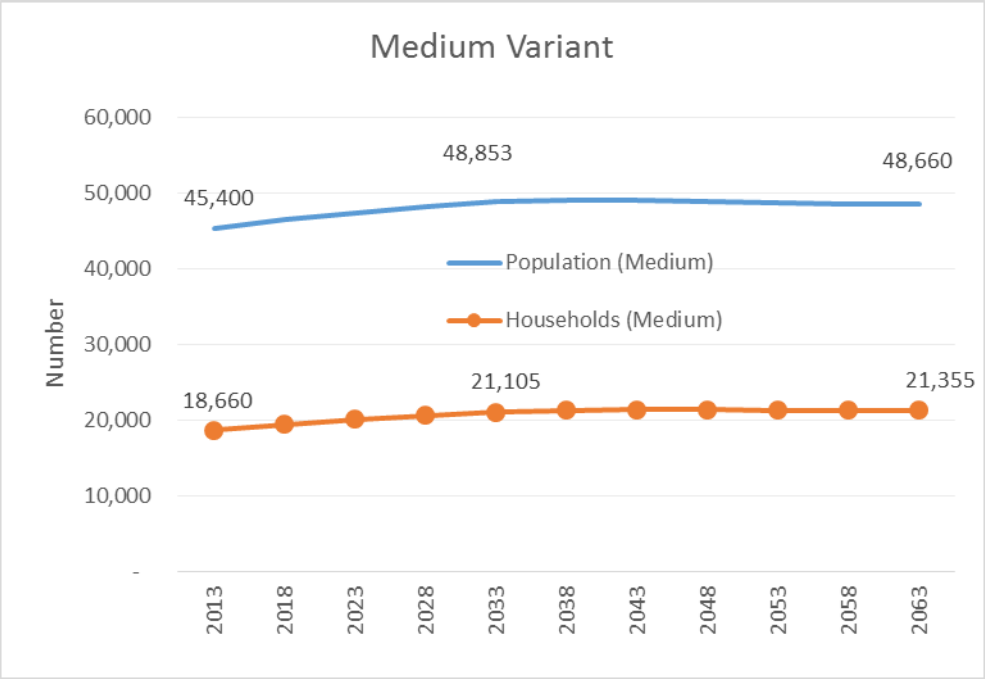
Tourism in South Canterbury is a growing sector. The District has many recreational activities and is the gateway to many tourist destinations such as Aoraki - Mt. Cook, Queenstown, Dunedin and Christchurch. Safe drinking water is of paramount importance in preserving the image of a safe and healthy environment in which to travel and stay.

Increase in tourism activity may bring about an increase in demand for water in terms of added requirements by business facilities as well as by increased number of visitors in the District. Water use by tourism facilities is trended and significant changes are investigated for any implications on demand for water supply services.

A7.2 Forecasting Future Demand

Demand forecasting is important as it allows Council to understand the future demand for the service from an assessment of the demand drivers. Changes in population and household number influence the demand for water.

Below is an illustration of the projected trend of population and household numbers in the Timaru District on a medium growth scenario in the next 45 years.



TDC mainly uses hydraulic modelling to assess the impact of the demand drivers on the capacity of the existing water supply infrastructure.

Demand Scenario Modelling

Hydraulic models of the water supply pipe network and utilities enable TDC to:

- Determine accurately the existing capacity of the system
- Assess the impact of development in predicted growth areas
- Identify inadequate sections of the scheme
- Operate the scheme in a most efficient manner
- Identify scheme upgrading requirements
- Compare options for upgrading the scheme
- Identify options for alternative sources to supply the scheme

Demand information is stored via Telemetry (real time) and a database of data logger information that is downloaded manually through site visits (not real time PMAC software).

The information provides an output to “all mains hydraulic models” for most reticulated schemes. The networks are developed as “peak demand hydraulic models” and “average demand hydraulic models.” The hydraulic models break the performance of the reticulation into demand performance, fire fighting capability performance, performance impact of renewal and development, all of which have an influence on the sustainability of the scheme.

With the continual change of the schemes, the hydraulic models are part of a managed model calibration programme with each model recalibrated on a 4-year rotation if changes of the network are not significant (e.g., replacing like for like). The next model for calibration is the Downlands model which is scheduled for 2018.

Shadow or full calibration is carried out at any time when deemed necessary for making decisions on large capital outlay projects.

A7.3 MANAGING DEMAND

Demand Monitoring

Demand is monitored through telemetry data on water flow rate and volume. The information from monitoring demand provides Council the ability to:

- Ensure LOS are sustainably met
- Identify operational issues
- Meet legislative requirements
- Identify asset issues

Reporting on *average water consumption per person* and on *water loss* has become mandatory in Council’s Annual Report starting in 2015-16. TDC uses the information to

identify improvement works/activities to deliver the service more efficiently. Data in the last five years on these two measures are as follows:

Table 8: Water Use and Loss, 2012-2017

Period	**Demand Volume** (m^3)	**Average Residential Consumption** (li/person/day)	**Water Loss** ($m^{3)}$
2016/17	tbd	316	2,482,916*
2015/16	11,324,091	323	2,130,699*
2014/15	11,344,565	322	1,987,755*
2013/14	11,496,681	362	2,200,544**
2012/13	11,681,196	292	1,567,334***

* All drinking water supplies

** Urban water supplies only

*** Urban water supplies excluding Peel Forest

There are various other demand indicators that are monitored for this Activity and these are reported in the annual Water NZ National Performance Review (see Folder #F4416 National Performance Reviews).

Demand Management Approaches

Council manages demand through various approaches that are appropriate at the time of dealing with an issue. These consist of the following:

Asset-based approaches

These are basically the life cycle management practices discussed in Section A9 consisting of:

(i) Timely repair and maintenance of assets

(ii) Asset renewal

(iii) Scheme modification or upgrade

Non-asset approaches

(i) Leak Detection and Reduction

Leak detection and repair are high priority activities. As the reticulation network ages these techniques become more vital to minimise water wastage and reduce expenditure.

(ii) Pressure Management

Reducing pressure has an impact on total demand. There is a reduction in unaccounted-for water in addition to a reduction in burst mains. Pressure reduction also reduces water consumption within the home through reducing flow rates. The main opportunity is in the

Timaru system where pressures exceed 800 kPa. Pressure management is desirable in some rural schemes but may not be practical as the pressure in the network is needed to supply high elevation connections downstream of the high pressure areas.

(iii) Additional Water

While reduction of demand is the best alternative for sustainability, providing additional volumes of water is sometimes necessary.

This could either be through an increase in the volume at an existing source or additional supply from a new source. It is unlikely that additional water will be available from any river source without supplementing the river. It could be possible to transfer water within a catchment.

The option of finding additional water needs to be investigated fully in conjunction with the cost of treatment, trunk mains and reticulation upgrades.

(iv) Water Metering and Pricing

Water metering is an important tool in implementing domestic water supply demand management. Water metering enables consumers to be more aware of their water consumption and the value of water. It enables a more accurate assessment of total demand to be measured, unaccounted-for water identified, and realistic charging for the service provided.

Council has been implementing water metering strategies for extraordinary water users or users exceeding normal domestic usage within the District. All industrial consumers are metered. A continuation of this strategy is planned.

(v) Stepped Hosing Restrictions

Dry weather conditions may result in the short supply of water because of low river levels and excessive use by consumers. When this happens hosing restrictions are imposed to help minimise the demand for water. Restrictions are advertised in the newspaper and radio, on TDC's website and through social media. Restriction levels are as follows:

Level 0 • No restrictions. • Demands are being regularly monitored. • Use water wisely.
Level 1 • Daily demands are being closely monitored. • There is a requirement to minimise water usage. • No watering of lawns is permitted.
Level 2 • A single hose, hand held, or with a sprinkler or micro jet system may be used for a maximum of two hours per day between the hours of 6pm and 8am.

• No watering of lawns is permitted. • Commercial users are requested to monitor and reduce water usage.
Level 3 • A single hose, hand held, or with a micro jet system may be used for a maximum of one hour per day between the hours of 6pm and 8am. • No watering of lawns is permitted. • Commercial users are requested to minimise usage.
Level 4 • A single hose, hand held, or with a micro jet system may be used for a maximum of 30 minutes per day between the hours of 6pm and 8am. • No watering of lawns is permitted. • Commercial users are required to minimise usage.
Level 5 • Total hosing ban - no hose or sprinkler system may be used. • Consumers may carry water using a bucket, watering can or similar. • Commercial users are required to achieve water savings.

(vi) Consumer Education

Water Conservation is always encouraged but education is needed to make further advances. Water usage can be influenced with the use of more efficient technologies. Household appliances are now available with a water use rating as well as an energy use rating. When replacing appliances consumers are encouraged to include water efficiency in their considerations. Water conservation tips are available on the TDC website.

A7.4 Demand Management Strategy

A Demand Management Strategy will be developed that will provide a comprehensive and systematic approach in dealing with issues on ensuring sustainable levels of consumption, providing for future demand, efficient operation of the schemes and optimum utilization of assets. This is an item in the Improvement Plan.

A8 Asset Knowledge

A8.1 What assets do we have

Plant Assets

Plant assets collectively consist of the intakes, treatment plants, reservoirs, pump stations and telemetry, generally characterised as follows:

Intake - used for taking water, include an infiltration gallery (gravity or pumped), bore (pumped), or surface water intakes (gravity or pumped)

Treatment Plant (TP) – a facility for treating water prior to entering the reticulation, usually located at the intake.

Reservoirs – facilities for storage of water including in-ground concrete reservoirs with a membrane cover and/or occasionally with a membrane liner and cover, above ground concrete reservoir, or a group of small tanks. Reservoirs may have chlorinators to increase chlorine levels but they are not considered to be treatment plants.

Pump Station (PS) – for pumping water to a higher level. They are either at an intake or reservoir or within the pipework to boost pressure. A typical TDC pump station facility includes: pump, flow and pressure monitoring equipment, pipework, electrical switchboard, and telemetry. Some pump stations in TDC's treatment plants have PLC and generator or generator plug facility.

Telemetry - based at critical sites allowing recording of instantaneous outputs and sending alarms. The frequency of storing data depends on the use of the data. Monitoring to meet the DWSNZ requires data to be stored every minute. Most data is recorded every 15 or 60 minutes.

The telemetry computer (base station) is within the TDC Office in King George Place.

Table 9 below provides a list of the main Plant Assets within the TDC's 12 water supply schemes.

Land Assets

Only land owned by TDC is considered assets for the Water Supply Services. Where a facility is on private land or Crown Land the TDC has an informal easement to access and maintain the facility site. Land maintenance is covered within the budget for the facility situated on the land.

The Pareora River Scenic Reserve is vested in TDC to enable the management and operation of Timaru Intake on the Pareora River. The 206 ha reserve include native bush, river flats and the Pareora River. Some native plants have been recently discovered within the reserve. Being a reserve, there is a requirement under the Reserves Act 1977 to have a management plan. This Plan (TRIM document #160783) was developed in 2003 and has been submitted to the Department of Conservation. The budget for reserve allows for pest control, weed control and limited planting aimed at enhancing the river to compensate for the reduction in water volume.

Table 9: Water Supply Plant Assets

SCHEME	FACILITY	INTAKE	TREATMENT	PUMP	STORAGE (m3)	TELEMETRY	LAND STATUS*
1. Beautiful Valley	Intake	River	x	x	25	x	P
2. Downlands	Te Ngawai TP	Infiltration gallery	Chlorine	√	x	√	C
	Waitohi TP	Infiltration gallery	Chlorine	√	x	√	C
	Pareora TP	Bore	UV and Chlorine	√	120	√	TP = R Reservoir = P
	Springbrook TP	Bore and infiltration gallery	Chlorine	√	122	√	DW
	Camerons Pump	x	Chlorine	√	25	√	DW
	Taiko Reservoir	x	Chlorine	√	5700	√	DW
	Clelland Reservoir	x	Chlorine	x	1800	√	DW
	Waitohi Reservoir	x	Chlorine	x	2800	√	DW
	Sutherlands Reservoir	x	Chlorine	x	1100	√	DW
	Camerons Reservoir	x	Chlorine	√	2800	√	DW
	Cannington Pump	x	x	√	x	x	R
	Harts Tanks	x	x	x	67	√	P
	Davison Road Meter	x	x	x	x	√	R
3. Geraldine	Geraldine TP	Bores	UV and filters	√	x	√	DW
	Geraldine Reservoir	x	x	x	2275	√	DOC
	Tripp St Pump	x	x	√	x	x	R
4. Orari	Nil						-
5. Peel Forest	Intake	Spring	x	x	x	x	P
	Treatment Plant	x	UV, Chlorine	x	120	√	P
7. Pleasant Point	Pleasant Point TP	Bores	UV	√	136	√	DW
	Pleasant Point Emergency Source	Timaru (Opihi)	x	x	x	x	R
8. Rangitata – Orari	Intake	River	x	x	x	√	C
9. Seadown	Seadown Intake and Treatment Plant (Mill	Bore	UV and Chlorine	√	500	√	DW

SCHEME	FACILITY	INTAKE	TREATMENT	PUMP	STORAGE (m3)	TELEMETRY	LAND STATUS*
	Road)						
10. Te Moana	Intake	River	Sand filter	x	x	x	DW
	Mees Road TP	x	Chlorine	x	x	√	R
	Gapes Valley Pump	x	x	√	x	√	R
	Pleasant Valley Pump	x	x	√	x	√	P
	Woodbury PS	x	x	√	x	√	R
11. Temuka	Spring Intake	Infiltration gallery	x	x	x	x	P
	Temuka Reservoir and Treatment Plant	Bores	UV and Chlorine	√	1600	√	DW
	Orari Pump Station	Bore	x	√	x	x	DW
12. Timaru	Pareora Intake	River	x	x	x	√	Rs
	Opihi Intake	Infiltration gallery	x	√	x	√	DW
	Claremont Reservoir and TP	x	Ozone, Chlorine and pH Correction	√	220,000	√	DW
	Rosewill Pump Station	x	x	√	x	√	DW
	Gleniti Reservoir	x	Chlorine	√	7000	√	DW
	Gleniti Pump	x	x	√	X	X	R
	Washdyke Meters	x	x	x	x	√	R
13. Winchester	Winchester	x	Source and TP decommissioned in 2016	√	240	√	DW
All	TDC HQ	-	-	-	-	√	TDC

SCHEME	FACILITY	INTAKE	TREATMENT	PUMP	STORAGE (m3)	TELEMETRY	LAND STATUS*

DW TDC owned and administered by D&W Unit
P Private
C Crown (usually riverbed)
R Road Reserve
DOC Department of Conservation
Rs Reserve
TDC Land owned and administered by TDC property

Reticulation Assets

The water supply reticulation network covers the pipeline from the source to the service connections at the consumers point of supply. Tables 10 and 11 below show a summary of information on the Timaru District water supply reticulation network. The reticulation asset information has a confidence rating of 3 (Refer to NPR document).

Table 10: District Wide Water Mains Diameter Profile

Diameter (mm)	Length (m)	% to Total Length
0-049	1,055,475	57%
050-099	262,169	14%
100-149	192,779	10%
150-199	140,930	8%
200-249	25,181	1%
250-299	24,988	1%
300-399	67,546	4%
400-500	45,934	2%
500-599	35,621	2%
600	3,095	0%
Total	**1,853,719**	**100%**

Table 11: District Wide Water Mains Material Profile

Material	Length (m)	% to Total Length
PVC	1,007,649	54%
CC	7,738	0%
PE	269,956	15%
AC	267,151	14%
CI	85,553	5%
ST	205,405	11%
UNKNOWN	10,267	1%
Total	**1,853,719**	**100%**

A8.2 ASSET CONDITION AND PERFORMANCE

Plant Assets

The condition of the plant assets is usually dependent on age. The expected life of plant assets are shown in the Table below.

Table 12: Water Supply Plant Assets Effective Life

ASSET	EFFECTIVE LIFE (yrs)
Pumps	15
Telemetry	15
PLC	10
Buildings	50
Chlorine Dosing	10
UV	15
Ozone Dosing	20
Storage Tanks	30
Reservoir Cover	20
Reservoirs	50-100
Reservoir Roof	30
Switchboards	30
Instrumentation	5-10
Well, Infiltration Gallery	40-50
Pipework - Site	50
Pipework - Treatment	15-20

The condition is also determined by the ability of the plant to perform an output. These outputs are monitored on a continuous basis e.g. pressure produced by a pump. Periodic checks are carried out on the assets and trended allowing a visual display which can alert to a change in performance.

With the exception of infiltration galleries, bores and submersible pumps and in ground reservoirs, most assets are situated above the ground and are readily accessible for inspection. Pump stations and treatment plants are visited regularly, often at least weekly. During these visits, an informal inspection and listening to equipment occurs giving an indication of the condition of these assets along with the carrying out of maintenance activities. This informal inspection procedure is currently being carried out by the operators as part of their routine activities in operating the schemes.

Report of a condition assessment of assets prepared in 2012 is in TRIM document #829869.

As an improvement in practice, a Condition Assessment Framework for Water Plants and Facilities will be developed which will define a more systematic approach in monitoring the condition of the assets. It will also provide a more robust data for planning of necessary renewals, replacements or upgrades of plant assets and facilities.

Plant performance is measured in a number of ways. These include:

- Operational Records. Staff visits most facilities regularly, often for water sampling, or analysis reasons. These visits may detect issues.
- Maintenance records. On-going maintenance issues are a measure of plant performance that can result in further investigation.
- Telemetry. Outputs from a facility with telemetry are monitored on a continuous (15 minutes) basis. This information is trended. If an output passes through an alarm level, the operator is alerted immediately. These alarms may indicate non-performance of an asset at the facility but may also indicate leakage or high demand within the reticulation.
- Water Quality Monitoring. Non-performance of a treatment process will show up with water quality monitoring. This can be via telemetry or from the water sampling program.
- Professional Services are commissioned when considered necessary to focus on a condition assessment of plant to augment the overall plant performance and for the development of plant renewal strategies.
- Periodic checks on performance and visual inspections by experienced personnel, e.g. switchboards are inspected annually using infrared cameras.
- Maintenance by specialised contractors.
- Age of the asset.

Reticulation Assets

TDC have taken a bottom-up approach for pipe condition grading (out of the NZIAGG). The condition of the reticulation is based on physical sampling of pipes in various categories (i.e. combination of year of installation, size, material, etc). Incidents such as pipe bursts, service leaks (proactive leak detection program) and hydraulic modelling are used to assess condition against service standards. The condition data goes into the asset information system and used as part of the renewal criteria for pipes. The 2008 and 2014 Pipe Condition Assessment Reports by Opus are in document # F7286. Table 13 provides a summary of the effective life of water mains.

The condition of other assets such as valves and hydrants are assumed to be the same as the pipes because these assets are renewed at the same time as the renewal of the water main. If these assets fail before the scheduled pipe renewal, they are replaced as part of the maintenance program.

Table 13: Water Mains Effective Life

Material	Code	Effective Life (Years)
Asbestos Cement	AC-38,	30
	AC-50	30
	AC-60	30
	AC-75	43
	AC-80	43
	AC-100	65
	AC-150	65
	AC-200	80
	AC-225	80

	AC-250	80
	AC-300 to 600	100
AC Blue	AC-B-100	65
	AC-B-150	65
AC Fibrolite	AC-F-75	53
	AC-F-100	65
	AC-F-150	65
	AC-F-200	80
	AC-F-450	100
AC Italite	AC-I-100	60
	AC-I-375 to 450	100
Cast Iron	CI	150
	CI-350	250
	CI-375	250
	CI-400	250
	CI-450	250
Concrete	CC-100	50
	CC-150	50
	CC-200	65
	CC	65
Reinforced Concrete	CC-RF	100
Polyethylene	PE-HD,-MD,-LD	100
PVC	PVC, UPVC,MPVC, OPVC	100
Steel	ST, ST-BL	100
Concrete Lined Steel	ST-CC	80
Galvanized Iron	ST-GL	50
Spiral Welded Steel	ST-SW	50

The reticulation performance is monitored to provide input into the Council's lifecycle management strategies. Maintenance information of programmed and reactive maintenance is captured against individual asset components. These records validate asset attributes which impact on the confidence of the data held in the AIMS. The records are also used to provide spatial verification in the Council's GIS.

Fire Fighting Capability

The urban network was designed to be able to deliver a minimum 25l/s firefighting flow in all urban areas. However there are several factors that could reduce the firefighting flow in the pipe that may not meet the design such as leakages and deterioration in the pipe as the pipe age. However, as part of the renewal and upgrade to the reticulation, it will be designed to deliver a minimum of 25l/s to residential areas and up to a minimum of 50l/s to critical areas such as hospitals and schools.

Businesses that require the extra capabilities due to activities on the site are required to have their own fire fighting systems.

Currently the gazetted fire district covers the approximate urban boundaries. There are no major discrepancies between the Fire District boundaries and the area covered by hydrants.

The Council has provided the Fire Service with a Water Tanker to cater for back sections and other small sections not covered by a hydrant. Some individual streets within the reticulated area are without hydrant coverage, as the sections are not developed to date. Hydrants will be installed as and when required by development.

NZ Fire Service has a programme of regular testing of Fire Hydrants. TDC rectifies any maintenance issues. There are no issues outstanding.

A8.3 DATA CONFIDENCE

In general, condition assessment of above-ground assets is largely informal but being above-ground these assets are more accessible and can be checked routinely, thus mitigating failure risks. We have good confidence in the condition data on these assets. Developing/adopting a more formal protocol for plant/facilities condition assessment is identified as an improvement action to be carried out in the short term.

There is also good confidence in the condition data for pipes with about 98% of the network already assessed. However it is acknowledged that levels of accuracy of data may decline with the age of the data (i.e., date when the assessment/survey was undertaken). Due diligence is exercised when using older data. Field validation is carried out as required to confirm asset condition before major works are undertaken.

A9 ASSET LIFE CYCLE MANAGEMENT

Council manages the life cycle of its water supply assets through operation and maintenance planning for optimal asset utilization, and the identification and programming of capital works (i.e., asset development, renewals, upgrades, disposal) that will sustainably deliver the required level of service. It follows asset life cycle management framework illustrated in the diagram below:

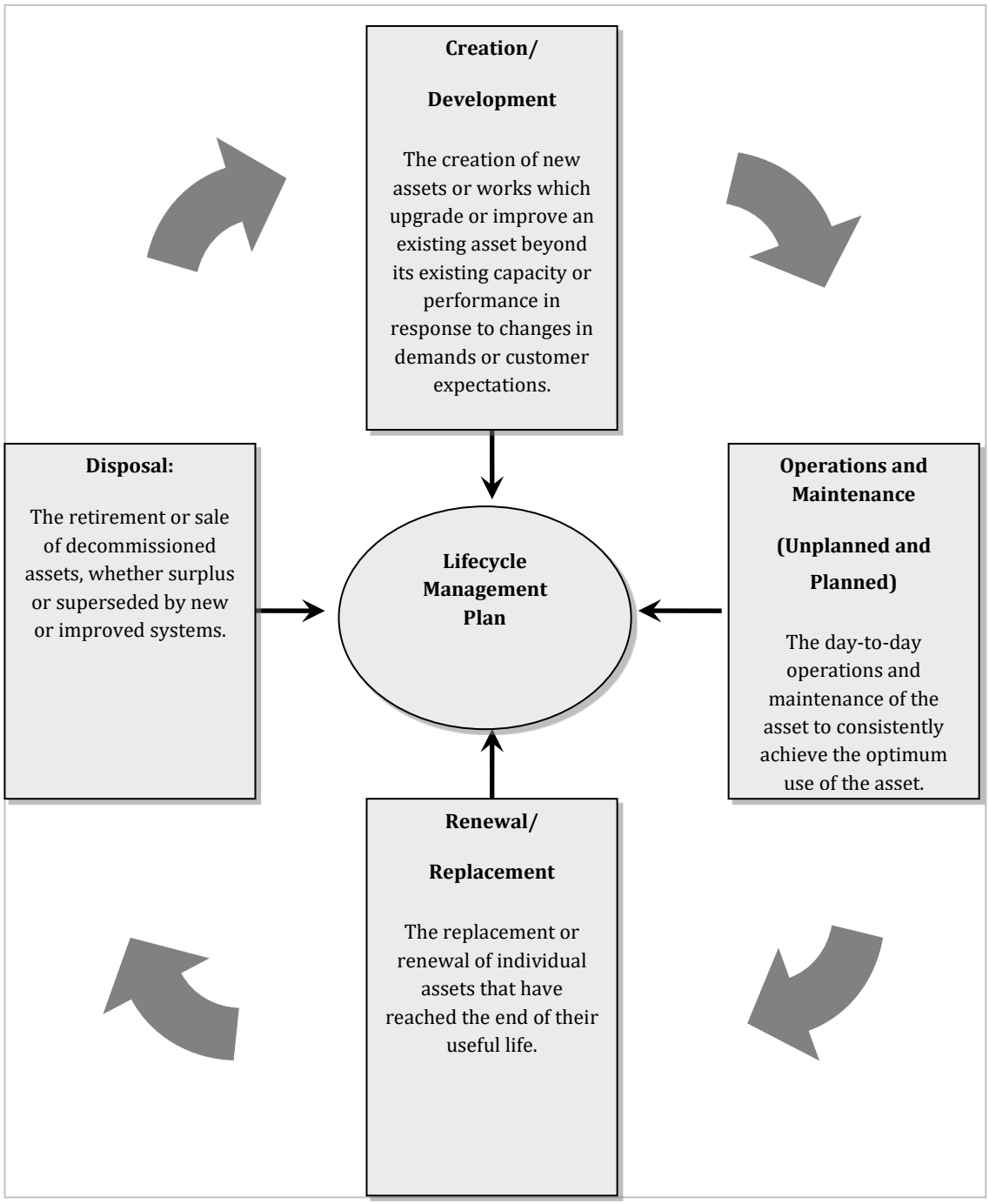


Figure 5: Life Cycle Asset Management Framework

Council's asset life cycle management aims to:

1. Provide and maintain assets economically and deliver services affordably
2. Deliver the following results:
    - Achieve the asset's service potential
    - Achieve customer LOS
    - Achieve health and safety standards
    - Reduce Council's exposure to risk from unforeseen asset failure

A9.1 Operations and Maintenance Planning

Operations cover the day to day activities that Council carries out to utilise the assets in delivering the required levels of service. Operational processes include maintenance or repair activities which are necessary to keep the asset operating.

Operations and Maintenance Strategies

1. Maintain existing assets to:
    - Achieve their service potential through efficient operation
    - Achieve customer levels of service
    - Achieve health and safety standards
    - Achieve legal compliance

2. Operate assets in accordance with defined procedures and standards including:
    - Water testing programme to monitor compliance with NZ Drinking Water Standards
    - Supervision for treatment and pump stations
    - Audits on contract compliance
    - Backflow prevention surveys of industrial and commercial properties
    - Safety audits to ensure compliance with the Health and Safety in Employment Act and related policies

3. Optimise asset management practices and decision making by:
    - Implementing Hansen AIMS in all schemes
    - Documenting and developing business processes
    - Collecting asset management data
    - Monitoring flows to provide records of water usage
    - Carrying out surveys to determine the condition and decay rates of materials
    - Carrying out inspections in response to excessive maintenance trends
    - Monitoring the effectiveness of all preventative maintenance programmes and modify where necessary

4. Minimise asset ownership costs by:
    - Considering all life cycle costs when evaluating asset renewal/acquisition options
    - Conducting power audits
    - Investigating new technologies

- Competitive tendering procedures for asset construction works
- Reducing water wastage and undertake leak detection surveys

5. Conserve water by:
   - Water leakage and wastage surveys
   - Water usage surveys during periods of peak usage
   - Public education initiatives

6. Manage risk exposure by:
   - Maintaining up-to-date fault detection systems and providing a prompt and effective response to system failures and pollution incidents
   - Maintaining appropriate insurance cover for key assets
   - Undertaking structural checks of key assets
   - Installing system backups to minimise risk of interruption to supply

7. With respect to asset condition and functionality, the overall maintenance strategy is to maintain the existing levels of service in a cost efficient manner.

Activities

(1) Core Operational Activities

TDC's in-house water plant operators and service technicians carry out the core operation of Council's water supply schemes. Activities include the following:

- Administration/Engineering
- Contract preparation/supervision
- Data management
- Resource consent monitoring
- Water quality monitoring
- Facilities operation
    - Headworks
    - Pump stations
    - Treatment plant
    - Reservoir
    - Supply main – sources to reservoir
- Meter reading
- Telemetry check and monitoring of alarms
- Pipe network performance monitoring
- Leakage control
- Backflow prevention
- Public liaison

Assets are operated in accordance with operations manuals, procedures and defined processes, and to comply with relevant Acts, Regulations, Bylaws and Statutory Plans.

(2) Maintenance

The planned maintenance of the plant is carried out by TDC operators during routine visits and who will use specialist assistance when necessary.

Maintenance of the reticulation is performed both in-house and by contract under Maintenance Contract 2080. Read details in document #812087.

- The maintenance contract requires all water shut downs to be reported to Council.
- A procedure to ensure the MOH is notified if the outage exceeds 8 hours has been established.
- Council's responsibilities cover pressure and flow management, leak detection, contract supervision and audit, public liaison, and approvals for new connections.

The planning of maintenance is carried out by TDC staff in conjunction with contractors.

- The role of TDC staff is to identify the preventive maintenance requirements of the schemes and organise the reactive maintenance so that the work is carried out in a cost effective and timely manner.
- Preventive maintenance for the networks is issued once at scheduled times during the year and in some areas, twice or thrice yearly.
- The proactive maintenance packages are issued in bulk for "like" assets to City Care Limited currently contracted to TDC, who respond and report back to Council via technology-based systems. The information returned is held in TDC's Asset Information Management System (AIMS).
- Reactive maintenance is planned for by utilising technology and mainly City Care staff under the direction of Contract 2080. The contract specifies the acceptable repair methods, the maximum response time, sterilisation and sampling requirements as well as qualification requirements.
- The Service Request System that tracks customer complaints and requests for service is used for planned maintenance and inspection programmes. The reporting generated from the information returned to Council's AIMS is used to support the agreed levels of service, e.g., response times to be met within a certain period of time. Another example of the data use is analysis of chronic or extensive failures. All feedback from the Contractor is captured and analysed and effectively addressed.

A9.2 CAPITAL WORKS PLANNING

This Section defines the strategies TDC follows in the planning of capital works for this Activity. Capital works include asset renewals/replacements, asset upgrades/improvements and new capital projects. Asset disposal is also covered.

Key capital projects for the next 10 years have been identified for particular schemes and are discussed in Part B.

A9.2.1 Asset Renewal Strategy

Renewals planning follow cyclic renewal strategies that provide for the progressive replacement of individual assets that have reached the end of their useful life. The rate of asset renewal is intended to maintain the overall condition of the asset system at a standard, which reflects its age profile, and ensures that the Community's investment in the District's water supply infrastructure is maintained.

The level of expenditure on cyclic asset replacement varies from year to year reflecting:

- The age profile of the system (asset life)
- Physical condition assessment of assets (sampling, CCTV, etc)
- Criticality of the asset
- Maintenance repairs
- Customer service issues
- Performance monitoring (e.g., leak detection, hydraulic modelling)

Table 14 and Figure 6 set out the details of the renewal strategies and the decision flowchart respectively.

Table 14: Asset Renewal Strategy

Strategy	Objective/ Description
Identification of renewal needs	Renewal/replacement needs are identified by analysing condition reports, maintenance records, AIMS data (asset failure and expenditure history), hydraulic performance, leakage, water quality test reports, service request records, telemetry and observations of staff and contractors. Renewal forecasts are based on an assessment of remaining asset lives. Industry base lives are used as a starting point and continually reviewed during condition and performance monitoring of plants and facilities, and the physical sampling of pipes. Telemetry alarms and customer feedback are essential for monitoring asset performance and achieving levels of service. The alarms and feedback are quite often the early warning system that a problem maybe developing and can lead to more formal investigations. Asset renewal programmes are prepared from specific renewal needs identified from the above information and assessed in conjunction with other departments within TDC (e.g Land Transport Unit) to coordinate the renewals. Long-term asset renewal programmes are prepared from the remaining life profiles for the assets.

Prioritisation of renewal projects	Renewal projects are assessed and prioritised based on the asset criticality, condition, maintenance history and frequency to the asset, estimated remaining life and future capacity requirement, and investment to the asset with the option of repair compared to the option of renewal. Decisions on renewal works consider the short and long-term effects on the operating and structural integrity of the system. Renewal works are designed and undertaken in accordance with industry standards (or known future standards) and system design loadings. Short-term renewal priorities are reassessed annually taking account of additional information that becomes available.
Deferred Renewals	The quantity and impact of deferred renewals (if any) is tracked. Plant assets such as pumps (15 year life) and electronics (5 year life) are usually run to failure. This means that budgets may not be spent in the year expected. A critical asset will be purchased and held in stock awaiting failure. This results in budget underspending and carry forwards. The Council recognises that although the deferral of some items on cyclic renewal programmes will not impede the operation of many assets in the short term, repeated deferral will create a future Council liability. As Council currently funds asset renewals from depreciation deferred renewals are not expected or are minimised. Asset renewals may be deferred if there is a significant project planned that may benefit from a different asset within several years.

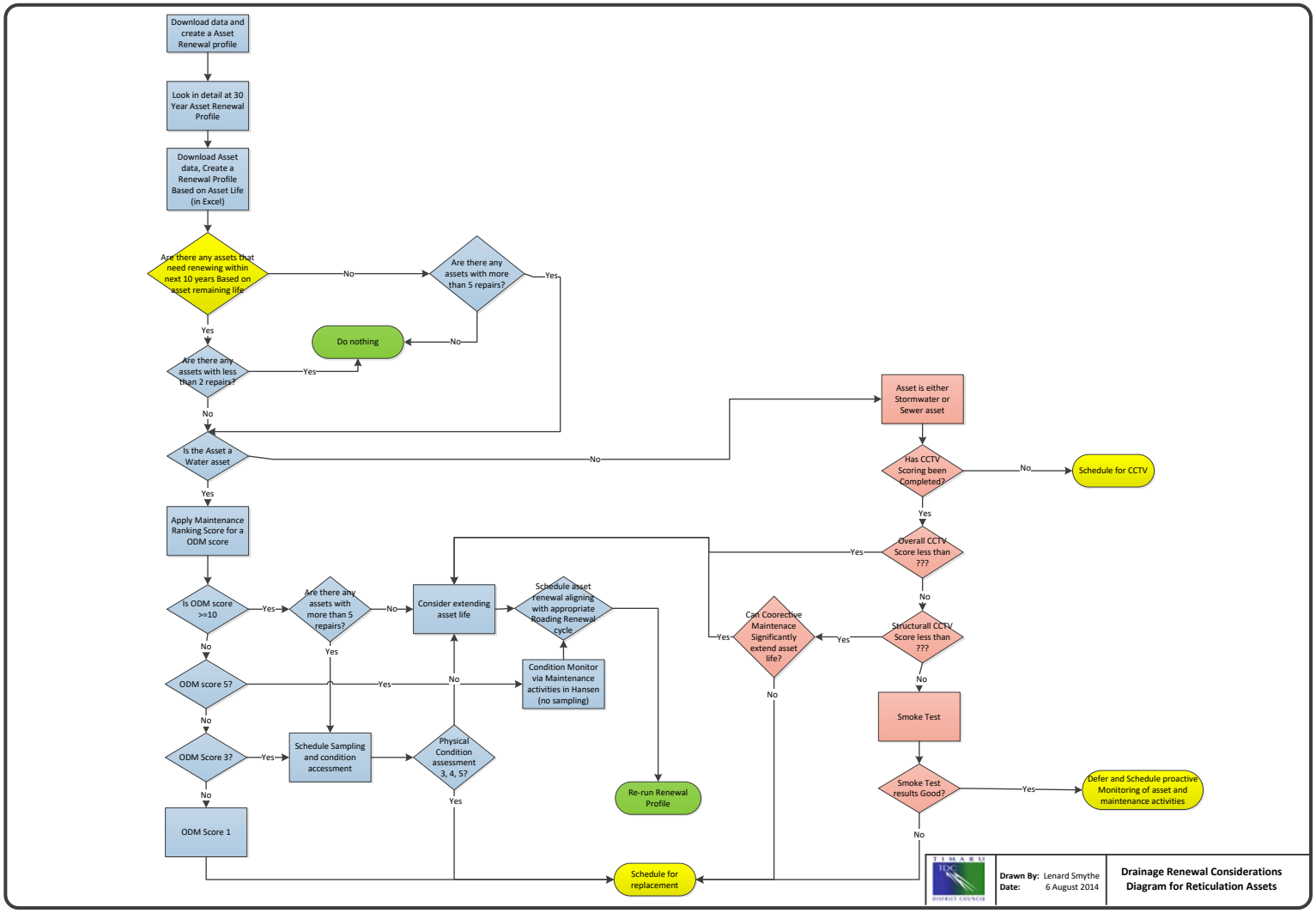


Figure 6: Pipe Renewal Decision Flowchart

A9.2.2 Asset Upgrading/Development Strategy

The water supply systems will be developed to meet community expectations, technical and environmental standards and growth projections over the next 10 years.

Upgrading works and/or acquisition of new assets are identified on the following basis:

- Growth - ability to meet the most likely demand projections.
- Regulatory - expenditure needed to meet new regulations, for example modified resource consents as a result of Resource Management Act or water quality requirements.
- Operation efficiency - to reduce costs and improve efficiency.
- Consumer demand.
- Resilience to security of supply.

The selection criteria for the prioritising and programming of assets development projects is a function of Council preference, consideration of risk, costs and benefits, affordability and ranking with other projects.

Project approvals will be supported by an economic appraisal using cost/benefit analysis techniques which take into account:

- Capital costs of various options.
- Any change in net annual operating costs.
- Any change in annual maintenance requirements.
- Any salvage value of existing assets or components.

Within a subdivision the developer shall meet Council standards and specifications. On satisfactory completion the public portion of these assets will be vested in the Council.

A9.2.3 Asset Disposal Strategy

Council's strategy is to develop asset management systems and asset condition/performance data to allow better planning for the disposal of assets through rationalisation of asset stock or when assets become uneconomic to own and operate.

Assets may become surplus to requirements for any of the following reasons:

- Under utilisation
- Obsolescence
- Provision exceeds required LoS
- Uneconomic to upgrade or operate
- Policy change
- Service provided by other means, for example private sector involvement
- Potential risk of ownership (financial, environmental, legal, social, vandalism)

When considering disposal options all relevant costs of disposal are considered, including:

- Evaluation of options

- Consultation/advertising
- Obtaining Resource Consents
- Professional services, including engineering, planning, legal survey
- Demolition/making safe
- Site clearing, decontamination and beautification

TDC ensures that all pipeline renewals have a corresponding disposal either through the pipes being removed and disposed of at the landfill, or being left in the ground if the services are renewed using trenchless techniques or the asset is replaced in a new location. A work order report records each disposal and the details put in the AIMS database.

Similarly, replacement of components at treatment plants and pump stations usually involves disposal of those items being renewed/upgraded. These are disposed of in an appropriate manner with pumps and metal components sold for scrap metal.

Decommissioned assets, whether surplus or superseded by new improved systems, are disposed of through sale of surplus land, decommissioned pipes, mechanical and electrical equipment, and the demolition of structures.

A9.3 RISK MANAGEMENT

Background

Managing the risks associated with the Water Supply Activity is in accordance with Council's **Risk Management Policy** which adopted the Joint Australian New Zealand International Standard Risk Management – Principles and Guidelines (AS/NZS 31000:2009). Details of the Policy are in document #832395.

ISO 31000 identifies the following components of, and relationships within, the risk management framework shown in Figure 7 below.

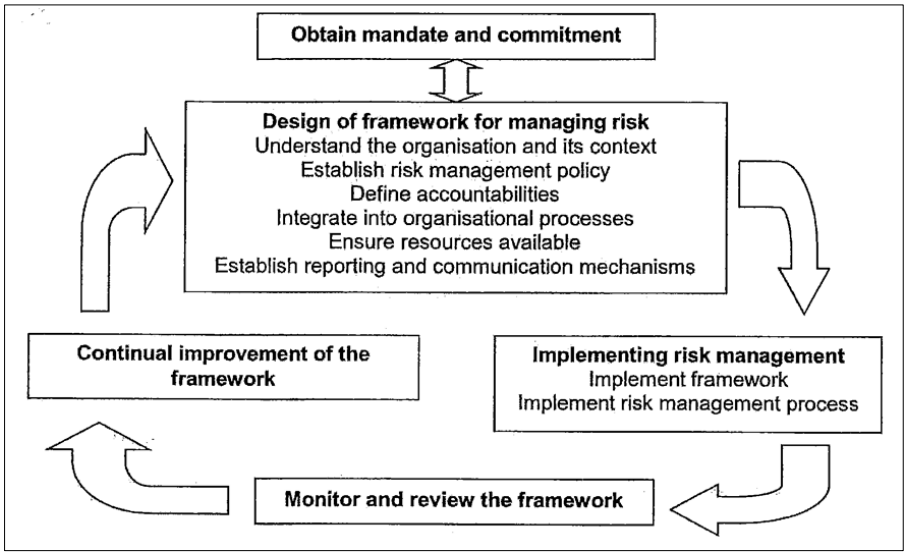


Figure 7: Risk Management Framework

ISO 31000 further identifies the following structure for the risk management process within the framework shown in Figure 8 below.

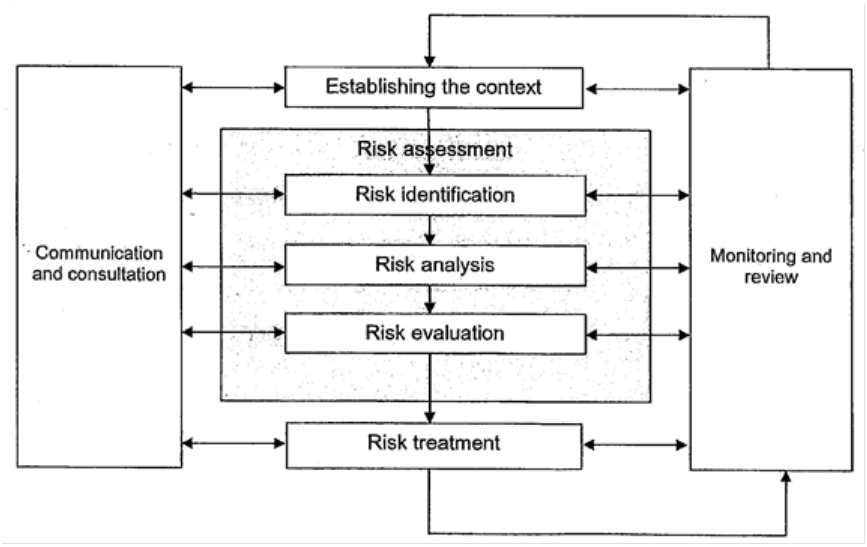


Figure 8: Risk Management Process

The Risk Management Plan for Council's 3 Waters (Water, Sewer, Stormwater) provides a detailed assessment of the sources of risks for the Water Supply Activity, including risk rating, consequences, treatment options, and mitigation measures (document #808045).

In summary, there are four categories of risk sources identified in TDC's water supplies, namely:

1. External - events largely beyond the control of the organisation like natural events and people.

2. Physical (Asset and Equipment) – events mainly associated with the failure of the assets and equipment.

3. Service Delivery – events largely caused by breakdown of operational processes, failure from service provider/contractors and human factors.

4. Management and Planning – events associated with human resource, designs, planning projections and assumptions and financial risks.

Consequences from the risk events could range from insignificant or minor to major or catastrophic. These were assessed in terms of costs to public health, corporate image, environment, health and safety, third party damage or loss, and loss of revenue.

Treating the risks involves balancing what needs to be done and the cost of doing it. TDC's treatment options include the following:

- Avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk
- Taking or increasing risk in order to pursue an opportunity
- Removing the risk source
- Changing the likelihood
- Changing the consequence/s
- Sharing the risk with another party or parties
- Retaining the risk by informed decision

Most of the treatments identified in the assessment report are already existing business practices (e.g., aging assets are programmed for renewal, works are done by approved contractors, Water Safety Plans are developed and implemented, critical assets are identified, etc). Measures that require significant cost to implement (e.g., additional treatment, additional capacity, etc) are being programmed. Specific details on risks and treatments associated with particular water supply schemes are provided in Part B.

Water Safety Plans

The Health Act is a driver of the potable water supplies. Water Safety Plans (WSP) are required under the Health Act for drinking water schemes. The objective of a WSP is to ensure public water suppliers develop operational practices which will reduce the likelihood of contamination and to respond and minimise contamination events. Therefore, a WSP identifies the risks associated with a public water supply and provides a plan to manage those risks. It does not measure compliance with the DWSNZ 2005.

The WSPs are required to be approved by a Drinking Water Assessor (DWA).

Key aspects that are audited annually by a DWA are:

- WSPs are current. These have a life of 5 years and are audited twice in their life.
- Compliance with DWSNZ
- Duty in relation to supply of drinking water (outages >8 hours must be reported to MoH)
- Duty to take responsible steps to contribute to protection of source of drinking water
- Duty to keep records and make them available
- Duty to investigate complaints (quality and wholesomeness)

WSPs are currently internal documents held in TDC's corporate document system. Below is the status of TDC's Water Safety Plans.

Table 15: Status of Water Safety Plans

Scheme		**Status**	**Document #**	**Review Date**
Geraldine		Approved	839444	October 2018
Peel Forest		Approved	847903	2022
Pleasant Point		Approved	846002	November 2018
Temuka		Approved	821708	July 2018
Timaru	Timaru urban	Approved	556590	August 2017
	Pareora Pipeline	Not Yet developed		
Winchester		Approved	927325	Refer Temuka
Beautiful Valley (stockwater only)		Not required	n/a	n/a
Downlands	Pareora	Approved	835437	2018
	Rural	Approved	787287	July 2019
	Hadlow	Approved	872129	April 2019
	St Andrews (Springbrook)	Approved	935998	April 2020
Orari (supplied from Temuka)		Refer Temuka	Refer Temuka	Refer Temuka
Rangitata Orari (stockwater only)		Not required	n/a	n/a
Seadown		Approved	858144	February 2019
Te Moana		Approved	866698	April 2019

Barriers to Deterioration of Water Quality

Water supply management addresses barriers. The barriers used by TDC are:

Source

TDC is involved in minimising any deterioration of the water quality of the source.

Staff are actively involved in catchment groups. These groups will consult with the OTOP Zone Committee on the methods to maintain or improve water quality, e.g. nitrate management within a catchment.

Staff input into resource consent application for activities within a Community Water Supply Protection Zone that may impact water quality.

No physical barrier is currently used.

Disinfection is currently the only barrier in use. To date water supplies have been confirmed as requiring 3 log treatments. Several remain to be assessed.

Summary of Significant Risks

For the current AMP period, the following risks remain as priority concerns in managing our water supplies:

1. High Demand

Demand for water at times can exceed the capacity of the infrastructure in some schemes, like pumps and pipe capacities.

This can in effect be “self regulating” in that the demand is limited to the capacity of the infrastructure. However, this poses risks with the potential of some properties receiving no water, with associated health risks and inconvenience, insufficient pressure being maintained in the reticulation, storage volumes being reduced, and insufficient fire fighting supply.

Or, the demand (and supply) can at times exceed the consented volumes or flow rates. The risk associated with this is non-compliance with resource consents conditions and subsequent prosecution, or a throttling of supply to meet the consent requirements and subsequent excess demand issues as noted above.

2. Consent Restrictions

Restrictions on abstraction consents limit the amount of water that can be taken during low river flow periods for some schemes. This can significantly reduce the amount of water available to meet demand. There is a significant risk that severe restrictions and rationing might be imposed on individual water users, with potentially significant economic implications. Currently, this level of restriction in Timaru is assessed as having a 5% chance of occurring in any one year.

Again, the risk associated with this event is consent non-compliance or excess demand consequences.

3. Water Availability

The potential exists for the availability of source water to be insufficient to meet consented abstraction limits and therefore not meet demands particularly during extreme dry weather conditions.

4. Natural Disasters

Although the probability of occurrence is low, natural disasters such as earthquakes, storms, floods, snow storms, winds and tsunamis do present a high risk. *See succeeding topic on "Emergency Response Management".*

5. Financial Risk

The Health (Drinking Water) Amendment Act requires all practicable steps to be taken for drinking water to comply with the DWSNZ. This will require significant water treatment upgrades at a number of water supply sources throughout the District. This in turn will result in significant cost increases for some consumers. The financial risk is that these costs that are a result of requirements of legislation may be unaffordable to consumers and may be a burden on ratepayers and a disincentive for people to live, work, play and do business in the District.

Another financial risk relates to the potential departure of high use industrial consumers. The water charges are based on an annual charge (for each scheme) for a domestic connection and use, with volumetric charges made for industrial water users that consume in excess of a typical domestic connection. Significant revenue is obtained from industrial volumetric charges.

A large proportion of the cost to supply and deliver the water is fixed, which will be incurred regardless of the total volume of water supplied. Therefore if a high use industrial consumer were to depart, these fixed costs would result in higher annual and volumetric charges.

6. Climate Change

The risks associated with climate change relate to the availability and quality of source water, such as an increasing frequency of drought resulting in the probability of severe restrictions being imposed increasing above the 5% chance of occurring in any one year. More frequent and intense rainfall can also affect the quality of raw water making it more difficult to treat to drinking water standards.

7. Operational Risks

The Water Safety Plans have identified inadequate treatment, inadequate storage and backflow as significant risks in TDC's large drinking water supplies. Details are in Part B discussion of particular scheme risks.

Risk Treatment

The following comprise the major courses of action that will continue to be pursued to mitigate or eliminate the significant risks identified above:

- Consumer education on water conservation
- Imposition of hosing bans and other water restrictions
- Leak management programmes
- Monitoring telemetry and alarms
- 24 hour, 365 day call-out service
- Infrastructure development and renewals programmes
- Liaison with high water users
- Treatment process upgrades
- Implementing Water Safety Plans for drinking water supplies
- Backflow prevention/testing

Risk Analysis Process in Asset Renewal and in New Projects

Prior to renewal, upgrade and development of assets, risk assessment will be carried out to consider all necessary mitigation options that can be practically actioned to isolate, eliminate or minimise the identified risk. The risk covers from the construction throughout the life-cycle of the asset.

Risk to Critical Assets

A criticality rating is held in Hansen against all plant facilities and pipe assets. The criticality rating, as described in Table 16 below, is based on the degree of importance of the asset in relation to potential loss of service.

Table 16: Asset Criticality Rating Scale

Criticality Rating	Level	Description
A	High	Asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
B	Medium	Asset components that is important to the effective day to day operation of the system where redundancy or contingency should be available for restoration of service within a reasonable time.
C	Low	Asset components which can fail without affecting the operation and service and where repairs or renewal can be realistically deferred.

Criticality rating is used as a criteria in identifying renewal projects (refer to Section A9.2 Renewals Planning Strategy).

The full assessment report on criticality of water assets carried out in 2012 is in document #829869. Table 17, extracted from the criticality report, shows a summary of the criticality rating of water supply facility assets. These ratings will be reviewed and updated as part of the Improvement Plan (see Section A12).

Part B of this AMP identifies the critical assets associated with each water supply scheme and how they are managed.

Any water shutdown to Critical A watermain will be assessed by Timaru District Council Drainage and Water Engineer prior to approval of the shutdown to the contractor.

TDC's Land Transport Unit has been provided information on the critical water supply assets for consideration in their risk management/emergency response plan.

An initiative developing a GIS layer for TDC's critical facilities, including water supply plant facilities, is also in progress. This is led by Council's CDEM unit.

Table 17: Water Supply Facilities Criticality Rating

WATER SUPPLY SERVICES FACILITIES (Facilities)	Criticality		Condition Grading	Risk Level
	Score	Rating		
Beautiful Valley				
Beautiful Valley Intake	60	C	2	Insignificant
Downlands				
Springbrook Bore	72	C	1	Insignificant
Springbrook Treatment	122	A	2	Low
Springbrook Reservoir	122	A	3	Moderate
Tengawai Intake	106	B	3	Low
Waitohi Intake	90	C	2	Insignificant
Waitohi Treatment	122	A	2	Low
Waitohi Reservoir	122	A	2	Low
Camerons Reservoir	122	A	3	Moderate
Camerons Pump Station	90	C	2	Insignificant
Cleland Reservoir	110	B	2	Insignificant
Sutherlands Reservoir	122	A	2	Low
Taiko Reservoir	122	A	3	Moderate
Hart's Tanks (holmes station)	68	C	2	Insignificant
Pareora Bore	96	C	2	Insignificant
Pareora Treatment	146	A	2	Low
Pareora Reservoir	138	A	1	Insignificant
Cannington Pump Station	44	C	2	Insignificant
Geraldine				
Geraldine Bores	124	A	2	Low
Geraldine Treatment	156	A	2	Low
Geraldine Reservoir	170	A	2	Low
Peel Forest				
Peel Forest Spring Intake	60	C	2	Insignificant
Peel Forest Treatment	96	C	2	Insignificant
Peel Forest Reservoir	94	C	1	Insignificant
Pleasant Point				
Pleasant Point Bores	116	B	2	Insignificant
Pleasant Point Treatment	156	A	2	Low
Pleasant Point Reservoir	160	A	4	High
Rangitata Orari				
Rangitata Orari Intake	90	C	1	Insignificant
Seadown				
Seadown Bore	68	C	2	Insignificant

WATER SUPPLY SERVICES FACILITIES (Facilities)	Criticality		Condition Grading	Risk Level
	Score	Rating		
Seadown Treatment	118	B	2	Insignificant
Seadown Reservoir	122	A	2	Low
Te Moana			0	
Mees Road Treatment	122	A	2	Low
Gapes Valley Pump Station	44	C	2	Insignificant
Te Moana Intake and Filter	124	A	4	High
Tripp St Pump Station	60	C	2	Insignificant
Pleasant Valley Pump Station	44	C	2	Insignificant
Temuka				
Temuka Bores	124	A	2	Low
Temuka Treatment	170	A	2	Low
Temuka Reservoir	170	A	2	Low
Temuka Spring Intake	116	B	3	Low
Temuka - Orari Bore	116	B	1	Insignificant
Temuka - Orari Intake	116	B	2	Insignificant
Timaru				
Pareora Intake	150	A	3	Moderate
Opihi Intake	140	A	3	Moderate
Gleniti Reservoir	170	A	2	Low
Gleniti Pump Station	130	A	2	Low
Claremont Reservoir	170	A	3	Moderate
Claremont Treatment Plant	174	A	2	Low
Winchester				
Winchester Bores	96	C	2	Insignificant
Winchester Treatment Plant	146	A	2	Low
Winchester Reservoir	146	A	1	Insignificant

Resilience

TDC's defines its approach to resilience in infrastructure assets and services planning and management as: follows:

- Resilience is based on a design philosophy which acknowledges that failure will occur.
- Resilience requires early detection and recovery, but not necessarily through re-establishing the failed system.
- To be resilient, planning needs to look ahead and respond to both anticipated and unexpected changes.
- The design of infrastructure can help alleviate the risk from natural disasters.
- More accurate physical condition assessment of assets can improve targeting of renewals and increase resilience of the infrastructure networks.

Insurance of Assets

TDC's water supply assets are insured to the value of the cost to replace them. Insurance of the assets mitigates financial risks to TDC and increases resilience of the water service utilities to events that may damage the assets.

Emergency Response Management

The risk of disruption in services is an inherent element of water supply operations. Notwithstanding the mitigation measures in place, incidents may still occur that disrupt services for maybe a few hours, a few days, or for a much longer period of time. The impact of these incidents could be minor, or in serious cases catastrophic.

There is currently a draft Crisis and Emergency Response Management Guidelines for TDC's Drainage and Water Unit, which outlines the general considerations in responding to incidents or events. Depending on the scale of an incident, D&W may or may not have an overall leadership role in response management. In all cases, however, D&W will be involved in incident response, and will be managing an Incident Control Point. TDC's water supply operators are expected to be available on site to assist in response procedures.

The objectives of the guidelines are to:

i. familiarize TDC D&W staff of the relevant systems and procedures in place to deal with events that can cause disruption in water services and have significant adverse impact to the health of the community;

ii. increase readiness by all D&W personnel for crisis or emergency situations that have impact on the continuity of TDC's water services;

iii. clarify the roles and responsibilities of key D&W personnel who are expected to assist in emergency response operations;

iv. identify contingency actions and resources and options in dealing with various scale and scope of emergencies;

v. contribute to attainment of the aim of emergency management to prevent or reduce loss of life and property; and

vi. comply with legislation (Civil Defence Emergency Management Act 2002 - Section 60 Duties of lifeline utilities)

Overall, the focus of the guidelines is to ensure that proper procedures are in place, and personnel are adequately trained to perform response functions. (Read the full draft in document #930290)

A10 ASSET MANAGEMENT INFORMATION SYSTEMS

Information management for water supply services covers collection and management of asset data and customer service information from various sources and making the information available to users. Information is collected, processed, stored and maintained within various systems that make up the information network, as described below and illustrated in Figure 9. Some component systems are enabled for interfacing to facilitate data accessibility, validation, analysis and reporting.

Enhancement of system linkages and further system integration are items identified in the Improvement Plan of this AMP.

Asset Information Management System (AIMS)

Asset data management is primarily carried out using Infor Public Sector 8.5, previously Hansen 8, an asset management application for maintaining a register of assets and recording of information on assets.

Currently, the core data for assets in the AIMS underpins spatial representation of asset attributes and lifecycle information. This core data also provides the technical basis for the hydraulic modelling capability of the Council for the three waters.

Asset information data on all sewer, stormwater and water systems are held to a component level. Examples of the reticulation components are pipes, valves, rural water tanks, etc. The Plant information components typically consist of buildings, pumps, treatment facilities, instrumentation and telemetry.

Infor 8.5 records:

- Asset information such as size, type, age, which can be linked to the GIS spatial database
- Maintenance history including time, cost, and performance indicators
- Work Order Data
- Condition Data
- Criticality
- Risk of Failure data (to be held in the future)
- Resource Consent Conditions monitoring data
- Valuation Data

Data build-up is ongoing. The facility assets data is currently being checked to enable full use of the Infor System. All data are subject to on-going checks via work reports from maintenance activities.

Data Confidence

The AIMS data for the water schemes have been sourced from existing drawings and plans, which came from original records and as-builts. There is high confidence in the completeness of water assets data based on the quality of the original information, and

the numerous checks carried out during the transfer of this information, including GIS and software modelling programmes.

Corporate Information System

TDC currently uses Civica's Authority as its Corporate Information System. The following components of the system are relevant to the water supply activity:

- Financial and rating databases
- 24/7 Call-out Service where all complaints from the public can be reported at any time and day.
- Registers for:
  i) Backflow Preventors (protection of the water supply from contamination)
  ii) Water Scheme and Tank Database (demand management for all water schemes)
  iii) Water Billing (invoicing high users of water)
  iv) Infiltration and Private Water Leakage (capture and monitor sewer infiltration and private water leakage)
- Electronic document management system using the HPE Records Manager software (RM8). It holds electronic records of documents pertaining to water supply.

TDC website

- Hosts information on Timaru District's water supplies, such as briefs on water supply schemes, water fees and charges, backflow prevention, water metering, and occasional public advisories.

Drainage Drive (X:)

Software operational files, such as water models, are stored in a dedicated drive within the network.

Conference proceedings and various other reference/resource materials are also held in this drive.

Hydraulic Model

Council uses the InfoWorks Hydraulic Software to model water schemes in order to provide efficient and sustainable distribution of high quality water to the community, at an acceptable pressure and with minimal leakage losses. The InfoWorks software is a state-of-the-art network hydraulic modelling package being actively developed by Innovyze. The software is capable of modelling complex components such as pumps with variable speed drives and control valves with remote parameter inputs.

The models are used to assist in design, renewals and developments which can identify deficiencies in the networks and the impact that property development may have. Water

mains that have been identified as not meeting the required performance criteria are then scheduled for renewal/upgrade.

Hydraulic software models of the water supply pipe network and utilities are required to enable TDC to:

- Determine accurately the existing capacity of the system
- Scenario Modelling to assess the impacts of changes and predicted growth areas
- Identify inadequate sections of the system
- Operate the system in the most efficient manner
- Determine the impact of further development on the system
- Identify system upgrading requirements
- Compare options for upgrading the Water Supply System

The upgrades to resolve pressure and fire fighting issues are being confirmed through the water network models. The models have been developed and are regularly calibrated from data being collected with pressure data loggers distributed within the reticulation system. External assistance with the models has been sought through Consultants.

The TDC water supply model is a mature model and requires on-going development such as:

- Leakage and demand assessments
- Data logger and meter calibration (shadow calibration)
- Master model upgrading (full calibration)

Geographic Information System (GIS)

The information in the GIS database and the system's data transformation tools and analytical functions provide significant material for asset management and decision-making. An example is spatial data and network attributes imported from the GIS system into InfoWorks provide the basis for "All Mains" models (see Hydraulic Model discussion above).

Telemetry

Telemetry is installed in 10 of the 12 water schemes operated by Council. Telemetry data is used for water management applications, including water quality and equipment surveillance functions. Having data available in almost real time allows quick reactions to occurrences in the field. Also, historical telemetry data is relied upon for water model calibration. Other applications include leak detection in distribution pipelines and groundwater monitoring.

The current telemetry system measures the following and provides alarms that have been set for the system:

- Water level
- Pump operations
- Chlorine and UV level
- Water turbidity

- Water pressure
- Flow rate and volume
- Water Inflow and Outflow

Telemetry sites are polled every 15 minutes. Pre-set alarms are triggered on site in between polls, provided they are set to do so.

For compliance purposes, some sites record water quality and flow data every minute and then download the information to the master unit every hour. This information is not used for telemetry alarms or trends.

The telemetry data is transferred to the SQL (Structured Query Language) database daily at the Claremont server to make the repetitive information much easier to handle.

The DWSNZ requires water treatment data for continuous monitoring to be collected every minute and be readily available for 10 years. As sites of over 500 populations monitor a minimum of 5 functions the management of the data is critical.

Reports are automated daily for compliance and management purposes.

There are a number of preset reports. Customised report writing is also enabled.

Access to the website allows the reports to be re-run for any period. Steps to view a report:

- Website: http://10.6.62.14/icsc/
- Select reports
- Select report start time and report stop time
- Select the scheduled report

Water Industry New Zealand (WINZ) Database and Water Online

All water sample results are imported to the WINZ database. The majority of samples are taken for e-coli. However, at the time of sampling, measurements of turbidity, and within chlorinated system, FAC Calculations are made each quarter to determine bacterial compliance against DWSNZ. In addition, UV transmittance, turbidity frequently ask questions, nitrate and cryptosporidium are also inputted. Information collected via telemetry every minute for protozoal compliance is summarized every quarter and a compliance questionnaire completed. Protozoal compliance is recorded within WINZ.

As from 1 July 2017 this information is held in an updated system Water Online, a web based equivalent to WINZ. This will allow DWA or MoH to access the information directly. The historical data will remain with WINZ.

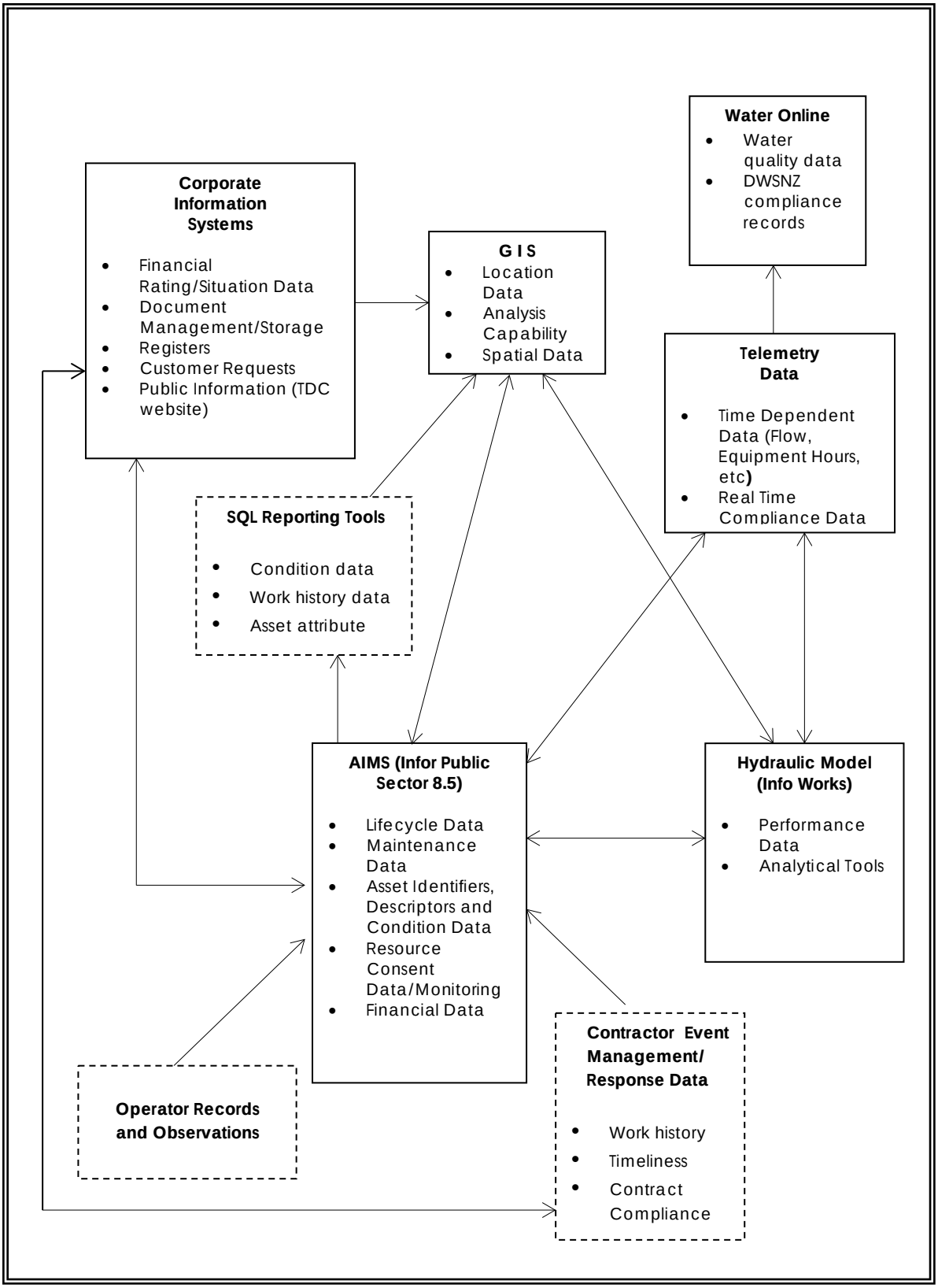


Figure 9: TDC Water Supply Services Information Network

A11 FINANCIAL PLANNING

A11.1 TDC'S FINANCIAL STRATEGY

The financial strategy guides the way the Council makes decisions. The Council must, under the Local Government Act 2002, manage its revenue, expenses, assets, liabilities, investments and general financial dealings prudently, and in a manner that sustainably promotes the current and future interests of the community. The aim of the Financial Strategy is to define Council's financial direction for the next 10 years that is agreed with the community, drawn from a balancing of ratepayer affordability against community needs and aspirations. This balancing process will consider the impact on affordability of expenditure proposals on:

- the need to maintain, replace and renew core infrastructure,
- the obligation under law to build new infrastructure of a higher standard; and
- a desire to respond to the aspirations of the community for new and improved community infrastructure.

The Council will strive where possible to either hold steady or reduce Council's operating expenditure over forthcoming years while maintaining an acceptable level of service. The Council is also committed to shared services with other local authorities to minimise costs.

Inflation factor

TDC recognizes that inflation is faced by the Council and inevitably means the cost of providing services will increase over the next 10 years and these increases will affect the level of rates.

TDC's approach is to include inflation based on the Local Government Cost Index (LGCI) prepared by Berl Economics. Annually, budgets are reviewed to more accurately reflect price movements.

Asset development and renewal expenditure

Asset development expenditure is for purchasing, building, replacing or developing the district's assets (e.g. roads, pipes, libraries). For each asset category, asset management plans are in place, which are the key planning tool for the maintenance, future renewal and additional assets required to meet increased levels of services or growth in the district.

The council has developed the asset development programme assuming that all projects will be completed in the year identified in the plan. However, past experience shows that due to external factors there can be delays in the completion of the project. Therefore projects that have similar amounts and funding may be substituted from the later years of the plan for other projects which have experienced delays. Conversely projects that are delayed in one year of the plan will be completed in the following years.

Renewals are the replacement programme for the existing assets. Levels of service improvements relate to where the council increases assets to increase the level of service provided to the community. Growth assets are constructed to support the growth in the district and provide the infrastructure that is required by the future demand.

Renewals of assets are generally funded from reserves which have previously been funded from rates. If there are insufficient funds in the appropriate reserve for the renewal expenditure, council has elected to borrow to pay for some of the renewals. The Council has reviewed the funding for infrastructure renewals and is proposing to increase the amount set aside from revenue each year to fund the replacement of these assets based on the 30 year renewals profile. This increase will be phased in over 6 years.

Level of service improvements and growth assets are generally funded from debt, capital subsidy or from capital contributions in the form of contributions (financial contributions and cash in lieu of reserves). This is to ensure that the costs are spread across the generations that utilise the assets.

Financial Implications and Trends

In setting rates at an appropriate level, the council must balance what is affordable for both the Council and the community. This is a delicate balancing act which needs to take account of the services that the Council delivers and whether current or future ratepayers should pay for them or intergenerational equity. This is particularly important for the Council given that many of its assets have long service lives and the benefits that these assets provide are over a long period of time. The main tool used is to use debt and then rate future ratepayers to service the debt.

Targeted rates

Targeted rates account for approximately 52% of total rates revenue and are in place to fund specific activities including water, sewer, stormwater, waste management, footpaths, aquatic centre, rural fire, community boards and community centres.

A separate account is maintained for each targeted rate to ensure any surplus or deficit is funded by the relevant ratepayers. In any one year, the account may be in surplus or deficit, but the level of rate is set to achieve a nil balance over the medium term (two to five years).

The rate for local targeted rates such as community centres, water, storm water, footpaths and community boards is set in consultation with the local community, taking into account the Activity Management Plan for each activity.

Overall Implications of Financial Strategy

The Council is promoting a “Business as Usual” approach through its financial strategy. It will continue to maintain and renew our assets for current and future generations while providing the services that the community enjoy.

The implications of this strategy, combined with the requirement for prudent financial management, the necessity to manage a complex array of operations and assets with long lives, and continuing improvements in required levels of service stemming from either legislative change or community demand means that there is little room for further significant projects within the next 10 years.

The Council has designed its financial policies to be prudent and fair to current and future ratepayers. Current ratepayers pay for the services they have available to them now, including a contribution to the cost of replacing the infrastructure they use. All ratepayers, current and future, pay for the costs involved in improving the quality of services.

This approach will maintain the Council's sound financial position over the next 10 years and provide a sound base for maintaining the well-being of future generations.

A11.2 Revenue and Financing Policy

The Council applies Targeted Rates to a number of services where the benefits are clearly received by a particular community or group of ratepayers. Targeted Rate applies to the Water Supply Activity. Specifically, Council's Revenue and Financing Policy states that, because the benefits of the water supply activity are predominantly private, it is considered appropriate to fund the activity separately through targeted rates and water supply fees and charges. Funding sources are:

Public – 0%

Private – 100%, via targeted rates for those connected to a water supply system and water metering (commercial/ industrial users) and land and volume based water fees and charges in rural areas. The targeted rate is set uniformly across urban connected communities to allow for an equitable charge.

Urban water schemes operate as individual water supplies but are funded as a single entity. Rural and stockwater supplies are funded as individual schemes.

Annual Water Charges

The cost of providing a water supply is recovered from those ratepayers who receive or could receive the service in the form of a targeted annual water charge. The rate is set in consultation with the local community, taking into account the Activity Management Plan.

Water rates are assessed as follows:

a) Urban

A targeted rate of fixed amount per rating unit applied uniformly on urban water supplies.

b) Rural

A targeted rate of fixed amounts based on various units of charging depending on the scheme, i.e. area charge (per hectare), unit charge, tank charge, etc.

c) Water by meter

A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit situated in areas which have been fitted with a water meter.

Detailed information on water rates and charges are in the Long Term Plan.

Current information on water fees and other charges are in this link:
http://www.timaru.govt.nz/council/publications/fees-and-charges/water

Council will amend its fees and charges annually (or more frequently as appropriate) to reflect increases in costs as measured by the council rate of inflation and/or maintain the cost recovery levels underlying the basis for setting the fee levels.

A11.3 Financial Contributions Policy

Council is required to adopt a Development and/or Financial Contributions Policy under section 102 of the Local Government Act 2002 (the Act). Development Contributions provide Council with a method to obtain contributions to fund infrastructure required due to growth. TDC does not intend to implement a Development Contributions Policy as outlined in Section 106 of the Act. TDC has an operative Financial Contributions Policy as set out in Part D, Section 6 of the Timaru District Plan. The cost of reticulation upgrade that is attributed directly to a property development is recovered from that development as financial contributions under the District Plan.

Capital contributions are charged when new connections are made to a water supply. The contribution is dependent on the scheme and is calculated from impacts each new connection has on the scheme.

Some schemes do not have a financial contribution but all costs to connect are met by the applicant.

Details of the provisions can be found in the District Plan document under Section D: General Rules - 6.5: Water, Sewer, Stormwater and Open Space and Recreation Contributions.

A11.4 Asset Valuation

Asset valuation is key in TDC's financial planning. The responsibility to carry out asset valuation lies primarily with TDC's Finance and Property Units.

The water assets were valued for fair book value and depreciation purposes in 2005. (see Asset Valuation Report in document #371288). Additions subsequent to the valuation are recorded at cost.

Asset Valued

The water supply asset valuations completed in July 2005 (by Maunsell Ltd) covered the following asset groups:

- Wells, Intakes and Infiltration Galleries
- Treatment Facilities
- Mains and Service Lines
- Tanks and Reservoirs
- Hydrants
- Meters
- Valves & Air Valves

The valuation was carried out in accordance with the NZ Equivalent to International Accounting Standard 16, "Property, Plant and Equipment" (NZ IAS 16), and the Infrastructure Asset Valuation and Depreciation Guidelines 2002 issued by the NAMS Group of Ingenium.

All assets were valued using optimised depreciated replacement cost (ODRC). An ODRC valuation requires determination of quantities of assets optimised to relate to those required for current service delivery and foreseeable demand, unit rates that reflect replacement with modern engineering equivalent assets, effective lives that take account of local influences, and depreciation that defines current value given a definable remaining life.

Optimised Depreciated Replacement Cost = today's cost of replacing the asset with another asset which provides the same level of service most efficiently and depreciated over the life of the asset to reflect its current value and remaining economic life.

Asset Depreciation

Council's Accounting Policy states depreciation is provided on a basis that will write off the cost or valuation of the assets, other than land, less their estimated residual values over their estimated useful lives. The rate of depreciation on water supply assets is set at 1-33% straight line.

Capital works in progress are not depreciated. The total cost of a project is transferred to the relevant asset class on completion and then depreciated.

Depreciation on water assets is fully funded from rates. TDC calculates depreciation fund requirement based on the long term projected renewals of the assets.

Valuation Forecast

Council currently has an accounting policy that Council owned assets of land, buildings and infrastructure are not revalued. At the time of adoption of International Financial Reporting Standards (IFRS) in 2005, Council approved this policy where the assets are recorded at their deemed cost as at 1 July 2005 with any subsequent additions recorded at cost.

The future forecast of asset values can be summarised as follows:

- Major capital expenditure shown in water treatment works and pipelines will increase the asset value
- Vested assets from subdivisions will be added to the fixed asset register and will increase the asset value
- The asset renewal programme may increase the average residual life which in turn will progressively increase the valuation

Valuation for Insurance

D&W carries out asset valuation for insurance purposes. In 2013 the water assets were valued for full replacement value for insurance purposes. As a result of the Christchurch earthquakes, Council revisited the insurance valuation and requested that a new valuation be produced. The final values were separated into *above ground assets* and *below ground assets*. The *below-ground assets* are insured by Local Authority Protection Programme (LAPP). The *above-ground assets* are insured by Council's general insurance policy.

The replacement value of water supply assets in 2014 was $255 million.

A11.5 Financial Projections 2018-2028

Part B of this AMP identifies the key projects in the next 10 years.

The projected capital works and the associated financial requirements form the basis for the 10 year operating and capital budgets for this activity.

The 2018-28 Budget, once finalised, is available in a separate budget document (# xxxxxxxxx).

A11.6 Key Financial Assumptions, Forecast Reliability and Confidence

All assumptions made in the financial forecasts are based on corporate level financial assumptions (refer back to section *A4 Planning Assumptions*)

Risks and confidence levels in the assumptions have been assessed and rated.

Mitigation measures have been identified to alleviate the consequence/s of any significant variation from the assumption. In particular, Council will review its budget annually through the LTP/Annual Plan process and may adjust work programmes/budgets where necessary.

A12 IMPROVEMENT PLAN

Table 18 below provides the status of actions on the Improvement Plan from the previous AMP period 2015-25.

Table 18: Improvement Plan 2015-25 - Status of Accomplishment

<table>
<tr><th>Management Practice</th><th>Improvement</th><th>Status of Accomplishment</th></tr>
<tr><td>Description of Assets</td><td>Asset Register:

• Develop Hansen's use in the management of water supply facilities (i.e., data, work orders, invoicing, etc)
• Implement data improvements -
o Sampling, investigation and location of the rural network assets
o Service laterals information
• Implement workflow improvements
o updating of asset registers to include capital works as-built data, costs, etc

Implement information system improvements:

o Hansen-InfoWorks-TRIM documentation links
o Information upkeep (updating, quality checks, audit)
o Set up core reports from Hansen (e.g., for valuation, renewal forecasting)

Asset Condition:

• Develop and implement condition assessment workflow
o utilise maintenance contractor for sampling when doing repairs
o Carry out data quality audit of sample assessments
o Ensure timely recording into AIMS of data from condition assessment programme
o Develop systematic recording of asset condition data into AIMS from routine inspections by TDC technicians

Asset Data Confidence:
• Formally assess and rate condition grade of assets and confidence grade of plant and reticulation asset data, using the IIMM as guide
o Benchmark condition grade of data held in the AIMS

<table><tr><th>Grade</th><th>Description</th><th>Accuracy</th></tr><tr><td>1</td><td>Accurate</td><td>100%</td></tr><tr><td>2</td><td>Minor inaccuracies</td><td>± 5%</td></tr><tr><td>3</td><td>50% estimated</td><td>± 20%</td></tr><tr><td>4</td><td>Significant data estimated</td><td>± 30%</td></tr><tr><td>5</td><td>All data estimated</td><td>± 40%</td></tr></table></td><td>- Asset register build up – more information has been added/updated in Hansen covering plant assets (visio diagrams), resource consents, as-built plans, etc</td></tr>
</table>

<table>
<tr><th>Management Practice</th><th>Improvement</th><th>Status of Accomplishment</th></tr>
<tr><td></td><td>
o Benchmark confidence grade of asset data in AIMS
<table>
<tr><th>CONFIDENCE GRADE</th><th>DESCRIPTION</th></tr>
<tr><td>A - Highly Reliable</td><td>Data based on sound records, procedure, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%.</td></tr>
<tr><td>B - Reliable</td><td>Data based on sound records, procedures, investigations and analysis documented properly but has minor shortcomings, for example some data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%</td></tr>
<tr><td>C - Uncertain</td><td>Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which Grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%.</td></tr>
<tr><td>D - Very uncertain</td><td>Data based on unconfirmed verbal reports and/or cursory inspection and analysis. Dataset may not be fully complete and most data is estimated an extrapolated. Accuracy ± 40%.</td></tr>
<tr><td>E - Unknown</td><td>None or very little data held.</td></tr>
</table>
o Incorporate asset condition grade and confidence ratings in the asset renewal strategy
</td><td></td></tr>
<tr><td>Levels of Service</td><td>• Identify LOS Options and Costs in consultation with communities</td><td>- Done through LTP CD process</td></tr>
<tr><td>Managing Demand</td><td>• Hydraulic Model Recalibration – review parameters, standards, assumptions, etc. Incorporate Growth Projections (growth and economy) into demand forecasting.
• Implement Leak Detection and Reduction Programme
• Develop and Implement Consumer Education Programme (Water Conservation, etc)</td><td>•</td></tr>
<tr><td>Risk Management</td><td>• Develop a Risk Register
• Risk Register Monitoring
• Emergency Response and Business Continuity Planning
• Project based risk assessments with regular revisions</td><td>- A draft Crisis and Emergency Response Management Guidelines has been prepared (Doc#930290)</td></tr>
<tr><td>Lifecycle Decision Making</td><td>Operational Planning:
• Develop and implement Demand Management Plan
• Develop an Emergency Response Plan
• Develop a Business Continuity Plan
• Monitoring and analysis of asset utilization</td><td>- Emergency Plan as above</td></tr>
</table>

Management Practice	Improvement	Status of Accomplishment
	• Improve staff knowledge of models used • Improve upkeep of models used Maintenance Planning: • Improve practice in collecting relevant plant and reticulation maintenance data including failure history, frequency of repairs, and cost of maintenance into Hansen. Capital Works Planning: • Alignment with District Plan objectives on subdivisions, etc. Model water services with these demands in place • Develop workflow to ensure capital projects are fully scoped and costs correctly estimated • Adopt lifecycle based decision making • Develop a formal decision making process to evaluate all aspect of capital works • Implement sensitivity analysis to critical assumptions • Improve data collection and analysis for renewals programming	- Capital works planning strategies developed and documented in the AMP
Financial Forecasts	• Improve valuation process (towards enabling automation based from Hansen info) • Improvement within Hansen on asset replacement cost	- Asset Value and Insurance Systemisation Project
AMP Format, Planning Assumptions and Confidence Levels, Planning by Qualified Persons	Internal Drainage & Water Unit user review Internal TDC peer review External expert review	- peer review within Drainage and Water Unit
Outline Improvement Programmes	Improvement Programmes from the Improvement Plan developed in detail, with agreed key responsibilities and set timeframes. Implementation of Improvement Plan is monitored and improvements documented.	
Council's Commitment	• Quality Management: (Linked to info system management) • Better coordination, communication between/among teams • Establish/formalize workflows (who will do what, when, how, etc) • Develop process for internal checks and balances (internal DWU, Infrastructure Group)	
Sustainability	Identify and adopt core measures for monitoring sustainability of water supply services	

Table 19 shows the **Improvement Plan 2018-28**. It is an updated version based on the latest assessment of gaps in practice, in line with the preparation of this AMP. Details of the assessment are in Document#1043797. Detailed action plans on the "Improvement Actions" will be developed as part of the implementation of the Improvement Plan.

Table 19: Water Supply Activity Improvement Plan 2018-28

No.	Areas of Improvement	AMP Linkage	Score/Current Practice	Score/Future Practice Required	Improvement Actions	Completion Date TBD	Responsibility
Understanding and Defining Requirements							
1	AM Policy Development	Section A1.1	(70) c/- Corporate Planning Unit	(80) c/- Corporate Planning Unit			
2	Levels of Service and Performance Management	Section A6	(70) LOS, PMs reported annually; communicating to customers via noticeboards, letter drops, newsletters, signages, Council's website; customer consultation through LTP process (CD), 2-yearly community surveys; and when required in major projects.	(80) Identify and analyse options to deal with recurrent performance issues, assess LoS implications and impact on customers. Customer consultation possibly required on new scheme strategies and potential LOS changes.	• KPI trending and reporting in D&W Unit Yearly Report • Develop a LOS consultation guidance document (including approaches; with inputs from Communications Manager)		GH, LG
3	Demand Forecasting	Section A7	(65) Demand scenarios and demand management is considered in strategic project development	(85) Water models currently do not allow for future demand identified in the District Plan so renewal designs don't look at future capacity issues except for known high demand sites (e.g. schools for fire fighting); Model sensitivity not done; Scenario Analysis not investigated on designs and documented. Demand forecast for rural sector is difficult.	• Develop a Demand Management Strategy • Develop a consumer education programme		JB, GC, LG
4	Asset Register Data	Section A8, A11.3	(75) Infor 8.5 is used, functionalities include management of resource consents compliance data, asset financial valuation for	(90) Asset replacement cost (using Optimised Replacement Cost) needs to be in Hansen; remaining useful life to be calculated and ability to over-ride when condition has been assessed; adopt a condition assessment programme;	• Data integrity • Plant and equipment to be included in annual revaluation • Plant programmed maintenance systems		GC

			insurance, etc.	formal documentation of data collection/maintenance process; build up service laterals data (not just mains); sample, investigate and locate rural network asset to improve accuracy; build up metadata. Develop Hansen's use in management of facilities.	to be developed • Plant reactive maintenance to be captured		
5	Asset Condition (Monitoring Asset Performance and Condition)	Section A8.2	(65) Plant facilities and network condition ratings reported in 2012. There has been no formal audit of data quality, although data confidence is reported as high. Pipe sampling for condition assessment by Opus 2014.	(85) Build up asset performance and condition data. Adopt a condition assessment program and all sample assessment needs to be validated by competent staff or organisation. All sample assessments shall be well documented in RM8 and linked to Hansen database and the Model.	• Develop condition assessment framework and renewal strategy/ programme for plant assets to be linked to Hansen database		JB, SC/LS
Lifecycle Planning							
6	Decision Making	Section A9.2	(65) Asset Renewal Strategy is defined in AMPs and the IS. There is no formally adopted process for decision making and prioritisation applied to capital works programme.	(75) Undertake formal use of BCA/MCA, sensitivity test of assumptions and estimates	• Documentation in AMP of current decision making practices		SC
7	Risk Management	Section A9.3	(60) Risks have been identified. Assets are rated for criticality. Risk factored in in renewals programme.	(75) Update risk assessment and management plan. Risk Register developed, monitored and reported. Asset criticality assessment needs updating, previously only a desk top assessment. Consider resilience.	• Documentation in AMP of risk assessment process for projects • Documentation in AMP of resilience building in water assets (e.g., design, material, duplicate asset, etc) • Improvement of procedure in adding information on new assets in Hansen (e.g.,		SC

					criticality rating) • Updating of Criticality Assessment • Reporting on implementation of Risk Management Plan		
8	Operational Planning	Section A9.1	(60) Operations Manual developed for drinking water supply schemes. The Maintenance Contract for the reticulation provides documented decision-making processes and procedures developed in consideration of associated risks and costs. Organizational structure and position descriptions reflect roles in operation and maintenance.	(70) Risk and opportunity planning (emergency, contingency, business continuity plans) and documented operating protocols (cost and budget management, security, operational risk management, environmental and sustainability management, reactive maintenance, preventive maintenance)	• Increase documentation in AMP of O&M • Identify manuals/documents on operational procedures held in the records system		ALL
9	Capital Works Planning	Section A9.2	(55) Capital works programme prepared for the next 30 years with firmed-up projects for years 1-3. Options analysis done for major projects (example: Temuka trunk main, new Temuka source, Timaru storage, etc).	(80) Lack of formal prioritisation framework to rank capital projects; projects in the 1-3 year budget not fully investigated and are often delayed to enable the options to be fully investigated. Also not fully scoped until the financial year in which the budget is available. The estimate in the budget may only be 30% accurate.	• Documentation in AMP of the planning, scoping and project development processes • Improve project/budget monitoring		SC
10	Financial and Funding Strategies	Section A11	(60) Asset revaluation done in 2005 (Maunsell report). There is collaboration between finance and asset managers in the setting of fees and charges, asset capitalization, depreciation, revaluation for	(70) Need more robust AMP data. Improve valuation process towards enabling automation based from Hansen info. Improvement within Hansen on asset replacement cost.	• further improve the procedure to ensure information from newly completed projects are added in the system in a timely and accurate manner (e.g., asset		SC

			insurance. Longer term financial forecast in IS? The AMPs provide comprehensive supporting data to enable long term financial forecasts.		capitalisation, asset register, etc) • establish good valuation data for insurance		
Asset Management Enablers							
11	AM Teams	Section A1.5, A6.4	(75) AM coordination process is established for AMP updating. Position descriptions reflect AM roles but not emphasized as such. AM is seen as the responsibility of "managers" and engineers. There is a projects coordination team in District Services with representatives from concerned units.	(80) More AM awareness across the organisation. AM communications needs improvement so as not to result in piece-meal planning. Need consistent approach to AM across the organisation.	c/- CPU		
12	AM Plans	Whole AMP	(70) The AMP's contents are aligned with IIMM requirements - LOS, risk and criticality, condition and performance, lifecycle management, demand forecasts, financial forecasts, improvement plan.	(75) It is possible that some AM practices are not adequately documented or described in the AMP.	• Increase/Improve documentation of AM processes		LG/Team
13	Management Systems	Section A10	(45) Work order procedures set up; resource consents management in Hansen.	(65) There is little formal documentation of processes or documentation is not shared; project management is too "isolated"; improve team coordination and communication; workflows; internal audit	Corporate level - functional linkages across units – IT, finance, HR, CPU, etc) *Unit level:* • Improve linkages: - Registers link with insurance, service		GC

					applications, etc - GIS and assets • Develop a D&W Project Management required coordination between teams		SC
14	Information Systems	Section A10	(60) See 2.4 Asset Register comments. Some level of integration of Asset Register (Hansen), CRM-Authority, GIS	(80) Further develop integration of systems for reporting on wider range of information.	• Improve functionality of the Information System • Develop further integration of the Information System		GC
15	Service Delivery Models	Section A6.4	(75) Council's core functions are defined. Council has a procurement policy in place. Internal service level agreements are in place (employment contracts/role descriptions); external service provider contracts are in place (maintenance contracts); competitive tendering practice in place - no issues; service delivery mechanisms reviewed (Stage 1) under LGA Sec17A provisions.	(85) Formal cost-benefit analysis of options.	• LGA Section 17A Stage 2 Review within the Plan period. • Consideration of shared services agreement (with other TAs).		GH
16	Improvement Planning	Section A12	(50) Current and future AM assessed and Improvement areas identified.	(70) No detailed implementation plan; no detailed project briefs for all key improvement actions; no monitoring and routine reporting; communicate improvements to staff.	• Detailed improvement plan with defined implementation actions • Documentation of improvements		ALL

Score and Level Description: 00-20 Aware; 25-40 Basic; 45-60 Core; 65-80 Intermediate; 85-100 Advanced

PART B – SCHEME AMPs

B1 URBAN WATER SUPPLY SCHEME AMPS

This section provides details of the activity management plan for the urban water supply schemes.

The urban schemes consist of the Geraldine, Peel Forest, Pleasant Point, Temuka, Timaru and Winchester water supplies. They are operated as individual water supplies but funded as a single scheme.

The plan for each water supply contains a detailed description of assets in the scheme, their condition and performance, associated risks, demand, and priority issues. Key projects and indicative costs are also identified.

B2 GERALDINE WATER SUPPLY

B2.1 SCHEME OVERVIEW

The Geraldine Water Supply is predominantly an urban on-demand water supply with water supplied to the consumer's boundary. Water is supplied for domestic, commercial, industrial and stock drinking water purposes.

Geraldine's water comes from four 12m deep wells near the Orari River and goes through an ultraviolet (UV) light chamber before being pumped into a reservoir located above ground within the Talbot Forest Reserve.

From the reservoir it is supplied to Geraldine using gravity only which means that the water pressure is mostly dependent on the height difference between the reservoir and the property being supplied.

Table 20 shows key statistics on the Geraldine Scheme. Figure 10 illustrates the scheme boundary.

Table 20: Geraldine Scheme Key Information

Item	Description
Scheme population	Approximately 2,433
Number of connections (Water NZ NPR definition)	Residential = 1,372 Non-residential = 111
Firefighting availability	Yes
Resource consent - Expiry date	80 L/s abstraction rate with a maximum take of 49,408m^3 in any period of 7 consecutive days. For the combined Geraldine and Te Moana takes, Te Moana has a maximum take of 7,408 m^3/7 days. The consent expires in 2027.
Sources	Non-secure groundwater - four shallow bores near the Orari River (3 at 12 metres, and 1 at 17 metres deep)
Average daily demand	1700 m^3/day through treatment plant 1460 m^3/day to Geraldine
Peak day demand	3440 m^3/day including supply to Te Moana 3020 m^3/day excluding supply to Te Moana

Treatment requirement and process used	3 log treatment UV disinfection
Location of treatment plant	Orari Back Road
Number and storage capacity of reservoirs	One reservoir 2275 m^3 capacity
Reservoir Storage Buffer (days of treated water storage in reservoir)	12 hours (peak day) 1 day (average day)
Number of pump stations	1 at Treatment plant; 1 at supply to Te Moana
Length of reticulation	approximately 26.2 km
Rating	• Urban targeted rate of fixed amount per rating unit (rate is set yearly in the Annual Plan) • A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit within the Geraldine scheme which has been fitted with a water meter
WSP Review	October 2018

B2.1a Geraldine Area Wide Water Strategy (GAWWS)

A strategic plan for the Geraldine Area Wide Water Supply is being implemented to address water supply issues in the area. The strategy covers Geraldine urban and Te Moana rural schemes.

The GAWWS covers issues on security of supply, drinking water quality, network and infrastructure condition and reliability, network capacity, operating costs, consumer charges, customer demand.

Various options have been assessed and a hybrid solution of supplying part of Te Moana from Geraldine has been determined as the preferred option. This option has significant advantages for affordability, minimising renewals and getting the best value from the existing infrastructure. This option supplies Geraldine Downs and Geraldine Flats from the existing Geraldine Tripp Street pump station, with the remainder of the Te Moana scheme supplied by a Te Moana source.

No specific projects to implement the GAWSS are within the Geraldine Water Supply.

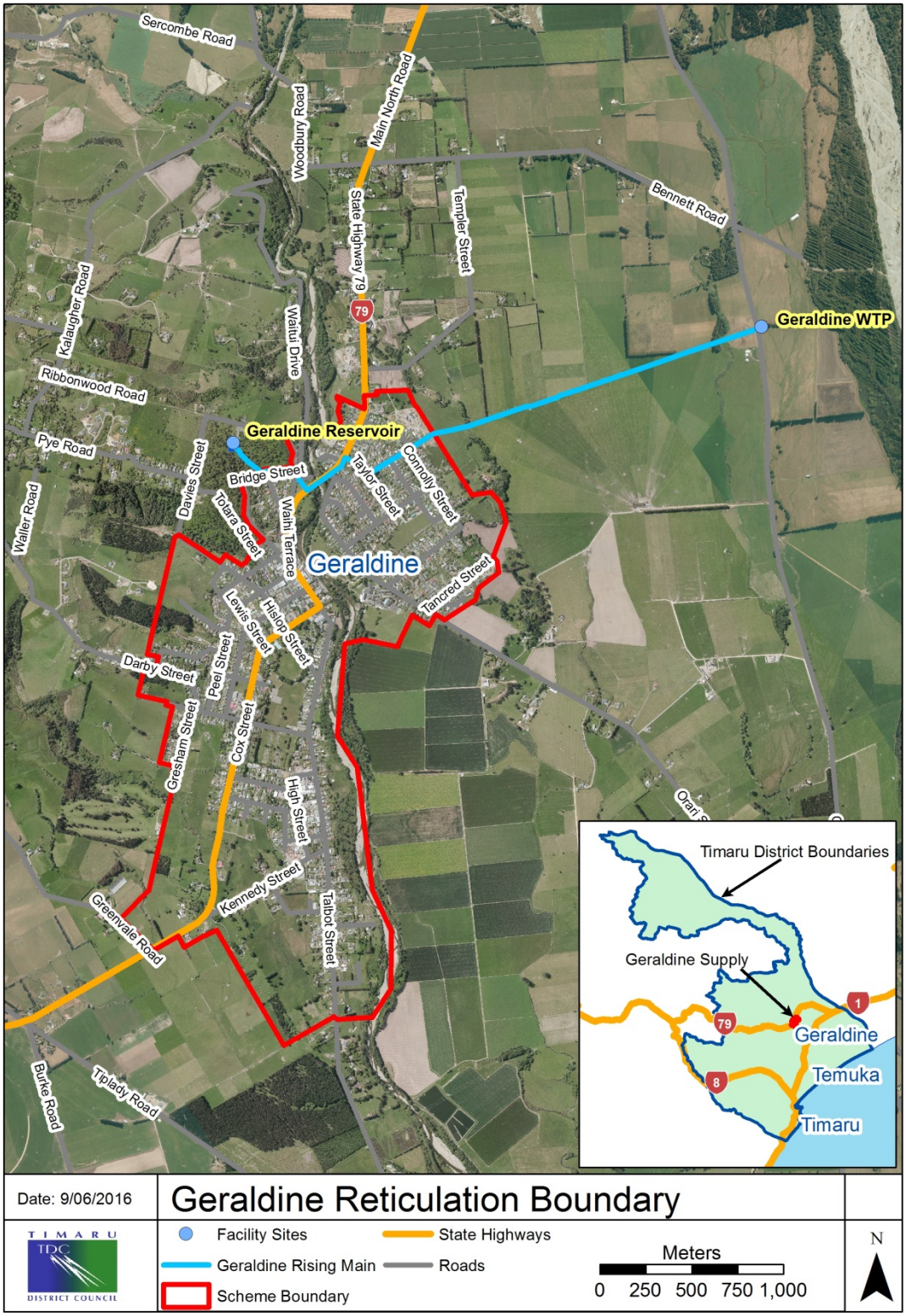


Figure 10: Geraldine Water Supply Scheme Boundary

B2.2 SCHEME MANAGEMENT

B2.2.1 ASSET SUMMARY

A. Plant Assets

Table 21: Geraldine Water Supply Plant Assets

ASSET	INSTALLATION DATE	LIFE EXPECTANCY (Years)
PUMPSHED	1/01/1978	50
EXTERIOR CHAMBER # 1	1/01/1978	50
EXTERIOR CHAMBER # 2	1/01/1978	50
EXTERIOR CHAMBER # 3	1/01/1978	50
FENCING	1/04/2014	50
FLOW METER # 1 (OUTLET)	1/01/1994	25
FLOW METER # 2 (UVI)	1/01/2011	25
FLOW METER # 3 (UV2)	1/01/2011	25
GENERATOR	1/01/2010	50
PLC	1/01/2000	15
WELL PUMP SET 1	1/01/2007	15
WELL PUMPSET THREE	1/01/2001	15
WELL PUMPSET FOUR	1/01/2000	15
PRESSURE RELIEF VESSEL	1/01/1978	50
SITE PIPEWORK & VALVES	1/01/1978	50
TREATMENT PIPEWORK & VALVES	1/01/2011	15
SWITCHBOARD	1/01/2011	20
WELL PUMPSET THREE SOFT STARTER	1/01/2001	15
WELL PUMPSET FOUR SOFT STARTER	1/01/2000	15
TURBIDITY METER	1/01/2000	10
TELEMETRY	1/01/2014	15
PRESSURE TRANSDUCER (OUTLET)	1/01/2000	5
PRESSURE TRANSDUCER (WELL 1 WATER LEVEL)	1/01/2001	5
DOSING EQUIPMENT UV UNIT 1	1/01/2003	15
DOSING EQUIPMENT UV UNIT 2	1/01/2003	15
VARIABLE SPEED DRIVE	1/09/2011	15
WELL ONE	1/01/1978	50
WELL TWO	1/01/1978	50
WELL THREE	1/01/1978	50
WELL FOUR (DEEP)	1/01/2000	50

A schematic diagram of the Geraldine Water Supply is shown in Figure 11.

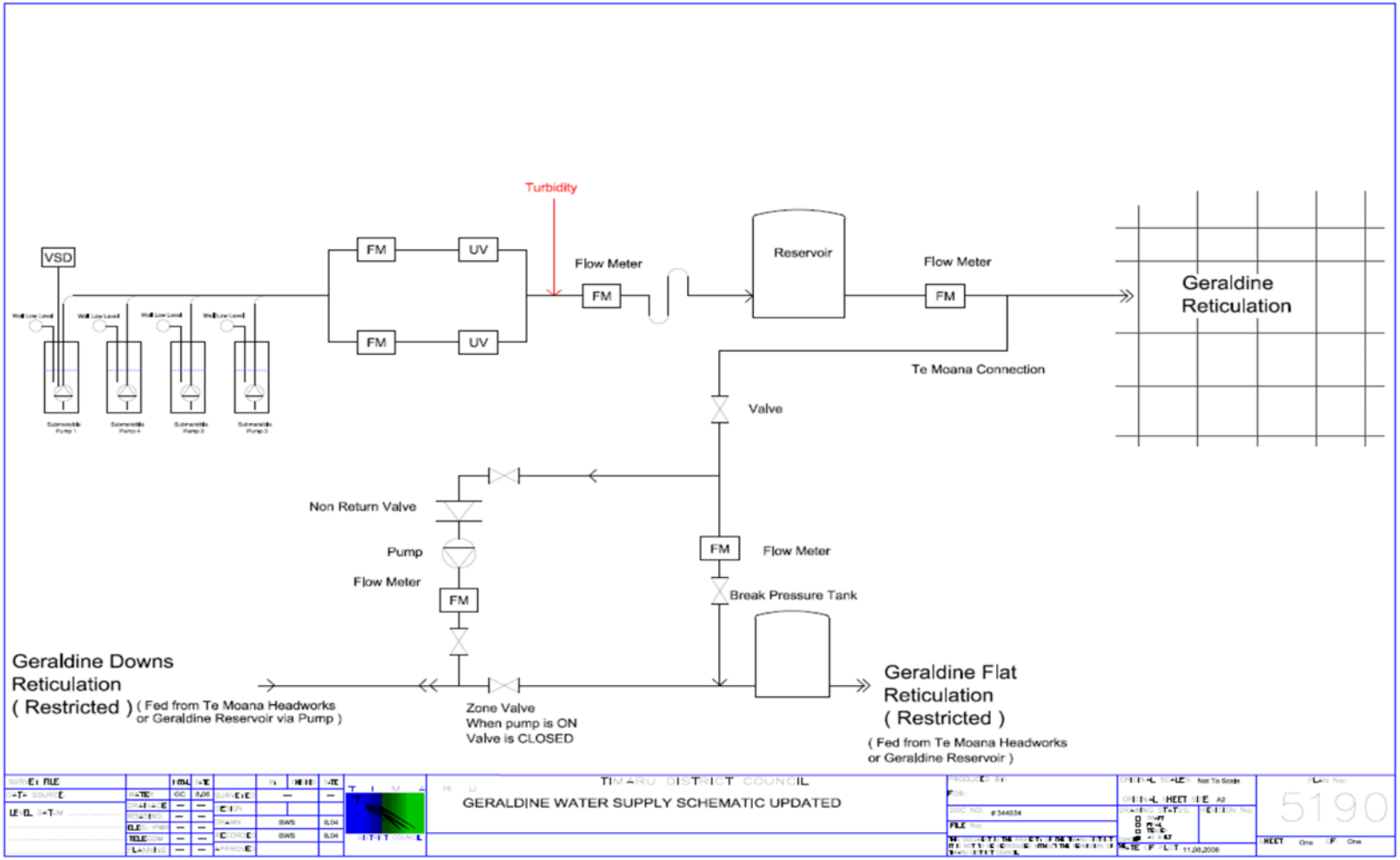


Figure 11: Geraldine Water Supply Schematic

B. Reticulation

There are approximately 26.432 km of water mains within the reticulation. Table 22 below shows the profile of the network.

Table 22: Geraldine Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)					Total (m)
	PVC	PE	AC	CI	ST	
000-049		503			137	640
050-099	368	2,135	116	187		2,806
100-149	4,745	29	6,943	540	371	12,628
150-199	2,408	213	4,086			6,707
200-249	228		146		61	436
250-299	4		3,211			3,215
Total	**7,753**	**2,880**	**14,503**	**727**	**569**	**26,432**

B2.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

There are 4 bores at the site of the treatment plant. Water is pumped from 3 of the bores. The pump station capacity is 60 L/s, whereas the consent allows a take of 80 L/s. To increase the pump station capacity, a new pump in the 4th well complete with a switchboard upgrade, and/or a trunk main capacity upgrade would be required.

Running three pumps together is inefficient because of the trunk main capacity.

Number of Pump	Flow (L/s)
1	24-27
2	47
3	60

There were no water shortages from the water table experienced in the dry 2014-2016 period.

The pumps have a life expectancy of 15 years and each is meeting the expectation.

Treatment

The Treatment Plant capacity is 60 L/s.

Water treatment for the Geraldine Water Supply Scheme uses a UV reactor. Water goes through an ultraviolet (UV) light chamber before being pumped into a reservoir located above ground within the Talbot Forest Reserve. The UV treatment kills giardia and

cryptosporidium and has been designed to meet the Drinking Water Standards for New Zealand. The design capacity for the treatment plant is 60 L/s.

The UV reactor is validated to treat water > 90 UVT. In a wet period the UVT of the water can drop below 95% of the validated transmittance resulting in non-compliance with DWSNZ.

The UV unit needs an electronic renewal which will ensure it meets the remaining 3 years of the predicted life. The UV model is obsolete.

Dust from increased traffic and an unsealed road will impact on life expectancy for the switchboard treatment and electronic assets. This is expected to be a 20% reduction.

Storage

Storage is a fully enclosed concrete reservoir that holds 2,275 m^3 or approximately 12 hours storage at high demand times. This capacity is adequate for current demand. However, storage capacity will be an issue with any significant growth in demand. Pressure reduction occurs when the draw off from the reservoir is very high and exceeds the inflow capacity. When the reservoir drops below approximately 70% full, several houses near the reservoir level have water shortages. This minimises the benefits of the storage.

The reservoir has a 20 year remaining life (Opus, 2017 – document #1026938) and is likely to fail in an earthquake if close to the epicentre.

B. Reticulation

The age profile of the Geraldine reticulation network is shown in the chart below.

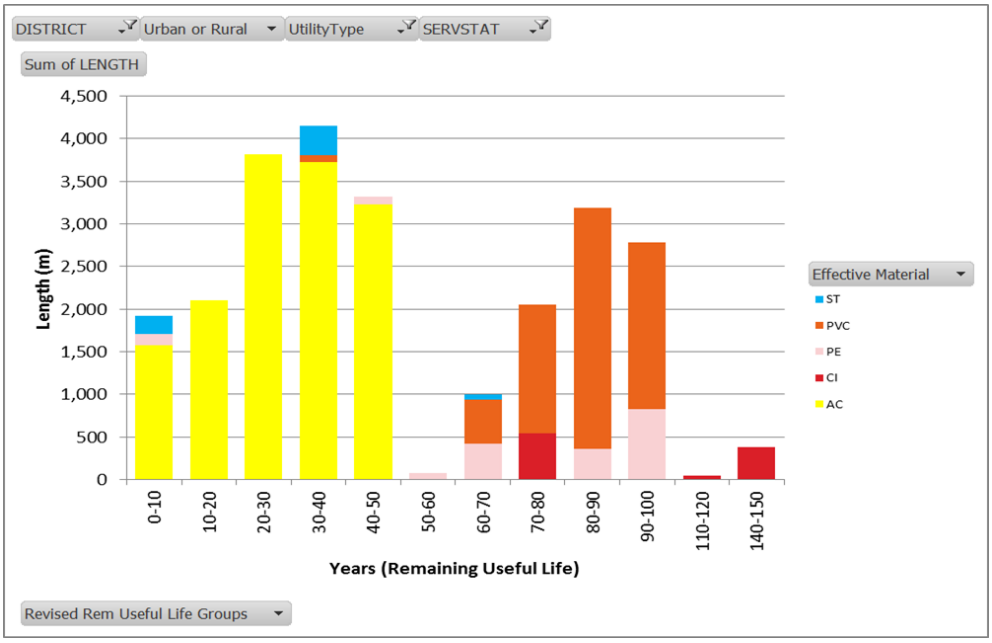


Figure 12: Geraldine Water Supply Network Remaining Useful Life

Current capacity of the Geraldine network is sufficient to meet the required Levels of Service within this AMP period. Of note, however, is that the Raukapuka catchment is currently fed by 150 mm diameter AC watermain which is close to demand network capacity to the catchment. Some areas such as Bridge St, Hewling St and Darby St LOS could be compromised because of low pressure during peak demand because it depends on the water level in the Geraldine Reservoir.

Fire fighting capability in Bridge St, Hewling St, Darby St is not able to meet the 25l/s flow due to low pressure.

B2.2.3 Asset Life Cycle Management

A. Operations and Maintenance

The facilities are operated by TDC operators and monitored by Telemetry for demand. City Care Limited are required to operate some of the equipment as requested by TDC operators.

Specific operating procedures are defined in the Geraldine Treatment Plant Operational Manual (Document #1073137).

Section A9.1 has details of the operations and maintenance activities common to every scheme.

B. Asset Renewals

Small plant renewals are ongoing. Significant items are:

- Treatment renewal
- Reservoir replacement

Reticulation renewals have been identified as shown in the Figure 13 below.

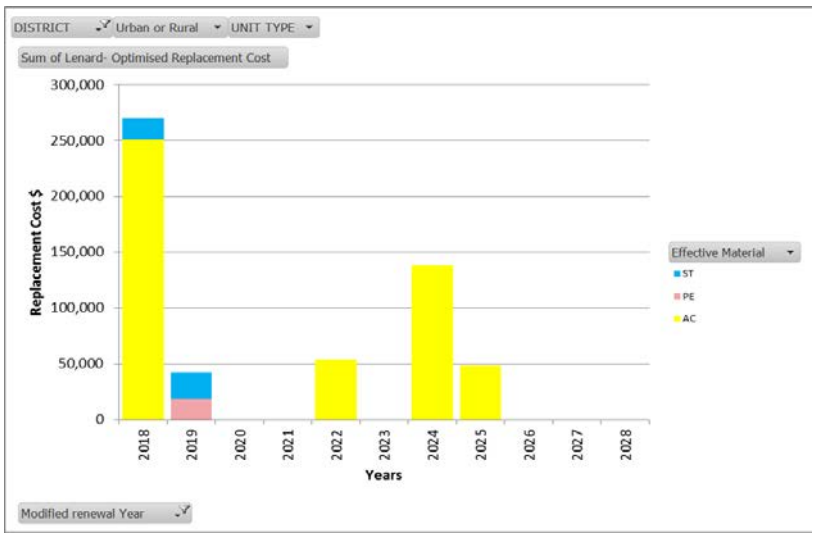


Figure 13: Geraldine Water Supply Network Renewal Programme 2018-2028

C. Asset Development/Upgrading

- Two pump stations are proposed to ensure the targeted minimum pressure is met.
- Majority of the network extension within the Geraldine Urban Zone boundaries is at developer responsibility to extend the network to TDC requirements which is vested to Council to maintain.
- Where required, upgrading of existing pipes will be done at time of renewal to accommodate future growth, improve and maintain LOS .

B2.3 Risk Management

A. Geraldine Water Safety Plan

Risks to public health from the Geraldine Water Supply were identified and assessed during the development of the scheme's Water Safety Plan (Document #839444).

A number of risks were identified, together with mitigating measures. Improvements to the water supply were identified, together with a time frame.

The improvements identified in 2013 and not yet completed are:

- Consider treated storage 2026
- Install BFP on interconnection with Te Moana 2015

Due to the GAWWS amendment, the improvement identified in 2013 to install BFP on inter-connection with Te Moana is no longer required.

A number of other improvements have commenced and are on going.

An additional risk is the lack of disinfection residual in the reticulation. There have been 2 samples with e-coli detected in the 2016/17 year. They occurred within a week of each other but were some distance apart. No cause was found in the Geraldine reticulation, however recent maintenance had been carried out. The reservoir was shock dosed with chlorine to provide short term disinfection within the reticulation. Chlorine is also known to be more effective against virus than UV treatment.

B. Asset Criticality

The data in Table 23 below were extracted from the water assets criticality assessment report in document # 829869.

Table 23: Geraldine Water Supply Facility Asset Criticality

Geraldine Facility Asset	Criticality Rating*	Condition Rating**	Risk
Geraldine Bores	A	2	Low
Geraldine Treatment	A	2	High
Geraldine Reservoir	A	2	Low

* A = Asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
**2 = Very Good Condition. Superficial deterioration. Minor reliability issue. Minor maintenance only is required.

In case of a district wide event, the area affected by a failure of the Geraldine WTP is restricted to the Geraldine Water Supply (and potentially part of Te Moana Water Supply). Apart from the Te Moana consumers with on site storage there is no other storage available within the Geraldine Water Supply. Therefore, the Geraldine Water Supply has a higher district wide priority ranking for emergency water supply.

The treatment plant is equipped with a generator on site with automatic control. In the event of a power failure liaison with Alpine Energy Ltd is required to determine the length of the outage and if the outage is expected to exceed eight hours then demand management will be implemented.

Figure 14 shows the network criticality. The trunk main is a high criticality asset (red line in the figure). Geraldine Watermains Criticality Rating report is in document #84887.

Criticality assessment of Geraldine facilities and watermains will be updated as part of this AMP's Improvement Plan.

C. Other Risks

Rising Main (WTP to Reservoir) – any repair work on the rising trunk main from the treatment plant to the reservoir is carried out by TDC Drainage and Water maintenance contractor who must liaise closely with the operators to ensure that the pump station does not automatically start on normal reservoir level setpoints and the supply to Geraldine from the reservoir is maintained.

Pipe at the Bridge servicing Raukapuka - there is no other watermain to supply Raukapuka catchment if the pipe is not operative. Planning is required in order to make sure the pipe can be commissioned within 8 hours prior to the shutdown. Critical Valve has been identified if any repair is required to this pipe. Removal of air sufficiently by opening multiple fire hydrants to bleed the air is required. Shock dosing with chlorine to provide short term disinfection within the reticulation from the reservoir should be considered.

Trunkmain from Reservoir to the network – there is no other supply to the reticulation if the pipe is not operative. Planning is required in order to make sure the pipe can be commissioned within 8 hours prior to the shutdown. Critical valve has been identified if any repair is required to the pipe. Removal of air sufficiently by opening multiple fire hydrants to bleed the air is required. Shock dosing with chlorine to provide short term disinfection within the reticulation from the reservoir should be considered.

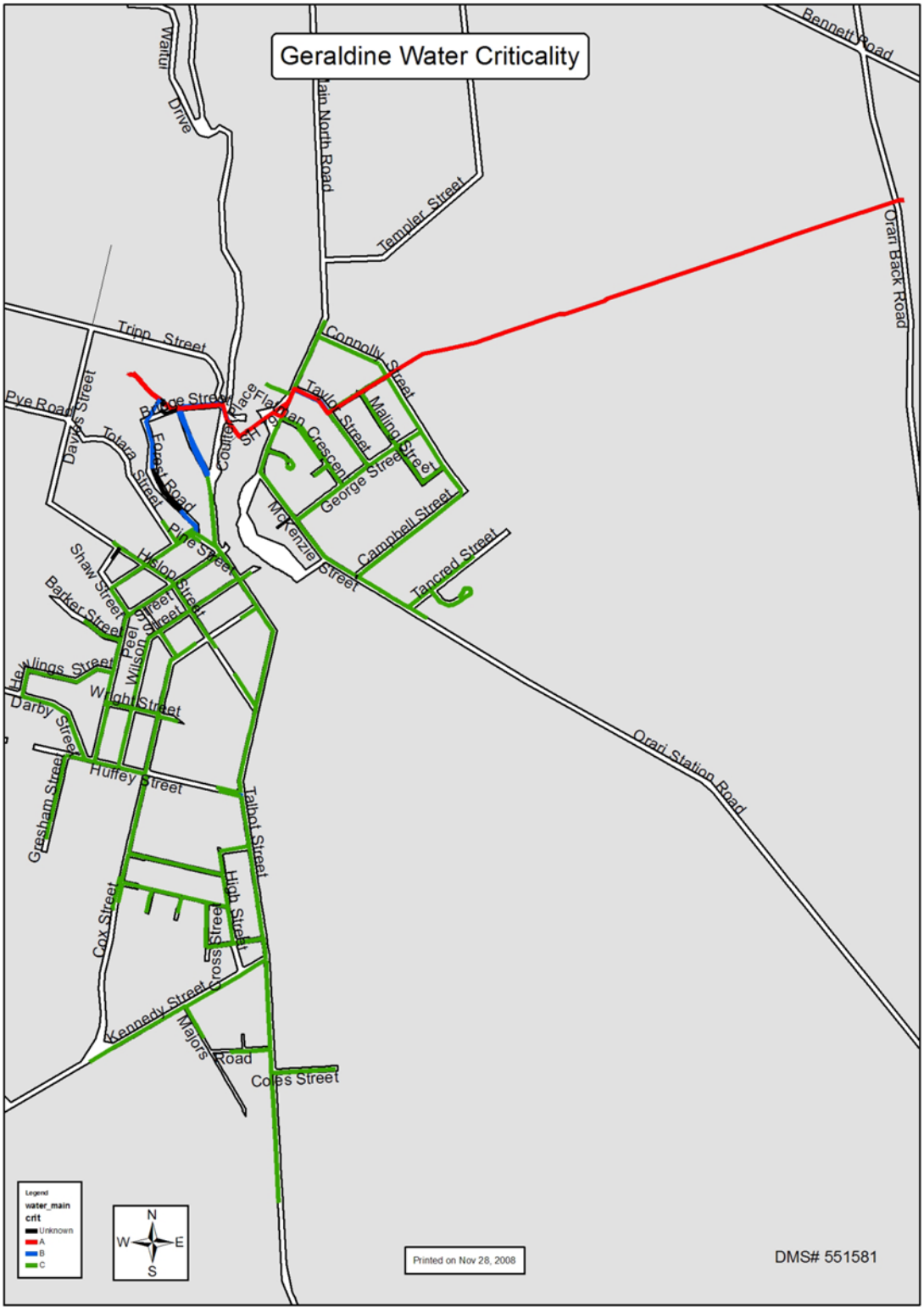


Figure 14: Geraldine Water Supply Network Criticality

B2.4 Demand Forecasting and Management

A. Demand Drivers

Population and household growth –

- Council's Growth Management Strategy (GMS) projects an additional population in Geraldine of 230 by the year 2043, raising the current population of 2,370 to 2,600.

- As shown in Figure 15, the GMS also projects an increase in the number of households which will reach a peak of 1,151 households by 2038:

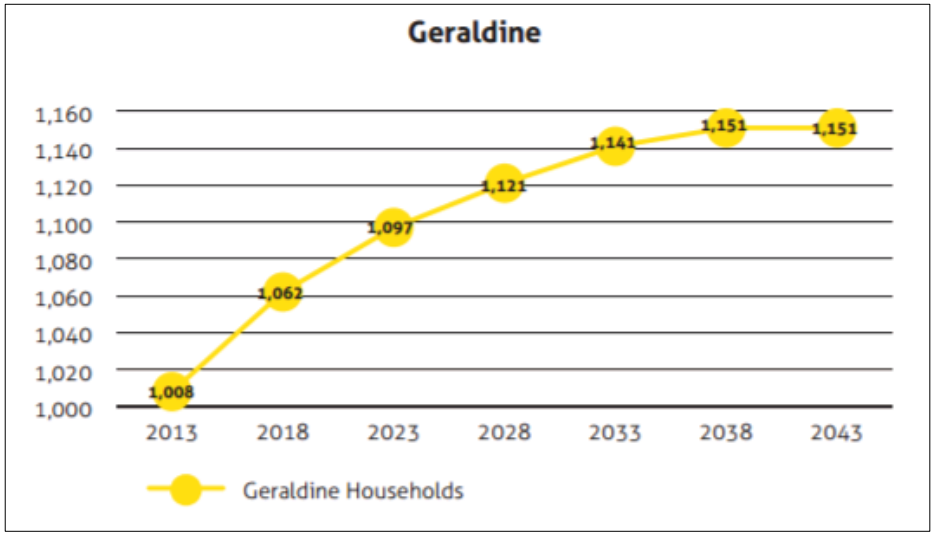


Figure 15: Geraldine Forecast Household Growth

Industrial development –

- The GMS projects some 10 hectares of industrial rezoning at Tiplady to provide for a range of industrial activities.

Land use change –

- Scheme boundary changes in the periphery may be requested. Extension of the network may be required.

B. Demand Forecast

- The scheme can accommodate the projected growth in population and households to year 2043. However, the design of the scheme is not suitable to servicing demand by a wet industry.

- Associated with the growth in demand, the reticulation has been modelled to identify parts of the network that need new pipes or upgrades or both. Expected infill in Geraldine will be South of Geraldine and Raukapuka catchment.

- A portion of Te Moana Water is currently supplied from Geraldine when demand from Te Moana Water Supply is likely to exceed its consent. The supply from Geraldine is either to Tripp Street break pressure tank (BPT) or the Tripp Street pump station and the BPT. The average demand is currently 78,000m^3 per annum. The Te Moana proposal is that this area will be supplied by Geraldine for the full year by 2019. The volume is expected to increase to 140,000m^3. The increase will be on the lower demand period. With growth and an increase to all consumers requiring the allocated volume every day this could increase to 230,000m^3 per year within 30 years.

- The significance of the growth and demand projections for Geraldine will be continually monitored and assessed through the hydraulic model of the scheme.

C. Demand Management

The data in Table 24 show the trend in water use and loss (leakage) within the Geraldine Scheme in the last 6 years. The volume through the treatment plant is the sum of columns 2 and 3 below.

Table 24: Geraldine Water Demand Statistics

Year	Volume of Demand (m^3)	Supply to Te Moana (m^3)	ILI
2016/17	529,704	105,587	4.8
2015/16	591,675	78,987	7.6
2014/15	577,014	67,730	8.7
2013/14	513,583	35,878	6.4
2012/13	486,890	124,427	0.8
2011/12	516,506	82,816	5.4

- The GAWWS ensures there is security of supply to consumers within the Geraldine Scheme while allowing for a portion of the Te Moana Scheme to be supplied from the Geraldine Scheme.
- Leakage issues are addressed through priority renewals in the network.
- There are currently 19 consumers within the Geraldine Scheme who are billed for extra-ordinary use of water. On the average, their consumption makes up 7% of the total demand within the scheme.
- Additional extra-ordinary water use demand (Xm^3/day) will need specific consideration and approval to be connected to Geraldine Water Supply Scheme.

- Proposed industrial zone in Tiplady area will not be serviced from the Geraldine Water Supply Scheme unless the reticulation is upgraded. The cost of network upgrade is very high.
- The Te Moana portion supplied by Geraldine Reservoir will remain a restricted scheme.

See Part A for other demand management approaches common to all schemes.

B2.5 Summary of Issues/Requirements

Ageing Infrastructure:

1. Ageing reticulation with 60% (14.8 km) of AC pipe reaching the end of its useful life.
2. Reservoir has 20 years remaining life, and is likely to fail in an earthquake if close to epicentre.

Meeting demand/Security of supply:

3. (Source/Headworks) To increase pump station capacity requires additional pump or trunk main capacity upgrade.
4. Geraldine will be fully supplying a portion of Te Moana scheme from 2018. This is likely to increase annual demand from the source, trunk main and reservoir.
5. Raukapuka catchment is currently fed by DN150 AC watermain which is close to demand network capacity to the catchment.
6. Additional storage to address pressure reduction/water shortage issues to several houses which occurs when the draw off from the reservoir is very high and exceeds the inflow capacity.

Meeting DWSNZ

7. Treatment renewal (UV model is obsolete). The UV unit has 3 years remaining life but is already experiencing component failure.

B2.6 Financial Plan

B2.6.1 Proposed Capital Works Programme 2018-28

Table 25: Geraldine Capital Works Programme 2018-28

Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
Treated Storage			2026
Raukapuka Watermain Upgrade	Growth and LOS		
MacDonald Street Watermain Upgrade	Growth		
Pump Stations x2	LOS	100 to 300	2026/27
McKenzie Street Watermain Upgrade	Renewal and LOS	250	2018

B2.6.2 Operations and Maintenance (O&M) Programme

Operational Needs and Timing

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Operational needs and costs may increase over time as:

- Two minor booster pump stations are installed to supply areas of low pressure.
- Demand from the Te Moana scheme increases due to the areas of the Downs and Geraldine Flat are permanently supplied for the Geraldine reservoir.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance	$60k	$60k	$60k	$60k	$60k	$60k	$60k	$60k	$60k	$60k

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B3 PEEL FOREST

B3.1 SCHEME OVERVIEW

Peel Forest Water Supply is a small scheme supplying drinking water in the residential area of the township. The scheme does not supply the picnic area, campground or all of the properties at Peel Forest.

The Peel Forest Water Supply is classified as an urban on-site storage scheme. The water is piped from a spring through a small treatment plant, where it is chlorinated, and pumped into a storage tank. It is then gravity fed into the reticulation network. Table 26 shows key statistics about the scheme and Figure 16 illustrates the scheme boundary.

Table 26: Peel Forest Water Supply Key Information

Item	Description
Scheme population	Approximately 63
Number of connections (Water NZ NPR definition)	Residential = 34 Non-residential = 3
Firefighting availability	The scheme has no fire fighting capacity and it is anticipated to remain this way in the future.
Resource consent//Expiry date	Maximum rate at 1.5 L/s, with a volume not exceeding 907 m^3 per week. The consent expires in 2046.
Sources	Spring with 0.7l/s capacity Located within private property
Average daily demand	27 m^3
Peak day demand	115 m^3
Treatment requirement and process used	Bacterial and 3 log treatment UV and chlorine
Location of treatment plant	1248 Peel Forest Road
Number and storage capacity of reservoirs	1 reservoir (3x30m^3 plastic tanks)
Reservoir Storage Buffer (days of treated water storage in reservoir)	2 days in high demand periods.
Number of pump stations	Nil
Length of reticulation	2.8km
Rating	Urban targeted rate of fixed amount per rating unit(rate is set yearly in the Annual Plan)
WSP Review	2022

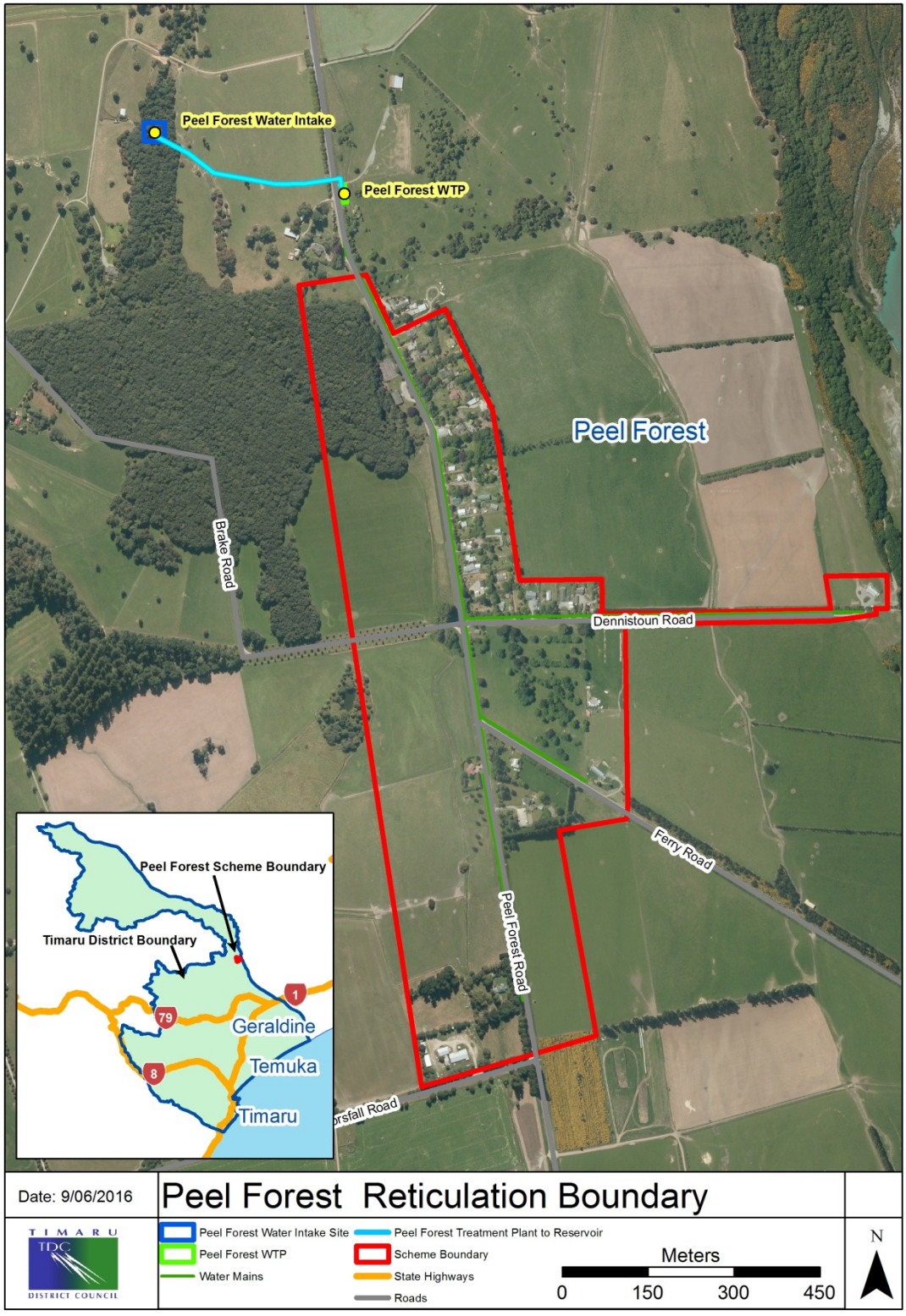


Figure 16: Peel Forest Water Supply Scheme Boundary

B3.2 SCHEME MANAGEMENT

B3.2.1 ASSET SUMMARY

A. Plant Assets

Table 26: Peel Forest Water Supply Plant Assets

Asset	Installation date	Life Expectancy
AERATOR	15/02/2016	25
BUILDING	15/12/2015	50
CHLORINE DOSING PUMP	1/11/2008	15
PH DOSING PUMP	1/04/2016	15
FENCING	15/04/2016	50
CARTRIDGE FILTER HOUSING (4 Filters)	1/03/2016	15
FLOW METER - Magnetic Inflow	1/12/2008	15
FLOW METER - Magnetic Outflow	1/12/2011	15
GENERATOR (Portable 3Kw)	1/09/2015	20
SPRING INTAKE	1/01/1960	100
PH METER	1/04/2016	15
TRANSFER PUMP	**1/03/2016**	**10**
SITE PIPEWORK & VALVES	1/03/2016	25
TREATMENT PIPEWORK & VALVES	1/03/2016	25
RESERVOIR (Tanks x 3)	1/06/2014	25
SWITCHBOARD	1/03/2016	20
RAW WATER TANK	1/12/2015	25
TURBIDITY METER	1/03/2016	15
TELEMETRY	1/03/2016	15
PRESSURE TRANSDUCER (Reservoir)	**1/11/2008**	**10**
PRESSURE TRANSDUCER (Filters)	**1/03/2016**	**10**
UV UNIT	1/03/2016	15
SOLENOID VALVE (To Waste)	**1/03/2016**	**10**
SOLENOID VALVE (Drain)	**1/03/2016**	**10**

A schematic diagram of the water supply is shown in Figure 17.

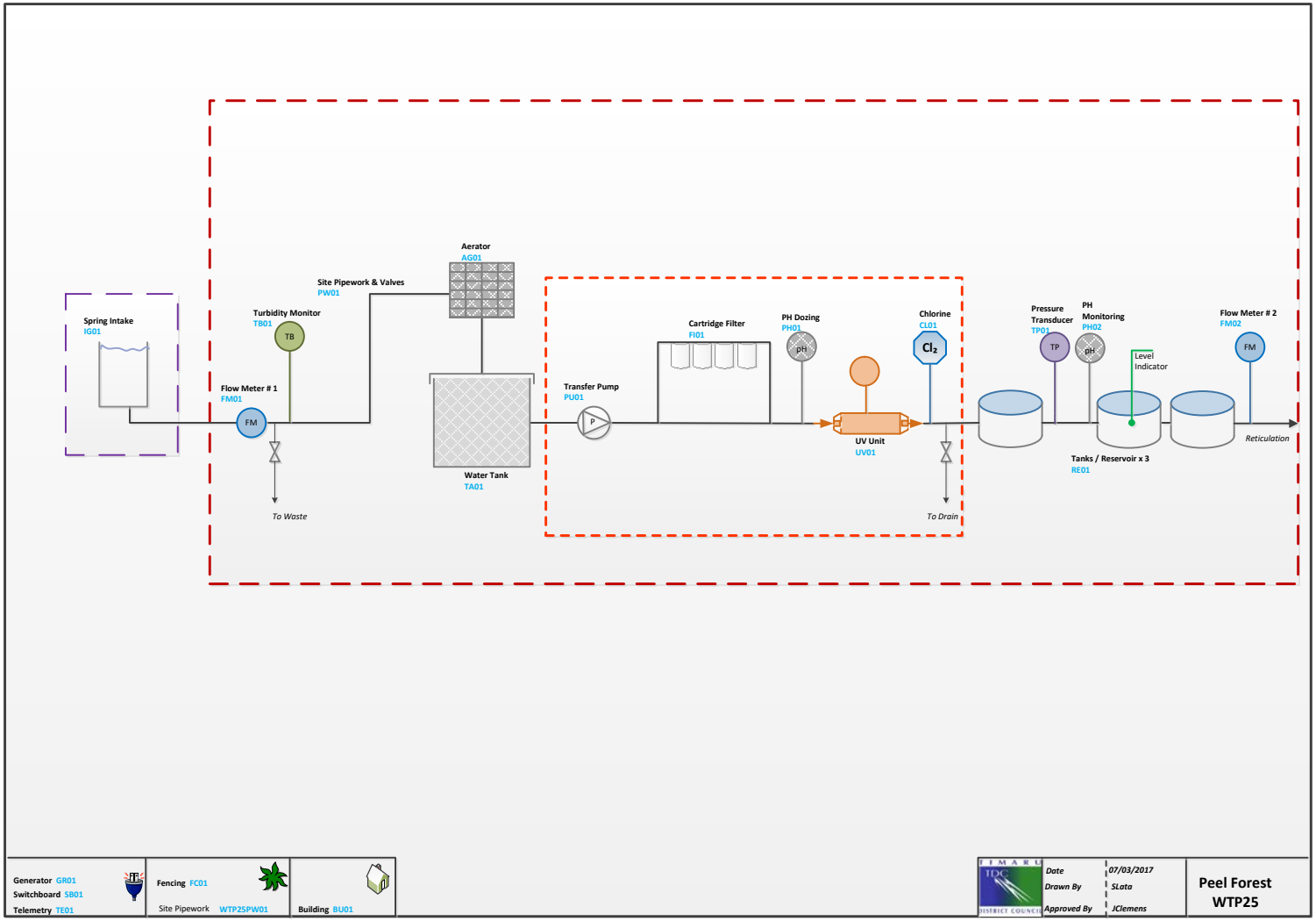


Figure 17: Peel Forest Water Supply Schematic

B. Reticulation

Reticulation is mainly PE pipes, approximately 3 kilometres. Table 28 below shows the network profile.

Table 27: Peel Forest Water Supply Network Profile

Diameter Group (mm)	PE-HD Length (m)
000-020	1,003
021-025	221
026-032	275
033-050	1,269
Total	2,768

B3.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

The source is a spring where water is collected in a box and piped to the treatment plant. There are no assets at the site other than an easement on the land.

Treatment

The treatment plant was upgraded to meet Section 10 Small Water Supplies, Alternative Compliance Criteria of the DWSNZ in 2016 (Bacterial and 3 log treatment).

The capacity of the treatment plant matches that of the intake which increased to 65m^3/day with the lowering of the raw storage tank in 2016.

Storage

The storage tank holds 20 hours supply at maximum daily demand.

B. Reticulation

Majority of the pipes have 50 or more years remaining useful life. The age profile of the reticulation network is shown in Figure 18.

Current network capacity is sufficient to meet the required Levels of Service in this AMP period.

The reticulation is not designed to provide fire fighting capabilities.

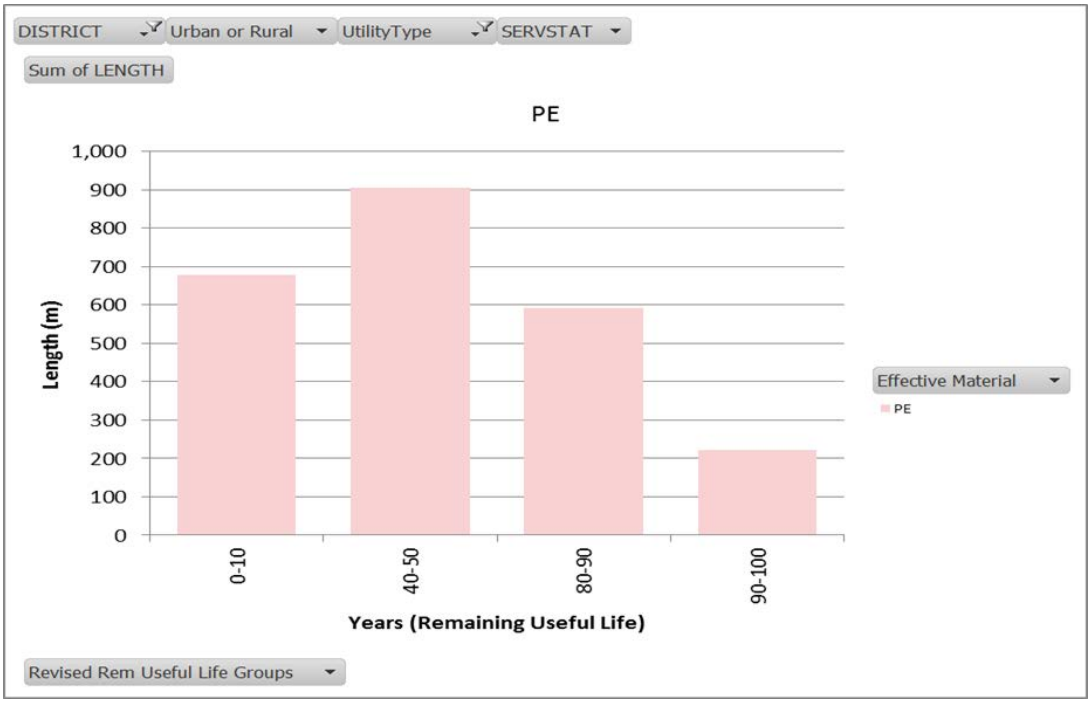


Figure 18: Peel Forest Water Supply Network Remaining Useful Life

B3.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the source and Treatment Plant are contained in the Operations Manual (Document # 1063898).

The reticulation network is a dead-end system with no ring main coverage, therefore the system needs to be shut down when undertaking system maintenance.

The service connections terminate at a toby tap adjacent to the property boundary. To maintain separation from the private pipework inside each property each connection has a non-testable dual check backflow preventer and private onsite storage. Onsite storage is a requirement of the scheme.

Section A9.1 has details of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

Some treatment plant components will require replacement during the next 10 years. All plant assets are expected to meet their expected lives.

Figure 19 shows the reticulation renewal programme.

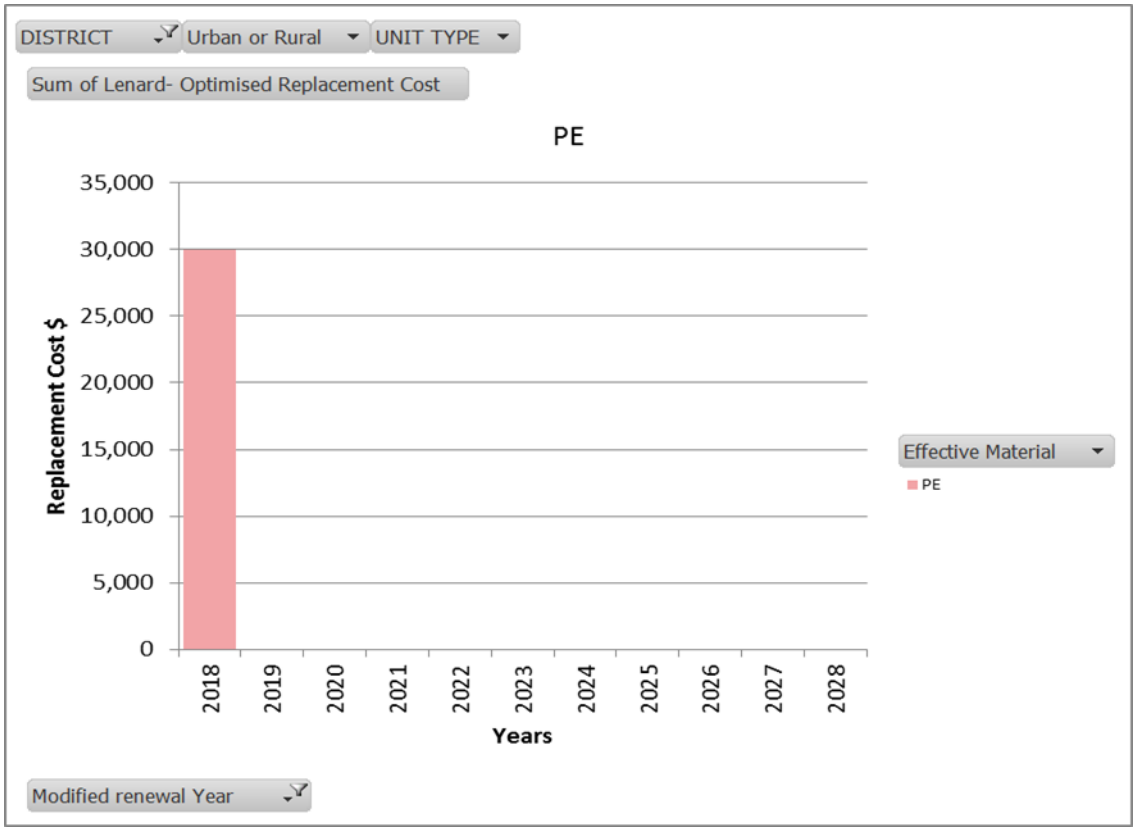


Figure 19: Peel Forest Water Supply Network Renewal Programme 2018-2028

C. Asset Development

There are no programmed asset development in this AMP period. Refer to related discussion in B3.4 on Demand Forecast.

B3.3 Risk Management

A. Water Safety Plan

Risks to the Peel Forest water supply were identified and assessed during the development of the scheme's Water Safety Plan (TRIM Document #847903).

One risk was identified, together with mitigating measures. Improvements to the water supply were identified, together with a time frame.

The improvement identified in 2017 has commenced. It consists of:

- Ongoing liaising with ECan to ensure implementation of the rules within the LWRP. This relates to septic tanks within the Community Drinking Water Protection Zone.

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 29 below were extracted from the water assets criticality assessment report in document # 829869.

Table 28: Peel Forest Water Supply Facility Asset Criticality

Peel Forest Facility Asset	Criticality Rating*	Condition Rating**	Risk
Peel Forest Spring Intake	C	2	Insignificant
Peel Forest Treatment	C	2	Insignificant
Peel Forest Reservoir	C	1	Insignificant

* C = Asset components can fail without affecting the operation and service, and where repairs or renewal can be realistically deferred.
**2 = Very Good Condition. Superficial deterioration. Minor reliability issue. Minor maintenance only is required.
**1 = Near as new condition with no defects. Asset is fully serviceable.

The area affected by the failure of the Peel Forest WTP is restricted to the Peel Forest Water Supply. The reservoir has approximately 4 days storage at average daily demand and all customers connected are required to have at least 900 litres on site storage.

In case of power failure, there is a generator connection socket to manually connect to and switch onto generator mode. The generator is kept at Claremont. The Peel Forest TP has a lower district wide priority for generator start up in the event of a total network wide power failure.

Figure 20 shows the reticulation network criticality.

The scheme's asset criticality ratings will be reviewed and updated as part of this AMP's Improvement Plan.

Figure 20: Peel Forest Water Supply Network Criticality

B3.4 Demand Forecasting and Management

A. Demand Drivers

- Demand from the scheme comes mainly from the approximately 63 resident population of Peel Forest.
- Demand will increase significantly during holiday periods. Holiday homes have low storage and short term high demand.
- Pipe bursts from frost results in water loss and an associated increase in demand from the scheme.
- Excessive watering can impact on ability to supply consumers at peak demand periods.

B. Demand Forecast

- Council's Draft Growth Management Strategy states that residential development in Peel Forest will remain within the existing boundaries and at current densities.
- By 2046 the Peel Forest settlement will be home to only a small number of additional permanent residents. Growth potential in this settlement is limited as it remains, on the whole, un-serviced.
- No significant change in demand is expected based on the last 10 year performance of the scheme.
- Any actual change in demand is assumed to stay within projected levels.
- The scheme has no allowance for industrial/commercial and agricultural use of water
- The scheme has no capacity for new connections without increased demand management.

C. Demand Management

Data in Table 30 show the trend in water use and loss within the scheme:

Table 29: Peel Forest Water Demand Statistics

Year	Volume of Demand (m^3)	Network Water Loss
2016/17	tbd	Monitored only
2015/16	8,891	Monitored only
2014/15	7,970	Monitored only
2013/14	7,726	Monitored only
2012/13	6,357	Monitored only
2011/12	6,490	Monitored only

Demand management approaches:

- Monitoring demand, particularly during holiday periods
- Encouraging greater storage at cost to the consumer
- If excessive demand becomes prevalent, consider converting the scheme to a restricted supply
- Implementing hosing restrictions to manage short term high demand during holiday periods
- Scheme upgrade – should additional capacity be required, the scheme will be upgraded from the intake and at the treatment plant and reticulation.

B3.5 Summary of Issues and Requirements

Ageing Infrastructure

1. Some treatment plant components will require replacement during the next 10 years Some mains are up for renewal

Meeting Demand

2. Demand will increase significantly during holiday periods that could impact on the ability to supply consumers during peak demand period

B3.6 FINANCIAL PLAN

B3.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 30: Peel Forest Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Utilities Maintenance Contract		1.5	18/19
2	Urban watermain reticulation renewals and upgrades		1,228 (all urban)	18/19
3				

B3.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B4 PLEASANT POINT

B4.1 SCHEME OVERVIEW

The Pleasant Point Water Supply is an urban scheme with on-demand and on-site storage supply. The supply is for domestic drinking water purposes only. Pleasant Point's water comes from 3 shallow (6m deep) wells in Halstead Road, it goes through an ultraviolet light treatment plant before entering the reticulation.

Upgrading of the scheme is being undertaken which will result in a greater ability to allow on-demand connections and the removal of on-site storage tanks as an option to property owners.

Table 32 summarises key information about the scheme. Figure 21 shows the boundary of the scheme.

Table 31: Pleasant Point Water Supply Key Information

Item	Description
Scheme population (Water NZ NPR definition)	approximately 1,282
Number of connections	Residential = 571 Non-residential = 43
Firefighting availability	Yes
Resource consent//Expiry date	Resource consent conditions allow 50 L/s abstraction rate with a maximum take of 1,850 m^3 per day. The consent expires in 2034.
Sources	2 bores, 1 infiltration gallery
Average daily demand	765 m^3
Peak day demand	1558 m^3
Treatment requirement and process used	3 log UV disinfection
Location of treatment plant	Stratheona Road
Number and storage capacity of reservoirs	Existing = 1 x 136 m^3 New reservoir (to be completed in 2017/18) =
Reservoir Storage Buffer	Nil
Number of pump stations	1 PS at treatment plant 1 PS from reservoir to reticulation
Length of reticulation	16 km
Rating	• Urban targeted rate of fixed amount per rating unit (rate is set yearly in the Annual Plan) • A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit within the Pleasant Point scheme which has been fitted with a water meter
WSP Review	November 2018

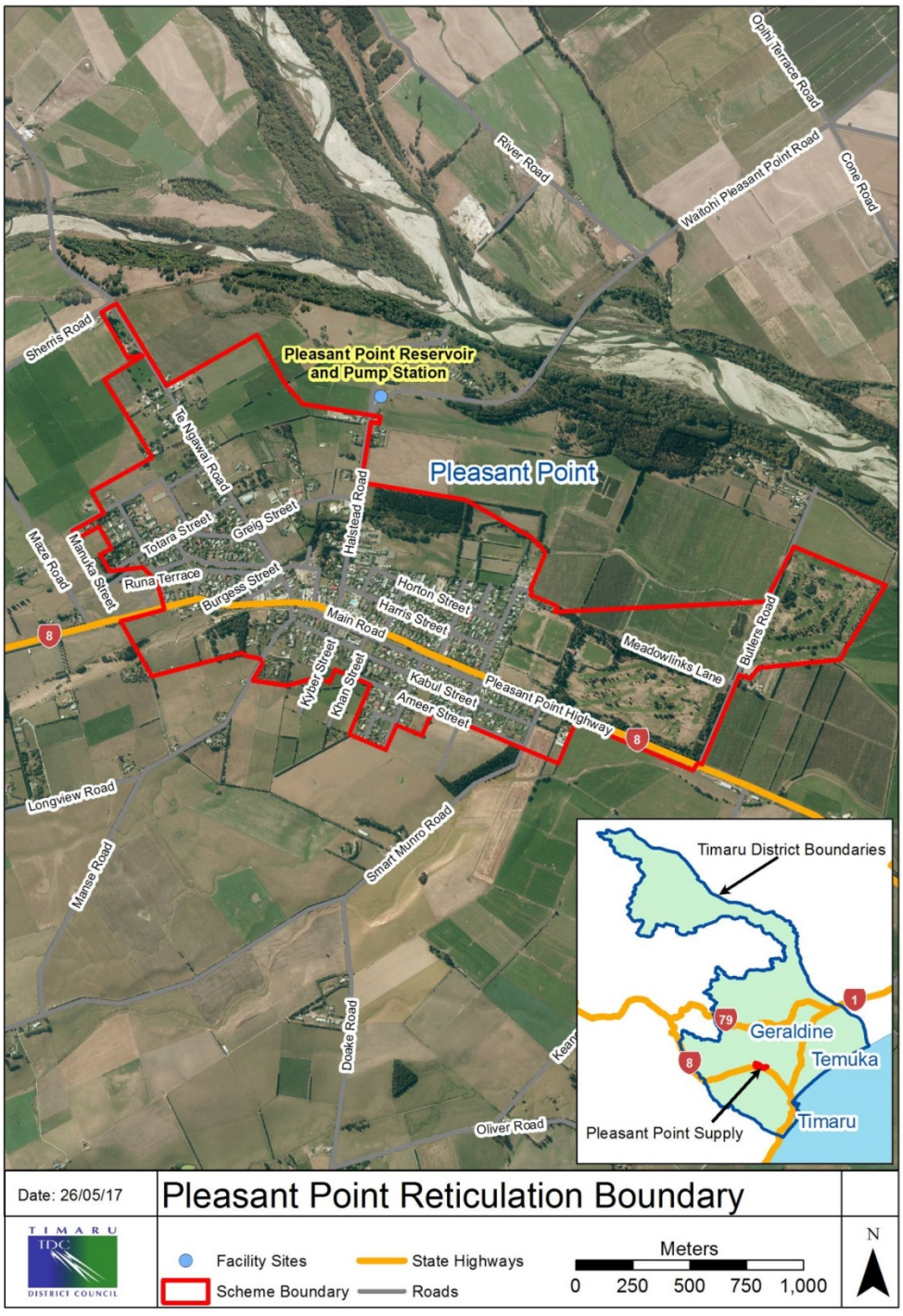


Figure 21: Pleasant Point Water Supply Scheme Boundary

B4.2 SCHEME MANAGEMENT

B4.2.1 ASSET SUMMARY

A schematic diagram of the Pleasant Point Water Supply is shown in Figure 22 below.

A. Plant Assets

The asset components of the scheme consist of:

- 1 infiltration gallery
- 2 bores
- a pump station
- a treatment plant
- a reservoir
- telemetry

B. Reticulation

There are approximately 16 km of pipe within the reticulation. Table 33 shows the profile of the network.

Table 32: Pleasant Point Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)						Total (m)
	PVC	CC	PE	AC	ST	Unknown	
000-049	284		128		234		646
050-099	339		2,193	229	188		2,949
100-149	2,258	2,524	141	823	92	1	5,840
150-199	4,261	586		55	15		4,916
200-249	1,001			497	12		1,511
300-399				70	45		114
Total	**8,143**	**3,110**	**2,462**	**1,673**	**587**	**1**	**15,976**

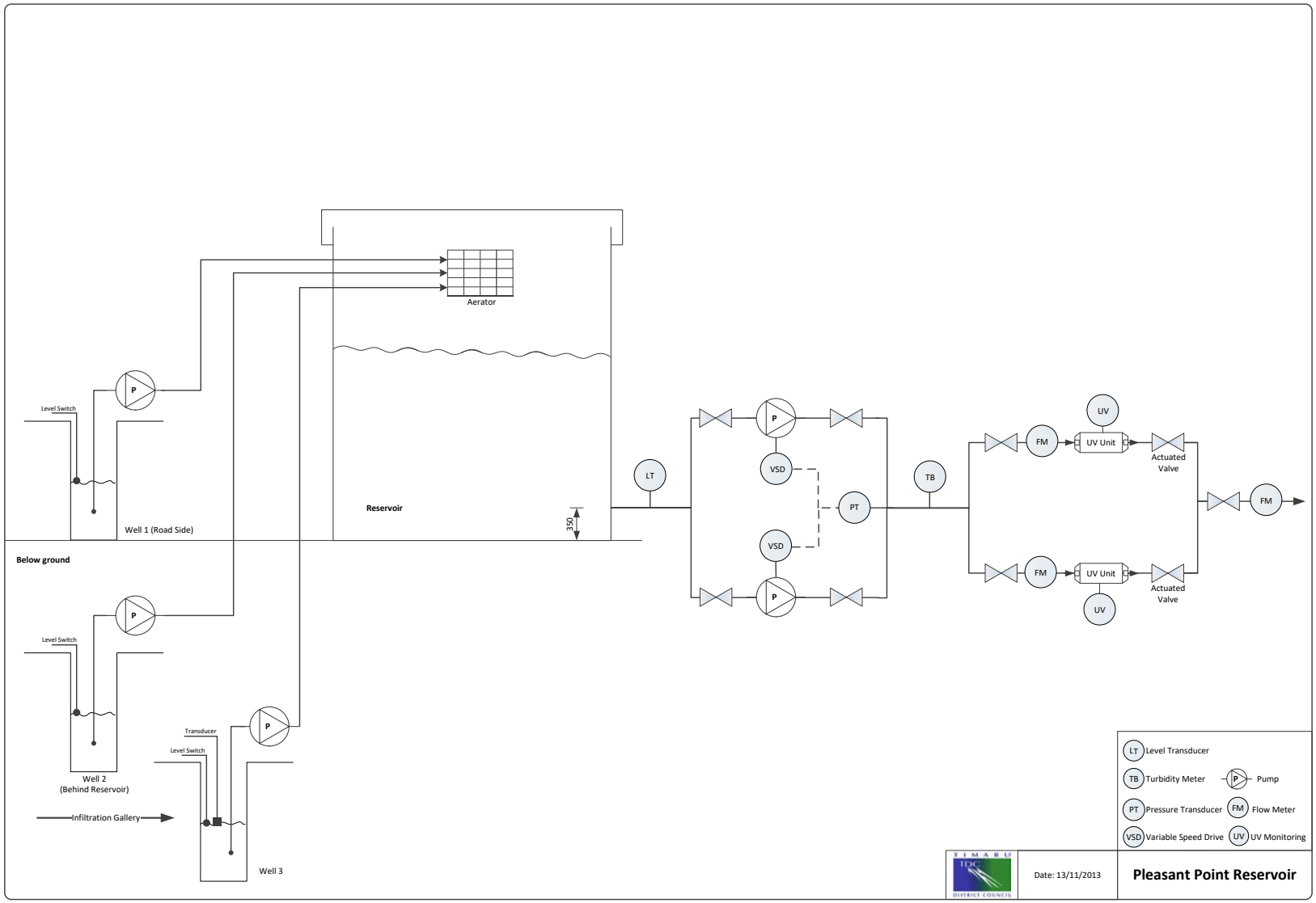


Figure 22: Pleasant Point Water Supply Schematic

B4.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

Water is sourced from two bores and an infiltration gallery.

Low water table levels occur relatively regularly and the well pumps are subsequently throttled back to ensure continuous pumping at a reduced rate.

The design of the headworks is based on supplying 50 L/s to the network.

Treatment

The water is firstly aerated and then passes into a 136 m^3 concrete raw water reservoir. From this, water then passes through a booster pump, an ultraviolet irradiation disinfection unit and then is supplied to the new reservoir (2018).

During extended wet weather water quality may not be sufficient for disinfection alone.

The raw water reservoir will be retained at this time. Once the new reservoir is completed the raw water reservoir will be taken out of service for maintenance. It has a remaining life expectancy of 15 years, although the roof will require replacement prior to this.

The treatment plant building requires seismic strengthening or replacement

Storage

The ongoing reservoir upgrading project is expected for completion in 2017/18. Once the new reservoir has been built, it will have usable storage volume of 2,400m^3 which will improve the security and resilience to Pleasant Point water supply.

Additional pumps are required to supply adequate pressure from the new reservoir into the reticulation.

B. Reticulation

Pleasant Point has a significant amount of CC pipes installed, making up 3 km of the water mains network. Water leak detection studies have shown joints in CC pipes are prone to leakage and thus requiring monitoring. Therefore increasing pressure within the network to improve fire fighting capabilities could increase water leakages. Priority in reducing leakage will be the renewal of the CC water mains.

The age profile of the reticulation network is shown in Figure 23.

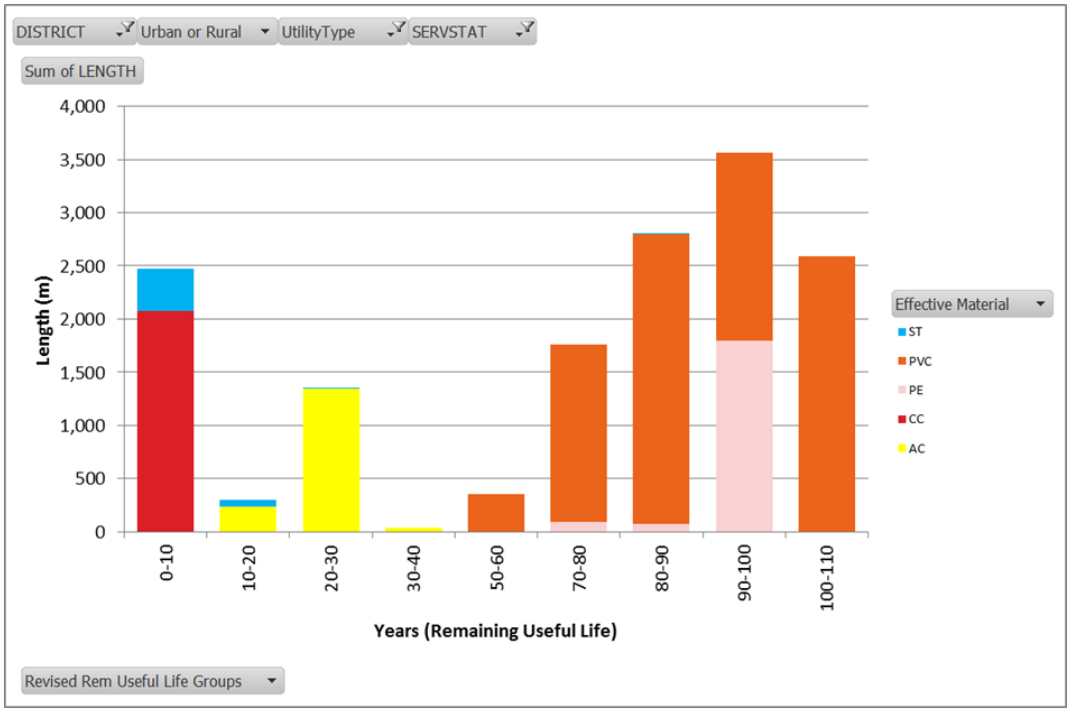


Figure 23: Pleasant Point Water Supply Network Remaining Useful Life

Current network capacity is sufficient to meet the required Levels of Service in this AMP.

The network is designed to be able to deliver firefighting supply of 50l/s to the school. During this event the network pressure will be reduced and may not be able to maintain the level of service. On-site storage in property is currently required to maintain the level of service during this event unless the property owner had applied for storage tank dispensation. After the new reservoir installation, pump station upgrade and major CC pipe has been replaced on-site storage in flat area of Pleasant Point is not required.

B4.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are contained in the Operations Manual (Document # 294135).

The manual will require updating following the installation of the reservoir and pump station. This will reference the 5 yearly reservoir inspections.

There are 2 different situations for maintenance on the Pleasant Point water supply:

If a toby exists at the boundary:

- The Council is responsible only to this toby
- Connected property is responsible for all the pipework etc within the bounds of the property including the tank ballcock maintenance

If no toby exists, the Council is responsible for the supply up to:

- The ballcock of the tank where the ballcock is less than 6m above the ground
- The base of the tank stand where the ballcock is more than 6m above the ground
- The foundations when the tank is inside a building

As all properties are required 500 litres or more of storage the Council does not notify if the water supply is to be shut down for maintenance purposes.

Section A9.1 has details of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

Plant renewals planned from 2015/16 to 2017/18 have been delayed and will be carried out following the completion of the new reservoir. This includes remedial work on the raw water reservoir which is difficult to manage without storage.

The reticulation renewal programme is shown in Figure 24. CC water mains will be the priority to be renewed to reduce leakages and staging the on-site storage to a demand system to the flat area of Pleasant Point.

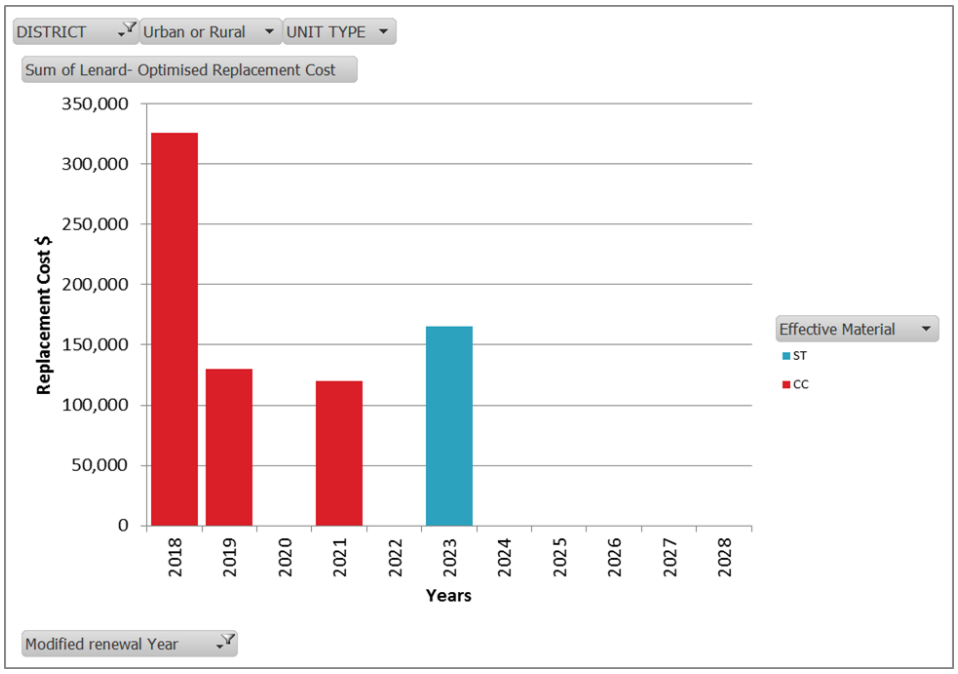


Figure 24: Pleasant Point Water Supply Network Renewal Programme 2018-28

C. Asset Development

- New reservoir to be installed in 2017.
- Pump station upgrade to boost pressure from the new reservoir to be installed in 2017/18.
- Duplicate trunkmain from the water treatment plant outlet to the network to improve resilience to the Pleasant Point Water Supply.

B4.3 RISK MANAGEMENT

A. Water Safety Plan

Risks to the Pleasant Point Water Supply were identified and assessed during the development of the scheme's Water Safety Plan (Document #846002).

A number of risks were identified, together with mitigating measures. Improvements to the water supply were then identified, together with a time frame.

The improvement identified in 2013 and not yet completed is:

- Consider additional treated storage possibly at higher pressure level - 2015/16

A contract has been let for a new reservoir alongside the Treatment Plant and should be completed in 2017. The risk *Unable to supply water at appropriate pressure to all consumers* has not been addressed with this upgrade.

Additional risks not identified in the water safety plan are:

- The lack of disinfection residual in the reticulation especially with the installation of the new reservoir which has a risk from bird ingress

Chlorine is also known to be more effective against virus than UV treatment.

- Contamination of the source could occur as there is an abandoned well 30m from the infiltration gallery. Stormwater can enter this unprotected well.
- The installation of BFPs in the business area resulted in low pressure beyond. As a result the pressure from the treatment plant to the reticulation was increased in 2017. This has increased the risk of leakage.

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 34 below were extracted from the water assets criticality assessment report in document # 829869.

Table 33: Pleasant Point Water Supply Facility Asset Criticality

Pleasant Point Facility Asset	Criticality Rating*	Condition Rating**	Risk
Bores	B	2	Insignificant
Treatment Plant	A	2	Low
Reservoir	A	4	High

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
* B = asset components are important to the effective day to day operation of the system where redundancy or contingency should be available for restoration of service within a reasonable time.
**2 = asset has superficial deterioration and minor issue with reliability. Minor maintenance only is required.
**4 = major or serious deterioration is evident. Asset is not operating effectively and major problems are imminent. Major maintenance or rehabilitation is required.

The risk of failure of the Pleasant Point Reservoir is being mitigated by an ongoing project to upgrade the facility. The upgrade is due for completion in 2017/18.

Figure 25 shows the reticulation network criticality. Pleasant Point Watermains Criticality Rating report is in document #84887.

The criticality assessment of the scheme's assets will be reviewed and updated as part of this AMP's Improvement Plan.

Other Risk:

Trunkmain from Reservoir to the network – there is no other supply to the reticulation if the pipe is not operative. Planning is required in order to make sure the pipe can be commissioned within 8 hours prior to the shutdown. Critical valve has been identified if any repair is required to the pipe. Removal of air sufficiently by opening multiple fire hydrants to bleed the air is required. Shock dosing with chlorine to provide short term disinfection within the reticulation from the reservoir should be considered.

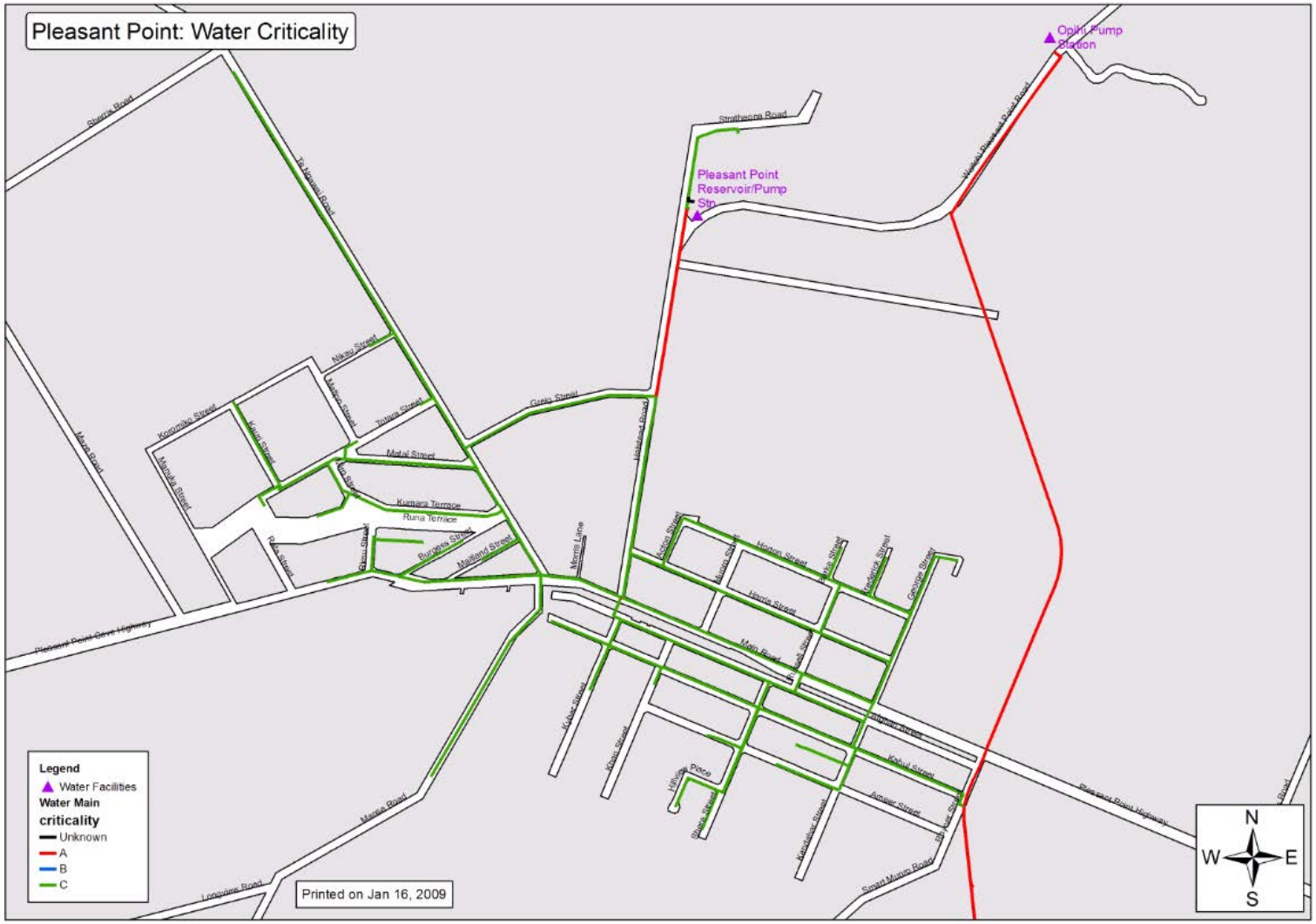


Figure 25: Pleasant Point Water Supply Network Criticality

B4.4 DEMAND FORECASTING AND MANAGEMENT

A. Demand Drivers

The scheme currently has around 612 connections and serves approximately 1,282 reticulated populations. These are all within the projected demand levels and the capacity of the assets.

B. Demand Forecast

- Growth directions from the Council's *Draft Growth Management Strategy (GMS)*:

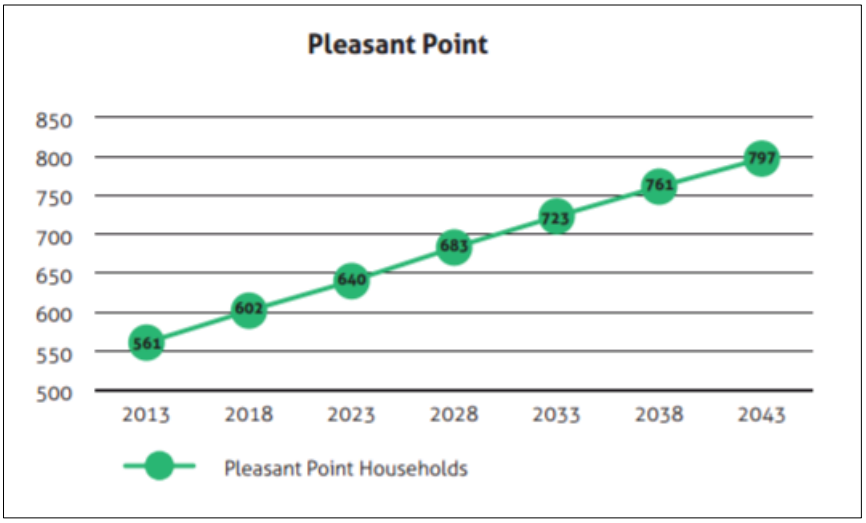


Figure 26: Pleasant Point Forecast Household Growth

  - Shown in Figure 26 is the projected increase in residential (housing) demand in Pleasant Point
  - Rural residential opportunities by Manse Road to be promoted to the South
  - Existing town centre and industrial zones to be intensified to improve productivity

- Scheme boundary changes in the periphery may be requested.

C. Demand Management

The data in Table 35 show the trend in water use and loss within the scheme.

Table 34: Pleasant Point Water Demand

Year	Volume of Demand (m^3)	Infrastructure Leakage Index (ILI)
2016/17	253,960	1.5
2015/16	271,681	2.6
2014/15	248,673	-

2013/14	262,134	-
2012/13	334,158	5.1
2011/12	280,087	-

Water shortage issue from insufficient storage is being addressed with the installation in the scheme of a new reservoir with greater storage capacity. Associated with this upgrade, there is now greater ability to allow direct on-demand connections to the scheme.

For the flat area of Pleasant Point staging from on-site storage to demand system will be followed with the cast concrete main renewal programme to ensure pressure and demand is managed to minimise leakages in the existing cast concrete main. The property connection to demand system will be done in conjunction with the reticulation renewal programme.

If the tank removal to demand system is high that the network could not maintain the pressure and leakages, a moratorium on the removal of tanks will be implemented to control pressure and leakages issue, or compress the reticulation renewal programme.

Properties in the high area of Pleasant Point will need on-site storage.

B4.5 Summary of Issues and Requirements

Ageing Infrastructure

1. CC water mains will be the priority to be renewed to reduce leakages
2. Raw water reservoir – remedial works, roof renewal
3. Treatment plant building requires seismic strengthening or replacement

Security of Supply

4. New reservoir to be installed in 2017.
5. Pump station upgrade
6. Duplicate trunk main from the water treatment plant outlet to the network to improve resilience to the water supply - TBC
7. Not able to allow low flat areas in Pleasant Point direct on-demand connections to the scheme

B4.6 FINANCIAL PLAN

B4.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 35: Pleasant Point Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	New Reservoir	Renewal, LOS and Growth	$566,000	2017
2	Pump Station Upgrade in new Treatment Plant ? is this what's referred in B4.2.2?	LOS	$295,000	2017
3	Duplicate Trunkmain from Outlet of WTP to network	LOS and Growth	$100,000	To be confirmed in LTP
4	Urban watermain reticulation renewals and upgrades		1,228 (all urban)	18/19
5	Utilities Maintenance Contract		15	18/19

B4.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B5 TEMUKA WATER SUPPLY

B5.1 SCHEME OVERVIEW

Temuka Water Supply Scheme is an urban on-demand scheme that supplies domestic drinking water only.

The Scheme supplies treated water to three distinct networks, namely:

- The Temuka Water Supply, a predominantly urban on-demand water supply with water supplied to the consumer's boundary.
- The Orari Water Supply, a restricted water supply to the consumer's storage facility
- The Winchester Water Supply, a small urban on-demand water supply with water supplied to the consumer's boundary.

Table 37 summarises some key information about the scheme and Figure 27 shows the scheme's boundary.

Table 36: Temuka Water Supply Key Information

Item	Description
Scheme population	Approximately 4,199
Number of connections (Water NZ NPR definition)	Residential = 1,983 Non-residential = 140
Firefighting availability	Yes
Resource consent//Expiry date	CRC167644 23/8/2048 8,470 m^3/day, each bore 25-30L/s
Sources	Bores at various depths and sites.
Average daily demand	3,479m^3 through Treatment Plant 3,409 m^3 to Temuka from TP
Peak day demand	5,623 m^3 through Treatment Plant 5,513 m^3 to Temuka from TP
Treatment requirement and process used	3 log UV disinfection
Location of treatment plant	Orari Station Road
Number and storage capacity of reservoirs	1 x 1650m3
Reservoir Storage Buffer (days of treated water storage in reservoir)	0.3-0.5 days
Number of pump stations	2 Orari bore and Treatment site bores
Length of reticulation	57 km
Rating	• Urban targeted rate of fixed amount per rating unit (rate is set yearly in the Annual Plan) • A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit within the Temuka scheme which has been fitted with a water meter
WSP Review	July 2018

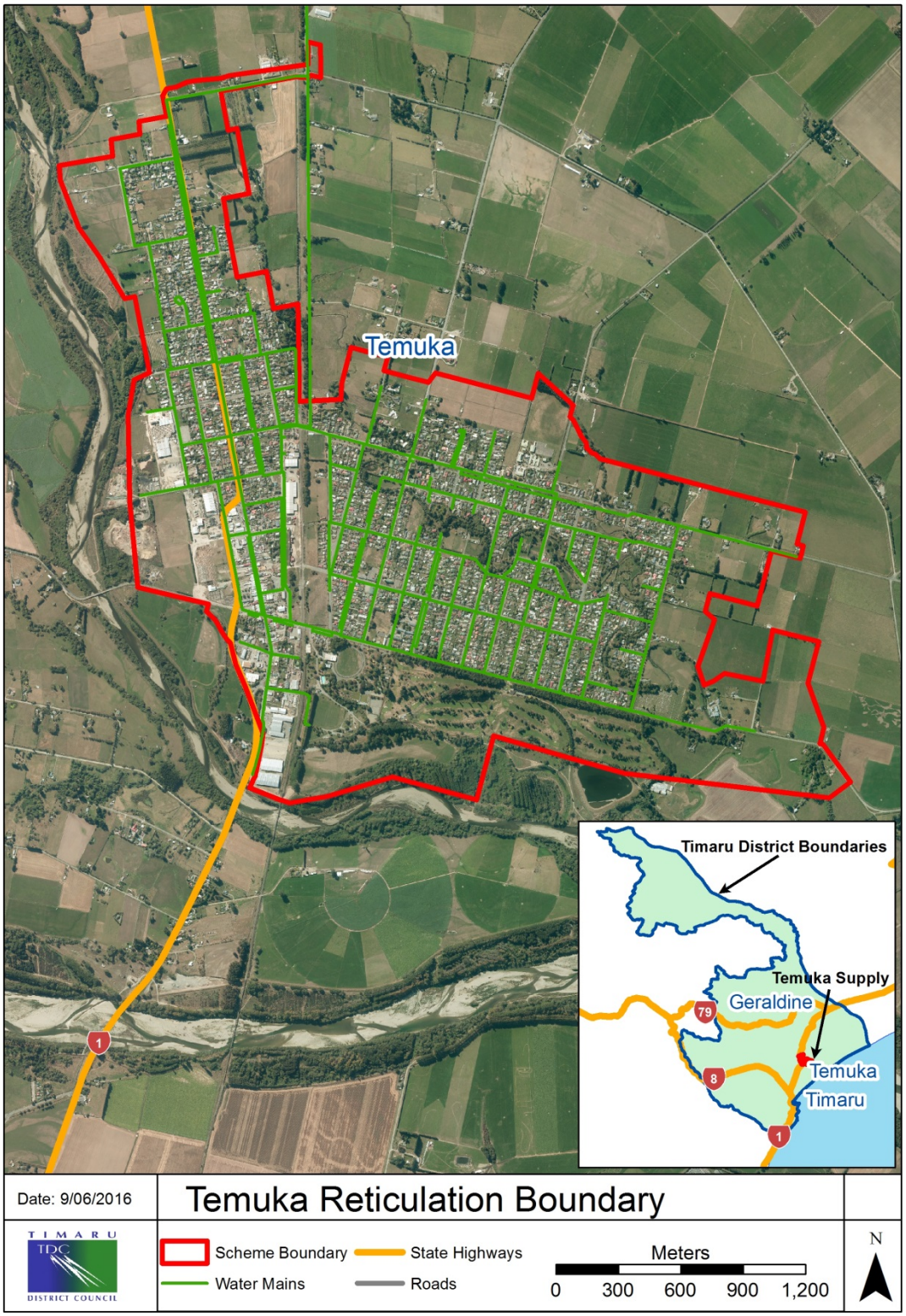


Figure 27: Temuka Water Supply Scheme Boundary

B5.1a Temuka Water Strategy

Background:

During the summer of 2014-15 Timaru District Council's (TDC) Timaru and Temuka water supplies were put under stress from an extended period of dry weather leading up to the summer demand period.

Opus International Consultants Ltd. (Opus) were engaged by TDC in March 2015 to undertake the 30 Year Strategy ('Strategy') investigation for the Timaru and Temuka water supplies. In addition Environmental Consultancy Services Ltd. (ECS) were engaged by TDC to provide local expertise in terms of surface and water sources within the areas of interest around the existing water supplies.

The key objectives of the Strategy are to:

1) identify the preferred option(s) to address the ongoing issues TDC has had in terms of the ability of the Temuka and Timaru water supplies to meet demand; and
2) confirm whether the capital works identified in TDC's 2015-2045 Infrastructure Strategy provide the appropriate solutions for both water supplies.

The following are the results of the investigations by Opus.

Conclusions:

The current peak day demand for the Temuka water supply is 4,500 m3/day. This is forecasted to increase to 5,240 m3/day in 2046. Of this, approximately 500 m3/day is estimated to be leakage in the Temuka trunk main, with the bulk of leakage attributed to the poor condition 3.2 km concrete section. In comparison it has been estimated that the drought capacity of the existing Temuka sources (Temuka and Orari bores) is approximately 3,240 m3/day, a current deficit of 1,260 m3/day.

At 50 % of its consented take the Orari spring source would provide the shortfall against current peak day demand. Whilst the long-term viability of the spring source is unknown, it has been a significant source for the Temuka water supply for many years.

The ground water levels from which the shallow Temuka and Orari bores take water can drop significantly during drought periods and low flows in the Orari river. An alternative, deeper ground water source would provide additional security for the Temuka water supply.

Installation of membrane filtration at Orari would resolve the issue of the existing sources being unavailable due to high turbidity levels. However the capital and operational costs of a new WTP would be significant. Blending of the existing source water with an alternative new source (deep ground water) may be more cost effective.

The issue of the current Winchester water supply being non-compliant with DWSNZ can be resolved by either upgrading the existing WTP to include UV disinfection, or connection of the Winchester township to the Temuka trunk main.

The Temuka trunk main is the main security of supply issue for the Temuka township. Installing storage at Temuka will reduce the risk associated with the trunk main. If the sources are to continue to be located at Orari, renewal of the Temuka trunk main will also reduce the risk.

The estimated demand of 2,000 L/connection/day in the Temuka township reticulation is high.

Recommendations:

1) Assuming that the Temuka bores, Orari bores and Orari spring source are all utilised, carry out renewal of the Temuka trunk main and confirm the reduction in leakage (and thereby peak day demand).

2) Recommission the Orari spring source (upgrade the existing headworks and renew the 3 km spring trunk main).

3) Carry out bore drilling and investigation to confirm yield and water quality of a new deep ground water source at Orari.

4) If water quality permits, utilise the new ground water source for blending with existing spring and bore water during periods of high turbidity levels from the existing sources.

5) Depending on 1) to 3) either install UV WTP and additional storage at Winchester, or connect the Winchester township to the Temuka trunk main.

6) Construct storage at Temuka to reduce the security of supply issue associated with the Temuka trunk main supply to Temuka township.

The consultant's full report on the Strategy is in document #1004172.

B5.2 SCHEME MANAGEMENT

B5.2.1 ASSET SUMMARY

A. Plant Assets

The asset components of the scheme consist of:

- Spring intake and 4 bores
- a pump station
- a treatment plant
- a reservoir
- telemetry

A schematic diagram of the Temuka Water Supply is shown in Figure 28.

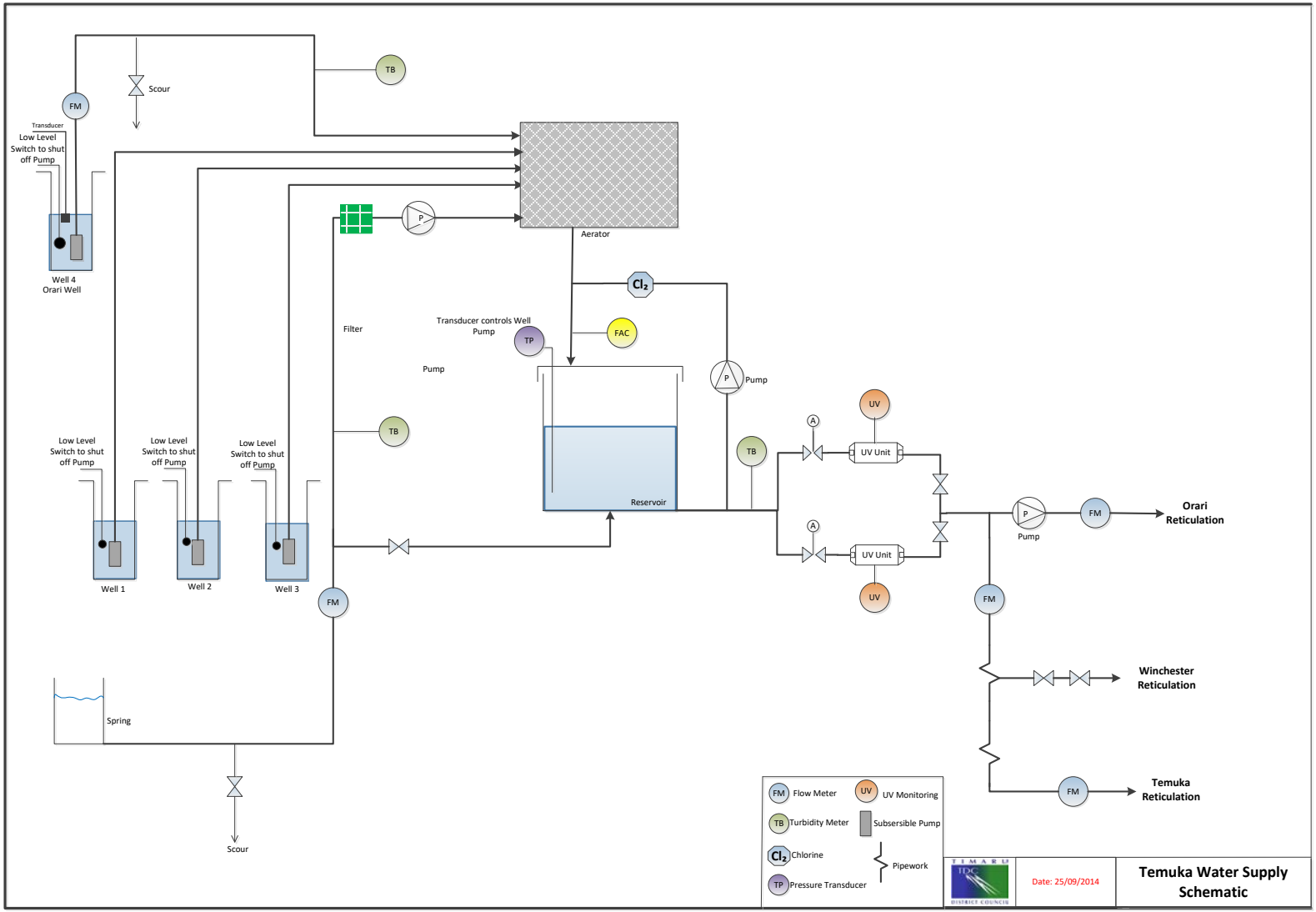


Figure 28: Temuka Water Supply Schematic

B. Reticulation

There are approximately 57 km of pipe within the reticulation. Table 38 below shows the profile of the network.

Table 37: Temuka Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)					
	PVC	PE	AC	ST	Unknown	Total
0-049		705		618		1,324
050-099	1,227	3,311	376	1,927		6,841
100-149	5,678	1,237	9,922	1,736	9	18,580
150-199	2,276	65	5,585	1,409		9,335
200-249	1,826		3,810			5,636
300-399	6,475		8,900	41		15,416
Total	**17,483**	**5,317**	**28,593**	**5,731**	**9**	**57,132**

B5.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

Bore 1 and 2 (11m and 14m) are influenced by the water table level. In the drought of 2014-2016 the pumps had to be throttled to ensure they did not stop on low levels. Pump 1 was removed and a sump pump installed as there was insufficient water depth for a submersible pump.

Bore 3 (23m) is from a less productive aquifer.

Bore 4 (10m) at the Coach Road site started producing turbid water in 2013. It remained unused from December 2013 to February 2015 when it was used with dilution from the other wells. This quality improved in 2016 following some rain.

The above sources were barely able to meet the demand in 2015, especially prior to the replacement of the concrete section of the trunk main.

Date	Bore 1 flow l/s	Bore 2 flow l/s	Bore 3 Flow l/s	Bore 4 Flow l/s
13/03/2012	22	24	28	
23/11/2012				23
23/03/2015	7 Sump pump in use. Flow prior to sump pump install on 4/3/15 was 5.6	23 but required to be throttled. Estimated at 15	11	15 Throttled for turbidity not water availability

Bore 5 (82m) was installed in 2017. There are no long term records on the reliability of this bore. The bore was test pumped at 18l/s.

The spring source has been abandoned. It will be a substantial project to reinstate this source.

The Winchester bore was decommissioned in 2016 and the supply to Winchester is from Temuka. The demand to Winchester is less than the leakage rate from the replaced section of trunk main.

Treatment

UV is used to kill bacteria and protozoa (giardia and cryptosporidium) and chlorine to prevent the water getting re-contaminated in the reticulation network.

The water passing through the treatment must be less than 1 NTU.

If the generator fails during a power outage untreated water will leave the site.

Compliance was not achieved in

- 2015/16 as it was >1NTU for more than 5% of the month of January during the drought
- 2016/17 the water exceeded 2 NTU for about 3 hours (more than 3 minutes) as a result of land movement with the Kaikoura earthquake and in January the generator failed allowing untreated water to leave the treatment site for 2 hours.

The existing set up requires Chlorine to be dosed prior to UV. UV removes some chlorine.

Storage

The reservoir capacity is barely adequate with regular low level alarms occurring in high demand periods. However the long trunk main effectively adds a further 1000 m^3 of storage ensuring the township does not run out of water. The programme for a new treated water storage will be determined within the current Long Term Plan period.

A recent assessment of the existing Temuka reservoir suggests it has a remaining life of 20 years without remediation, or 50 years with remediation within 2 years, estimated at $250,000. In addition the reservoir is likely to fail if a local earthquake occurs. Remediation would cost an additional $500,000.

B. Reticulation

Temuka has an ageing reticulation infrastructure both Steel and AC pipes reaching the end of their useful life. A significant portion of the Steel and AC pipes is due for renewal in the next 30 years. Strategic sampling is currently being undertaken to enable prioritisation for renewal. Discovery of asbestos fibres in the Temuka Water Supply in November 2017 required the urgent replacement of the 9km AC trunk main with 450 mm diameter HDPE plastic pipe.

Leakage is a major issue in the network both public and private domain. Leak detection is programmed annually to detect leaks and report the severity of the leak in the network for it to be repaired or to be programme for renewal.

The age profile of the reticulation network is shown in Figure 29 below.

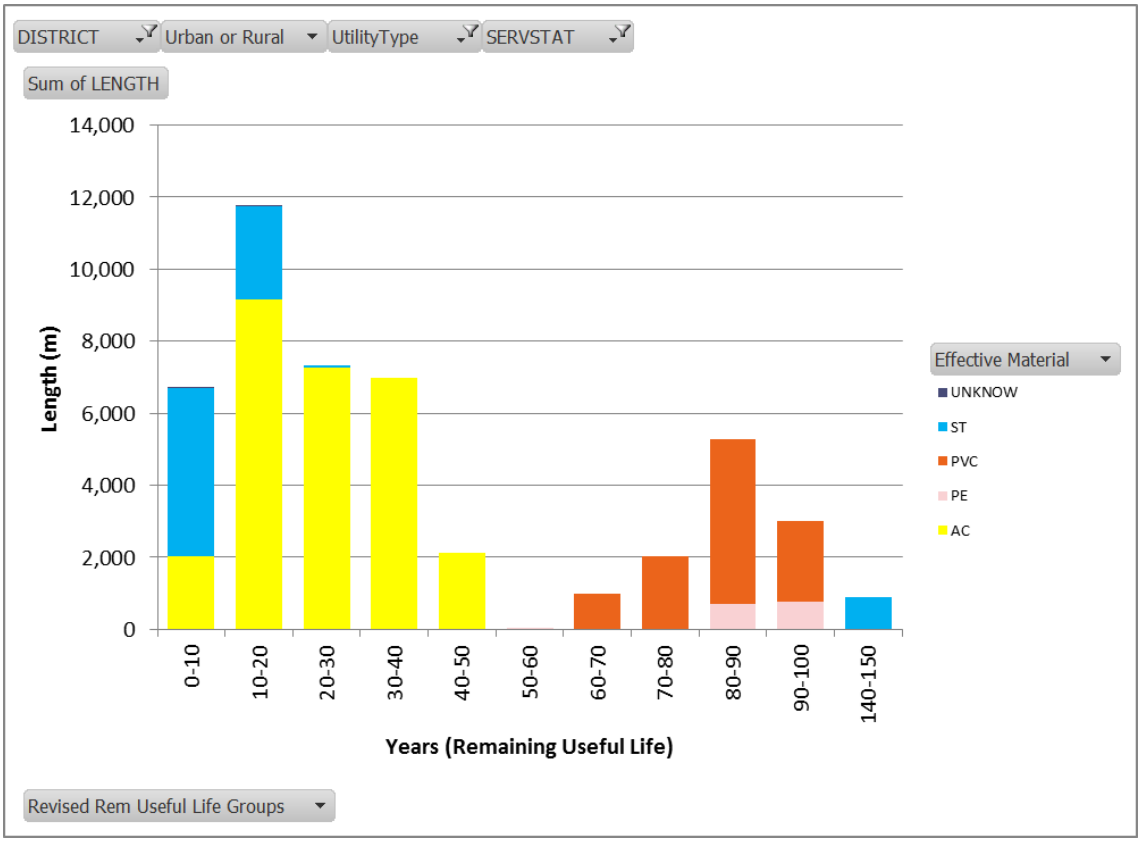


Figure 29: Temuka Network Remaining Useful Life

Current network capacity is sufficient to meet the required Levels of Service in this AMP.

Combination of factors such high leakages in the network, small size steel pipe and pipe deterioration will contribute to the scheme not being able to deliver a minimum of 25l/s firefighting flow in peak demand period.

Most Hydrants in Temuka are compliant with the main exception being hydrants on 75mm Steel mains.

B5.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are contained in the Operations Manual (Document #1073049).

The plan on the new treated water storage is still to be determined. The remedial work on the existing reservoir needs to be programmed. The remedial work would impact significantly on the operation of the headworks and treatment plant and the reliability of supply to Temuka.

Maintenance of the reservoir is extremely difficult as the reservoir cannot be bypassed. Cleaning would currently result in turbid water and non compliance with DWSNZ.

Maintenance on the UV system must be carried out in lower demand periods as the approved flow though a single unit is less than peak demands. A unit fault in peak demands will result in non compliance with the DWSNZ.

The supply to Temuka and Winchester is dependent on the Temuka trunk main being operational. The additional demand on the Temuka trunk main from the connection to supply Winchester results in pressure levels of service issues in Temuka for flows above 65 liters per second at the Springfield Road meter.

Additional details are in Section A9.1 of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

- Pump 1 has exceeded its expected life. A replacement pump has been purchased given the criticality of the source.
- The existing reservoir remediation.
- Forecast renewals in the reticulation network are shown in Figure 30.

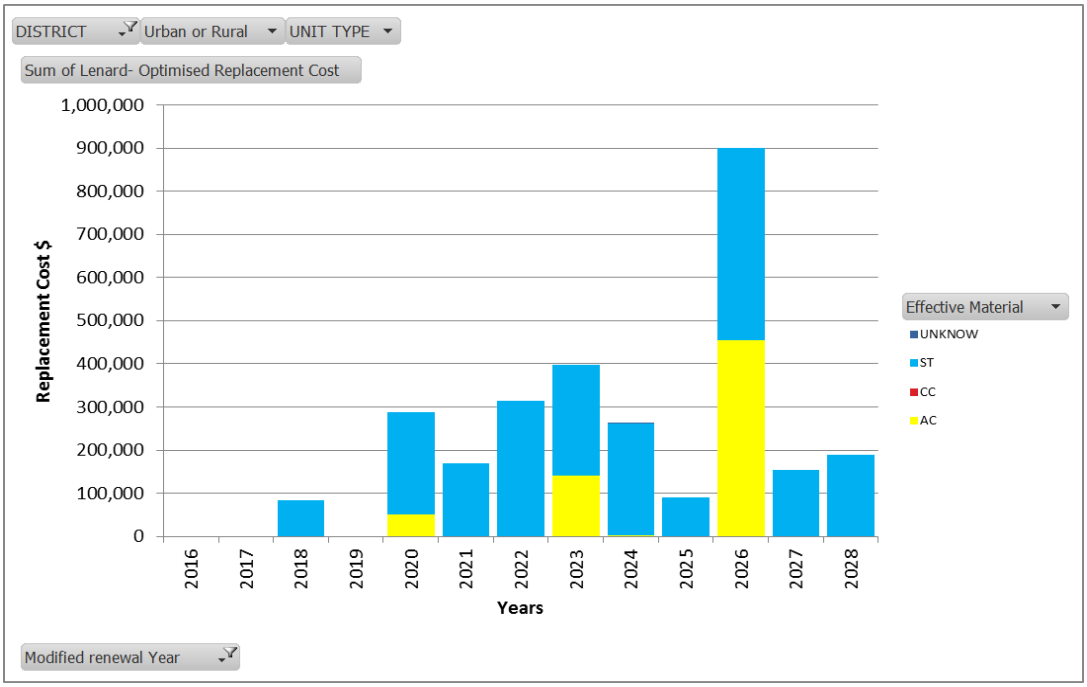


Figure 30: Temuka Water Supply Network Renewal Programme 2018-28

C. Asset Development

- The supply of adequate water for Temuka is not yet proven. Although there is budget for an additional well in 2018 this should be delayed to determine the new well is in a productive aquifer. Space at the treatment plant means any new well will be located elsewhere.
- New pipe will be required to service and provide bypass to the proposed new treated water reservoir. However the design alignment of the new pipe is to be confirmed once the location of the new reservoir and the system is confirmed.

B5.3 RISK MANAGEMENT

A. Water Safety Plan

Risks to the Temuka Water Supply were identified and assessed during the development of the scheme's Water Safety Plan (Document #821708).

A number of risks were identified, together with mitigating measures. Improvements to the water supply were then identified, together with a time frame.

The improvements identified in 2013 and not yet completed are:

- Install generator plug at Orari Bore 2020
- Consider pneumatic closure of valves on power failure 2020
- Consider storage within Temuka 2016/17
- Various improvements to the spring source and supply main which need to be addressed prior to the spring source reinstatement.

Should the spring source be reinstated the Geraldine Oxidation ponds will become a prohibited activity as the land is within the Community Water Supply Protection Zone.

Following a non-conformance with the Temuka WSP, approval has been given for a delay in the construction until 2018/19.

A number of other improvements have commenced and are on going.

Additional risks identified include:

- The risk of reservoir failure in an earthquake.

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data below were extracted from the water assets criticality assessment report in document #829869.

Table 38: Temuka Water Supply Facility Asset Criticality

Temuka Facility Asset	Criticality Rating*	Condition Rating**	Risk
Bores	A	2	Low
Treatment Plant	A	2	Low
Reservoir	A	2	Low
Spring Intake	C	3	Low
Temuka-Orari Bore	B	1	Insignificant

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
* B = asset components are important to the effective day to day operation of the system where redundancy or contingency should be available for restoration of service within a reasonable time.
**1 = near as new condition with no defects. Asset is fully serviceable.
**2 = asset has superficial deterioration and minor issue with reliability. Minor maintenance only is required.
**3 = significant deterioration. Assets are operational but display efficiency deficiencies. Routine maintenance and or refurbishment are required.

The area affected by the failure of the Temuka TP is restricted to the Temuka Water Supply (including Orari and Winchester). Apart from Orari consumers with on site storage there are no other storage available within the Temuka and Winchester supplies. In the event of a district wide event, the Temuka Water Supply has a higher priority ranking for emergency water supply.

The TP is equipped with a generator. This mitigates the risk of failure of operation in the event of a power failure.

Figure 31 shows the reticulation network criticality. Temuka Watermains Criticality Rating report is in document #84906.

Criticality assessment of Temuka water supply assets will be reviewed and updated as part of this AMP's Improvement Plan.

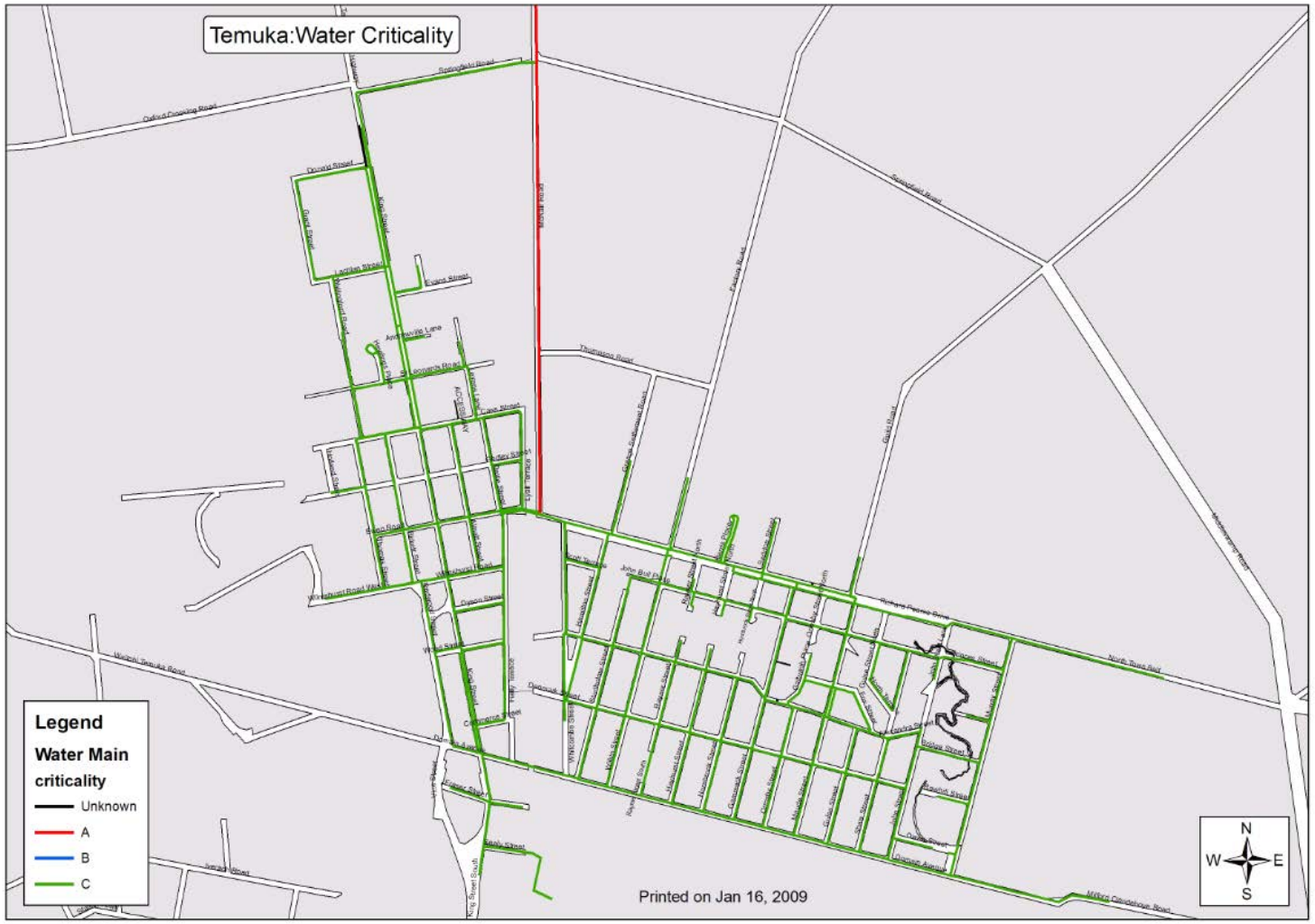


Figure 31: Temuka Water Supply Network Criticality

B5.4 DEMAND MANAGEMENT

A. Demand Drivers

The scheme has around 2,101 connections. The scheme currently serves approximately 4,199 reticulated populations. There are few industries, restaurants and food outlets, and small businesses supplied by the scheme. Other non-domestic consumers include schools and hospitals.

The Orari Water Supply and Winchester Water Supply are also supplied from the Temuka scheme.

B. Demand Forecast

As shown in Figure 32 below, TDC's draft Growth Management Strategy projects an increase in the number of households in Temuka which will peak from the current number of 1,777 to 1,943 in 2038, thereafter declining to 1,925 by 2043.

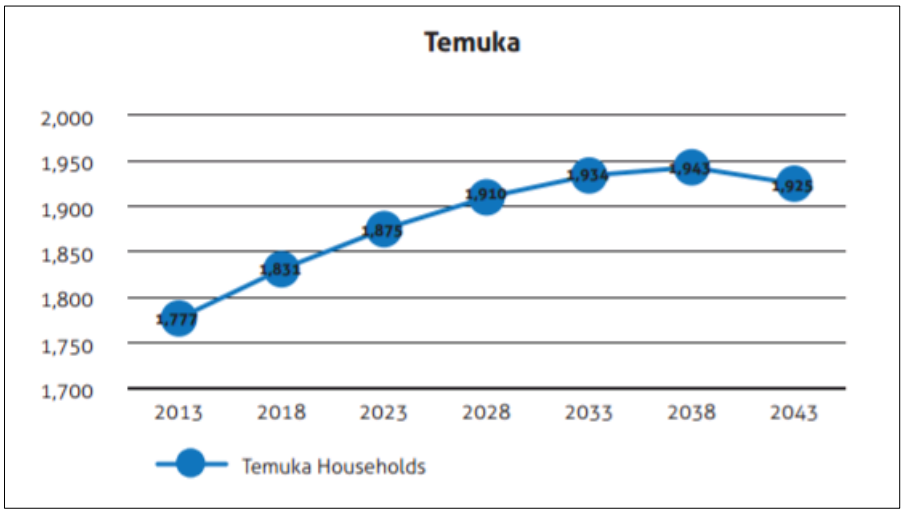


Figure 32: Temuka Forecast Household Growth

The following growth directions are also projected:

- Residential growth will be focused to existing urban and deferred areas. No additional residential land is required.
- Infill opportunities will be promoted around the Temuka Town Centre, and through minor dwellings.
- Peripheral rural residential supply options to be provided north of Richard Pearse Drive.
- On business directions, greenfield industrial land is not identified given –
  - Proximity to Washdyke and Clandeboye; and the
  - Ability to intensify existing Industrial Light zoned land in Temuka such as to the west of Vine and Redwood Streets, to provide industrial employment and access to industrial goods and services. Additional commercial land is not required.

The significance of these projections for Temuka Water Supply will be monitored and any potential impact will be assessed through the hydraulic model of the scheme.

It is considered that:

- The actual change in demand is assumed to be within the projected levels.
- Design capacity of the scheme's plant assets and reticulation are sufficient to meet projected medium growth scenarios. It is not suitable to servicing demand by a wet industry.
- Scheme boundary changes in the periphery may be requested.

C. Demand Management

The data in Table 40 shows the trend in water use and loss within the scheme.

Table 39: Temuka Water Demand

Year	Volume of Demand Temuka, Orari and Winchester* from Treatment Plant (m3)	Volume of Demand Temuka only from Treatment Plant (m3)	Infrastructure Leakage Index (ILI)
2016/17	1,069,878	971,686	6.9
2015/16	1,157,867	1,130,283	7.8
2014/15	1,278,301	1,249,066	9.9
2013/14	1,324,883	1,297,223	12.8
2012/13	1,326,643	1,296,899	13.2
2011/12	1,262,450	1,238,374	8.3

** Supply from Temuka Treatment Plant to Winchester commenced in 2016.*

Demand management approaches:

- Restrictions are imposed on the resource consent when the Temuka River is low and Dobies creek is flowing downstream of Orari Station Road. The restrictions are a reduction of 25% or 50% of the volume. Analysis of restrictions and demand indicate the peak demands and the low river flows do not frequently coincide. Restrictions on water takes will result in an associated hosing restriction for consumers within the scheme.
- Scheme upgrade – an additional treated water reservoir and pumps will be assessed within the period of the current LTP to provide resilience to supply and to mitigate pressure related issues in the network during peak demand.
- Leakage control – leakage is a significant issue in the Temuka network. Leak detection will be programmed annually to ensure medium to high leakages are identified and repaired. Leakage report will be produced by the contractor to the Council to be able to analyse and monitor the leakage level and trend in the area. This would include private leakage.

- Asset renewal – As part of the asset renewal programme especially the reticulation to ensure it is implemented to reduce the leakage level.

B5.5 SUMMARY OF ISSUES AND REQUIREMENTS

Security of Supply/Meeting Demand

1. Insufficient storage
2. Existing reservoir remediation
3. New reservoir
4. Additional well
5. Fire fighting capability may be compromised during peak demand
6. High leakage in the network

B5.6 FINANCIAL PLAN

B5.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 40: Temuka Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	(New) Treated water storage and pump	LOS	2,280 (21,100)	To be determined within LTP period
2	New Pipeline to Service and provide bypass to the new treated water storage	LOS	300-500	To be determined within LTP period
3	Temuka Plant Renewals and Upgrades		28	18/19
4	Urban watermain reticulation renewals and upgrades		1,228 (all urban)	18/19
5	Utilities Maintenance Contract		57	18/19
6	Remediation of existing reservoir *(B5.2.3)*		250	
7	Additional well *(B5.2.3)*			2018 (to be delayed- location of well TBD)

B5.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance	$78k	$138k	$138k	$138k	$138k	$138k	$138k	$138k	$138k	$138k

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B6 TIMARU WATER SUPPLY

B6.1 SCHEME OVERVIEW

Timaru Water Supply Scheme is an urban on-demand scheme that supplies domestic drinking water only. Customers in the Timaru water scheme are domestic and industrial users, with each accounting for approximately half of the total volume of water consumption.

The Timaru Scheme also supplies treated water to the Downlands-Hadlow and Seadown networks.

Table 42 summarises some key information about the scheme and Figure 33 shows the scheme boundary.

Table 41: Timaru Water Supply Scheme Key Information

Item	Description
Scheme population	Approximately 26,019
Number of connections (Water NZ NPR definition)	Residential = 12,127 Non-residential = 1,056
Firefighting availability	Yes
Resource consent//Expiry date	Pareora River 215l/s 5/11/2024 Opihi River 329l/s 9/10/2030 Opihi River 100l/s 9/10/2030
Sources	Pareora River Opihi River
Average daily demand	20,000m^3
Peak day demand	28,900m^3
Treatment requirement and process used	3 log Ozone disinfection
Location of treatment plant	Claremont Road
Number and storage capacity of reservoirs	x1 raw water storage = 113,000m^3 x2 treated water storage = 113,000m^3 and 7,000m^3
Reservoir Storage Buffer	4-6 days
Number of pump stations	5
Length of reticulation	332 km
Rating	• Urban targeted rate of fixed amount per rating unit (rate is set yearly in the Annual Plan) • A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit within the Timaru scheme which has been fitted with a water meter
WSP Review	August 2017

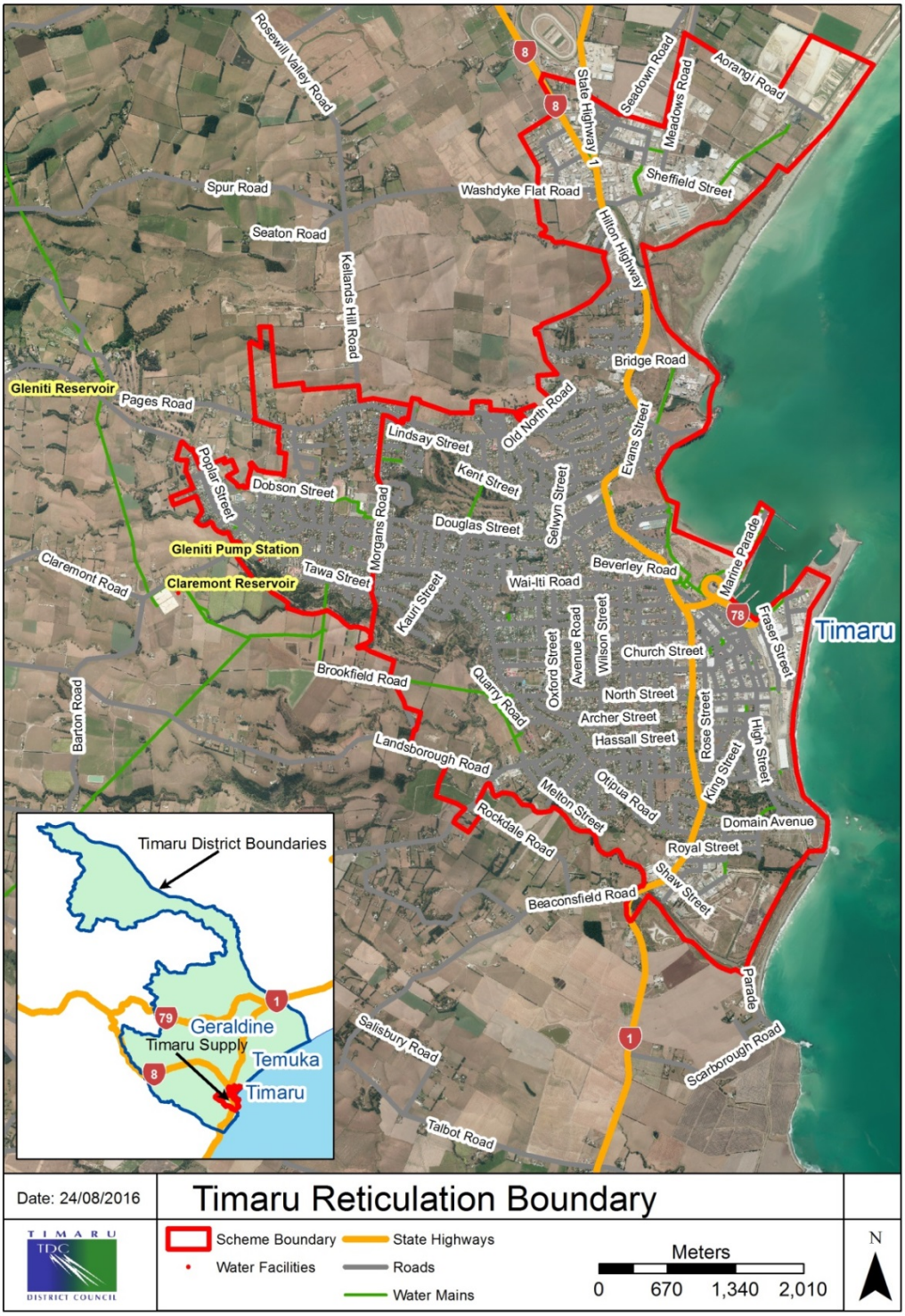


Figure 33: Timaru Water Supply Scheme Boundary

B6.1a THE 30 YEAR WATER SUPPLY STRATEGY FOR TIMARU

Background:

During the summer of 2014-15 Timaru District Council's (TDC) Timaru and Temuka water supplies were put under stress from an extended period of dry weather leading up to the summer demand period.

Opus International Consultants Ltd. (Opus) were engaged by TDC in March 2015 to undertake the 30 Year Strategy ('Strategy') investigation for the Timaru and Temuka water supplies. In addition Environmental Consultancy Services Ltd. (ECS) were engaged by TDC to provide local expertise in terms of surface and water sources within the areas of interest around the existing water supplies.

The key objectives of the Strategy are to:

1) identify the preferred option(s) to address the ongoing issues TDC has had in terms of the ability of the Temuka and Timaru water supplies to meet demand; and
2) confirm whether the capital works identified in TDC's 2015-2045 Infrastructure Strategy provide the appropriate solutions for both water supplies.

The following are the results of the investigations by Opus.

Conclusions:

The current peak day demand for the Timaru water supply is 28,955 m^3/day. TDC have identified an aspirational peak day demand of 35,000 m^3/day. In comparison it has been estimated that the drought capacity of the existing Timaru sources is between 20,685 m^3/day to 31,243 m^3/day depending on low flow conditions applied at the Opihi river source and available take during low flow conditions in the Pareora river.

Out of the ten options investigated, only one option was close to resolving the shortfall in source capacity against the aspirational peak day demand of 35,000 m^3/day. For this option a large proportion of the water volume would be reliant on establishing deep ground water source(s) in Level Plains GAZ up to 17,280 m^3/day (200 L/s). However the likelihood of needing to treat the groundwater for iron, manganese and hardness is high, and carries a significant capital cost estimated at $21.89M with operational cost being high due to the need for sludge handling and disposal.

The proposed Hunter Downs Irrigation Scheme (HDIS) is currently programmed to operate from 2020, and could be used as an alternative to the Pareora source. At the time of undertaking the Strategy TDC advised that due to current uncertainty the option of an alternative supply from HDIS would not be considered as part of the option analysis and rough order cost exercise. For the purpose of assisting future decision making an indicative broad brush capital cost for establishing a supply from the HDIS at Otipua is $37.1 M - $46.1 M. In addition the Pareora source and pipeline would need to be maintained until 2020.

The residential demand in Timaru is estimated to be approximately 1,500 L/connection/day in the Timaru township reticulation. There is a need to fully explore the

benefits and opportunities that can be gained from implementing a demand management strategy at a reticulation level. This will confirm whether reduction in demand can help offset (delay) any required investment in a new ground water source.

The early engagement between TDC, OWL and ECan was an important factor in maximising the available take from the Opihi source during the 2014-2015 drought. Ensuring that this relationship is continued will be key to maintaining supply during any future drought conditions in the short term.

Implementing UV disinfection at Claremont WTP will remove the risk and reduce the chemical cost associated with the ozone plant during low water temperatures.

Recommendations:

1) A memorandum of understanding (or other form of agreement) between TDC and OWL will ensure interpretation of the consent conditions attached to the Opihi and Opihi 'various' consents is recognised by all parties, and will serve to provide further security for TDC to be able to maintain a take from the Opihi river during low flow conditions.
2) Explore the opportunities and benefits that are available for reducing demand in the Timaru reticulation and develop an overarching demand management strategy for the Timaru water supply.
3) Install UV disinfection at Claremont WTP.
4) Confirm whether the HDIS could be considered as an alternative to the Pareora source by end 2016.

The consultant's full report on the Strategy is in document #1004172.

B6.2 Scheme Management

B6.2.1 Asset Summary

A schematic diagram of the Timaru Water Supply is shown in Figure 34. The asset components of the scheme consist of the following:

A. Plant Assets

- Pareora Intake
- Opihi Intake
- Rosewill Pump Station
- Claremont Reservoir and Treatment Plant
- Gleniti Pump Station
- Gleniti Reservoir

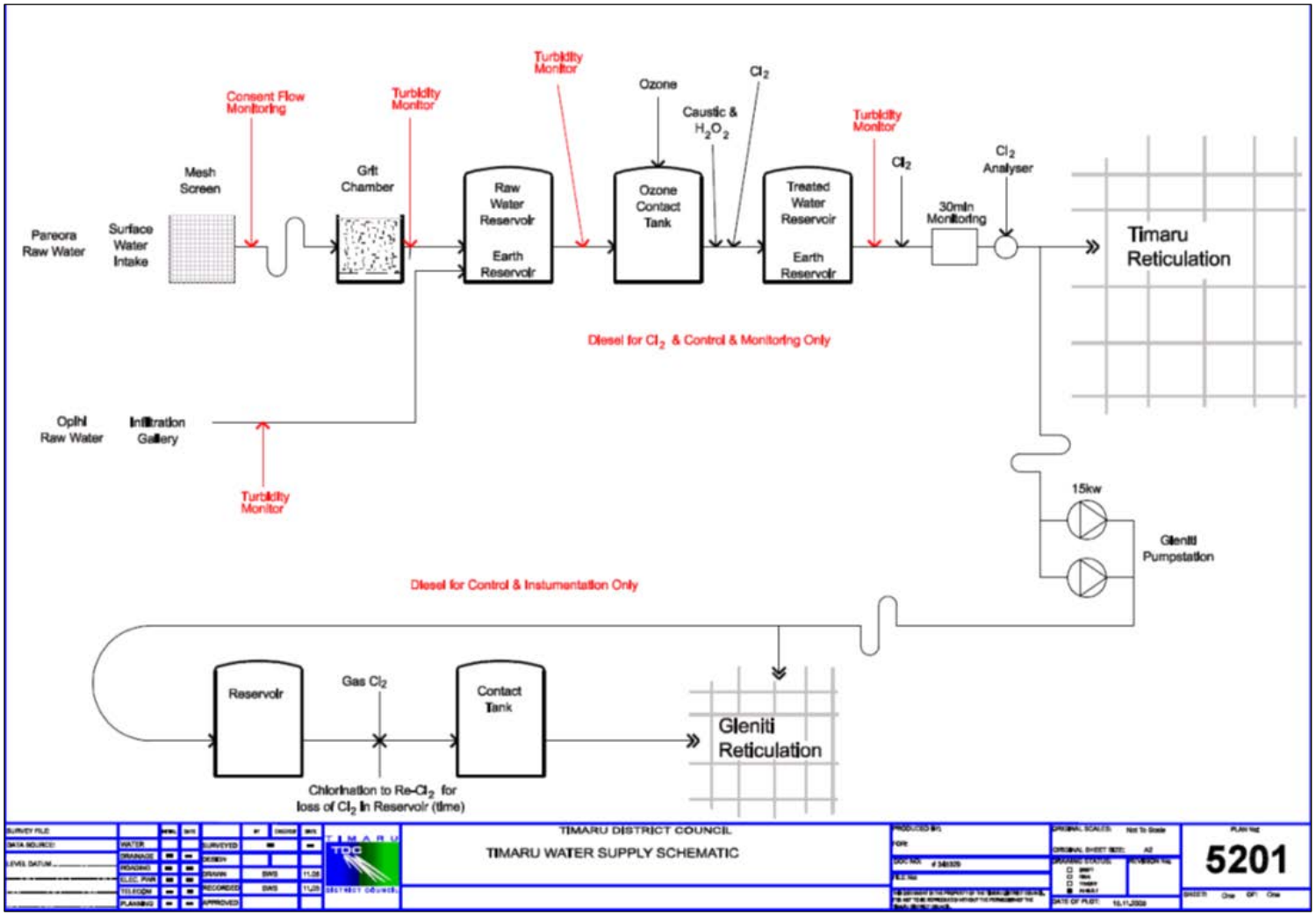


Figure 34: Timaru Water Supply Schematic

B. Reticulation

The length of the reticulation network is approximately 332 km. Table 43 below shows the profile of the network.

Table 42: Timaru Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)							Total
	PVC	CC	PE	AC	CI	ST	Unknown	
000-049	893		860	49		326		2,128
050-099	21,030		9,573	14,486	994	417	66	46,565
100-149	12,892		3,332	23,262	45,253		15	84,754
150-199	11,068	212	789	24,055	24,090	359		60,572
200-249	2,336	16		9,681	2,035			14,068
250-299	447			8,875	1,303	20		10,645
300-399	6,242	27	951	12,793	8,734	75		28,822
400-500	1,359	248		8,444	2,416	33,467		45,934
500-599				35,598		23		35,621
600	2,401			511		59	124	3,095
Total	**58,667**	**503**	**15,506**	**137,753**	**84,826**	**34,746**	**205**	**332,206**

B6.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

Pareora River Intake

Although this take is consented to take 18576m^3/day at times of low river flows this can drop to 6500m^3/day. The infrastructure can abstract the consented amount.

Opihi Intake and pump station

There are two consents to take water from this source.

The older consent allows the take of 28,409m^3/day.

The newer consent allows the take of 8,600m^3/day for 3 water supplies

These consents are restricted in times of low river consent to a take that could be as low as 14,205m^3/day, although the agreement with ECan increases this to 18,500 m^3/day (50% of both consents).

TDC has met with OTOP to request a change on the restrictions imposed on Community Water supply with the new Orari, Temuka, Opihi Pareora section of the LWRP being

reviewed in 2018. The ORRP specifies the current restrictions but the LWRP does not impose restrictions if a demand management plan exists.

The infrastructure was upgraded in 2007 to increase the capacity to 28,400m^3/day. This involved the installation of the Rosewill Pump station.

The submersible pumps at Opihi are in shallow water and the duty was impacted with the low head. The Rosewill pumps have never been used as on commissioning head issues were observed. The current take capacity is around 19,000m^3/day, when turbidity increases although 21,800m^3/day was achieved in August 2012.

In the 2014/2015 drought the pumps rate was reduced to 12,500m^3/day until the river was diverted to bring a flow close to the gallery.

Treatment

With the exception of the storage for chemicals especially Caustic Soda, the Claremont treatment plant is in good condition given its age. Renewal of components are ongoing.

The office and treatment plant building is <33% New Building Standard for seismic strength.

The treatment process does not treat water >1 NTU. This means there are occasions when water cannot be taken from one or both sources. Storage is utilised to meet demand. Storage drops to about 25% every 2-3 years, leaving Timaru vulnerable to either untreated water or water shortages, if there was an additional rain event.

The water treatment operators are based at Claremont. The office facilities are inadequate.

Storage

The raw water reservoir and treated water reservoir are considered to be a component of the treatment plant. These give a total of 11 days average demand catering for the time when poor quality water cannot be treated, or when demand exceeds supply.

The two Claremont reservoirs are covered with a polypropylene cover. A recent assessment shows the UV protection has been used. Deterioration will occur rapidly although replacement can be delayed several years.

The Gleniti reservoir has an estimated remaining life of 40-50 years.

Remedial work on the Gleniti reservoir roof and floor is required at a cost of $5000.

The Gleniti reservoir can be taken out of service and the reticulation supplied directly from the Gleniti Pump station. The Gleniti Reservoir and Pump Station, and the Claremont Treatment Plant are in good condition. There are significant deterioration and deficiency issues with the Pareora and Opihi intakes.

All these facilities are rated highly critical assets. Risks on the Pareora intakes and the Claremont Reservoir are high due to condition issues. This is addressed in the capital works programme for this AMP period.

B. Reticulation

As shown in Figure 35 below, Timaru has an ageing reticulation infrastructure with about 140 km of AC pipes and 86 km Cast Iron Pipes reaching the end of their useful life. Strategic sampling is currently being undertaken to enable prioritisation for renewal. Small diameter AC mains (less than Nominal Diameter 100mm) replacement program is in place which will be renewed in the next 10 years. Studies have shown these are assets that could reduce associated maintenance costs when replacement has been completed. A significant portion of Steel pipes will be due for renewal on the Pareora trunk mains in the next 20 years.

Currently there is only one main out of and into the Gleniti Pump Station. The 150mm asbestos cement main out of the pump station is undersized for the current discharge from the pumps and causing 6m of head loss in the 120m length of pipe. The pumps have to work harder to overcome this head loss. Having only one main out of the pump station is a security of supply issue. If this main were to be unavailable, water would not be able to be delivered to Gleniti Reservoir and therefore, the high level zone.

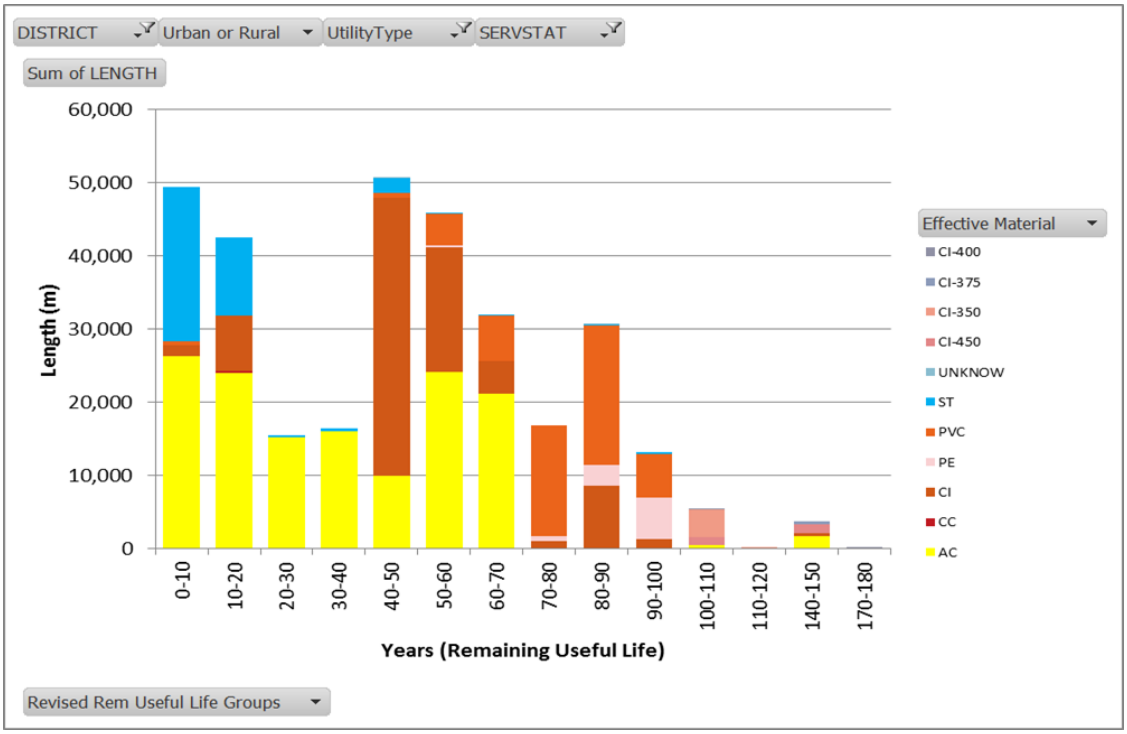


Figure 35: Timaru Water Supply Network Remaining Useful Life

Water capacity to Washdyke is close to maximum capacity and will need upgrades to ensure it could meet the appropriate increased industrial demand for growth and firefighting capabilities.

Port area has been identified high fire risk and is a prime economic importance to Timaru, the firefighting capability in Port will require improvement to ensure critical areas are covered with sufficient firefighting capability in the event of fire.

B6.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are contained in the Operations Manual (Document #810355).

A contract with Ozone Technologies is held for maintenance of the ozone system.

The management of the Pareora River Scenic Reserve, where the intake is sited, is the responsibility of the TDC staff. Wallaby control is expensive and required every 2-3 years.

Additional details are in Section A9.1 of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

The ozone treatment plant renewal is within the next 10 years.

The Claremont reservoir covers renewal is within the next 10 years.

Pareora trunkmain is reaching the end of its useful life and was programmed to be renewed, however the reinvestment to this pipeline is still to be determined on the Timaru 30 year Water Strategy.

Figure 36 shows the planned reticulation renewals. Majority of the renewal is targeting Small AC mains around Timaru.

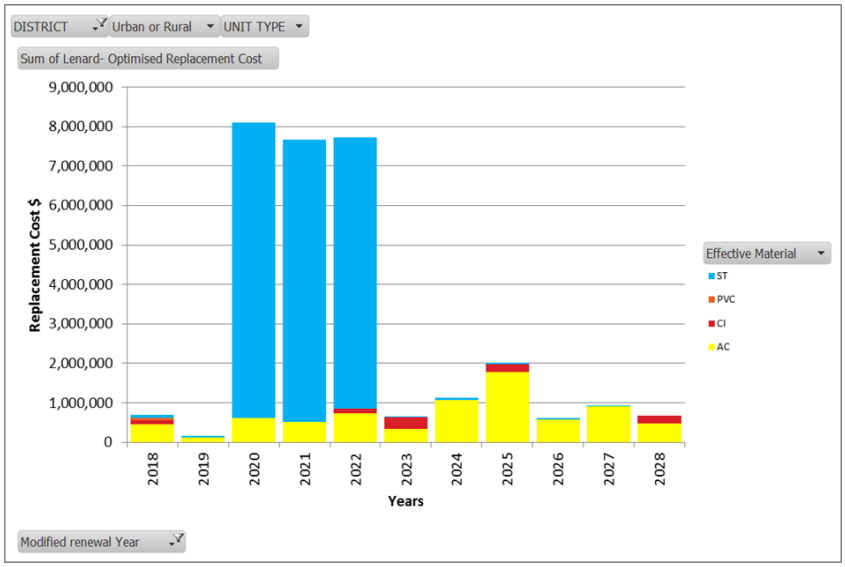


Figure 36: Timaru Water Supply Network Renewal Programme 2018-28

C. Asset Development

- Opihi source upgrade
- Install duplicate main approximately 120m of 300mm internal diameter pipe new watermain from Gleniti Pump Station to Gleniti Road and Gleniti pump station upgrade – to improve security of supply, improve the efficiency of the network and for health and safety improvement when maintaining the pumps.
- Washdyke Water Network Improvement – To improve capacity to allow future industrial growth and demand in Washdyke. Security of supply to Washdyke will be taken account to ensure improve the resilience of the supply to the Washdyke industries.
- Port Water Network Improvement – To improve greater fire flow capacity to the Port due to high industrial fire risk and economic importance in this subject area.
- Timaru 30year Water Strategy will provide direction whether there will be other Asset Development required in the Long Term Plan.

B6.3 RISK MANAGEMENT

A. Water Safety Plan

Risks to the Timaru water supply were identified and assessed during the development of the scheme's Water Safety Plan (TRIM Document #556590).

Consider materials when Renewing reservoir cover	Contamination from cover damage	2019/20 **$800,000**	Medium The cover is programmed for renewal. Options for materials to be assessed.	Utility Operations Engineer
Consider using storage bladder	Reservoir failure	2015/16 $5000	Medium This will be assessed with the renewal of the cover	Utility Operations Engineer
Standby generator at Opihi	Power failure at Opihi	2012/13. $10,000	Medium The generator from Timaru milliscreen is planned to be relocated to Opihi	Utility Operations Engineer
Renew Pareora pipeline or determine and install viable alternative	Pareora supplying reduced or no flow	2015/16 **$4m** 2020/21 $27m	Medium TDC needs to determine the strategy for source water. An alternative source may be a viable alternative.	Drainage and Water Manager

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 44 were extracted from the water assets criticality assessment report in document #829869.

Table 43: Timaru Water Supply Facility Asset Criticality

Timaru Facility Asset	Criticality Rating*	Condition Rating**	Risk
Pareora Intake	A	3	Moderate
Opihi Intake	A	3	Moderate
Gleniti Reservoir	A	2	Low
Gleniti Pump Station	A	2	Low
Claremont Reservoir	A	3	Moderate
Claremont Treatment Plant	A	2	Low

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
**2 = asset has superficial deterioration and minor issue with reliability. Minor maintenance only is required.
**3 = significant deterioration. Assets are operational but display efficiency deficiencies. Routine maintenance and or refurbishment are required.

Figure 37 shows the reticulation network criticality. Timaru Watermains Criticality Rating report is in document #84934.

Pipe supplying water to Washdyke via Washdyke Bridge, Old North Road (Jellicoe Street to the Washdyke Bridge) and Hilton Highway (Jellicoe Street to the Washdyke Bridge) cannot be shutdown. Shutting down one of the mains will result in severe reduction of pressure to the critical wet industries and Timaru Wastewater Treatment Plant. A communication, management plan and valve exercising is required prior to shutting down.

Criticality assessment of Timaru water facilities and reticulation will be reviewed and updated as part of this AMP's Improvement Plan.

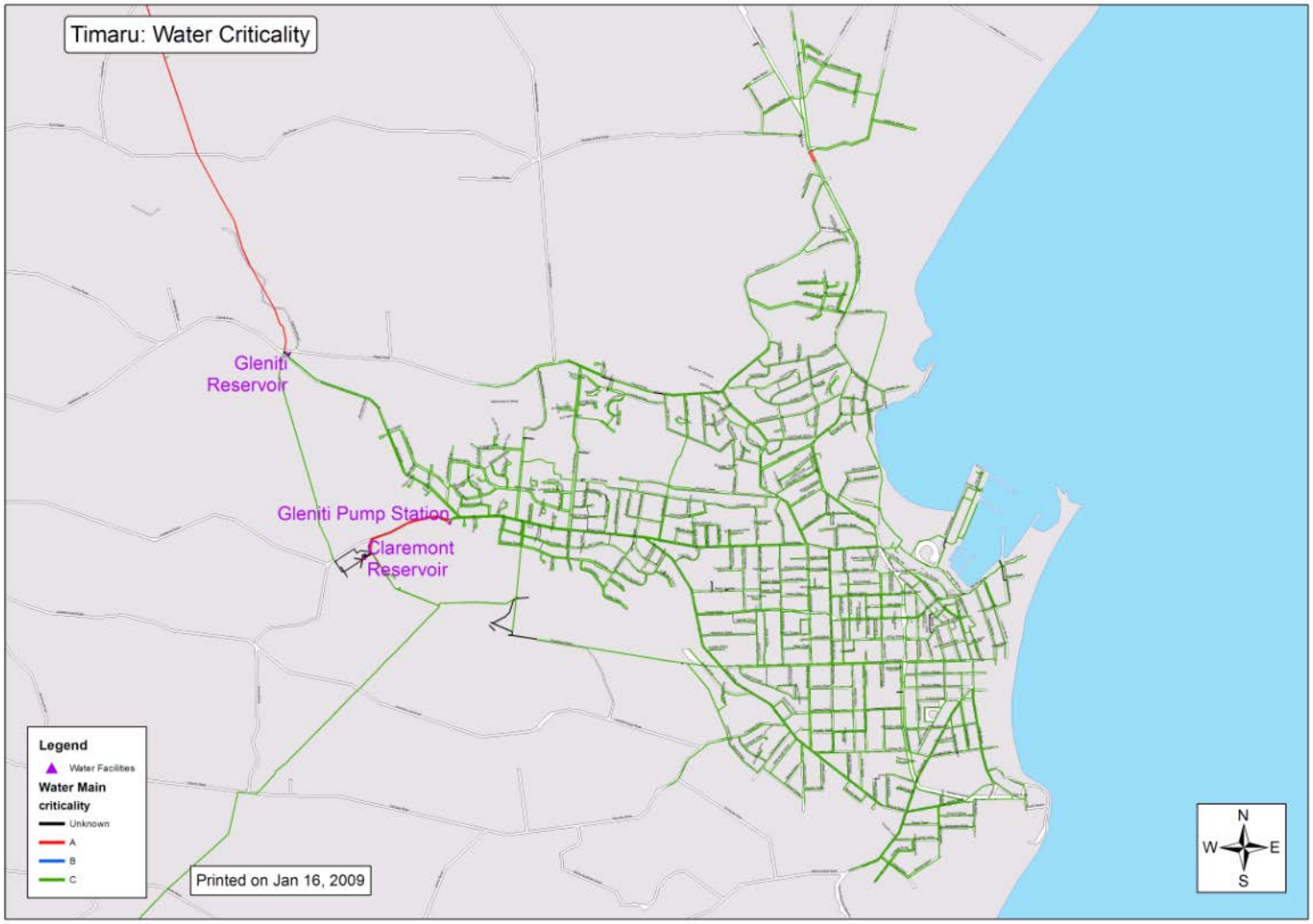


Figure 37: Timaru Water Supply Network Criticality

B6.4 DEMAND FORECASTING AND MANAGEMENT

A. Demand Drivers

Customers in the Timaru water scheme are domestic and industrial users, with each accounting for approximately half of the total volume of water consumption. The types of Timaru industries that generate significant industrial consumption include meat slaughter and processing, food processing, fish processing, breweries, wool scours, rendering and hide processing. Other non-domestic contributors include schools, hospitals, restaurants and food outlets, and small businesses. The scheme has around 13,016 connections. The scheme serves approximately 26,019 reticulated populations. Around 40-50% of water supply is used by industry

B. Demand Forecast

TDC's draft Growth management Strategy projects the following growth directions:

- As shown in Figure 38 below, household demand peaks at 2033 for an additional 760 households, inclusive of a 20% buffer.

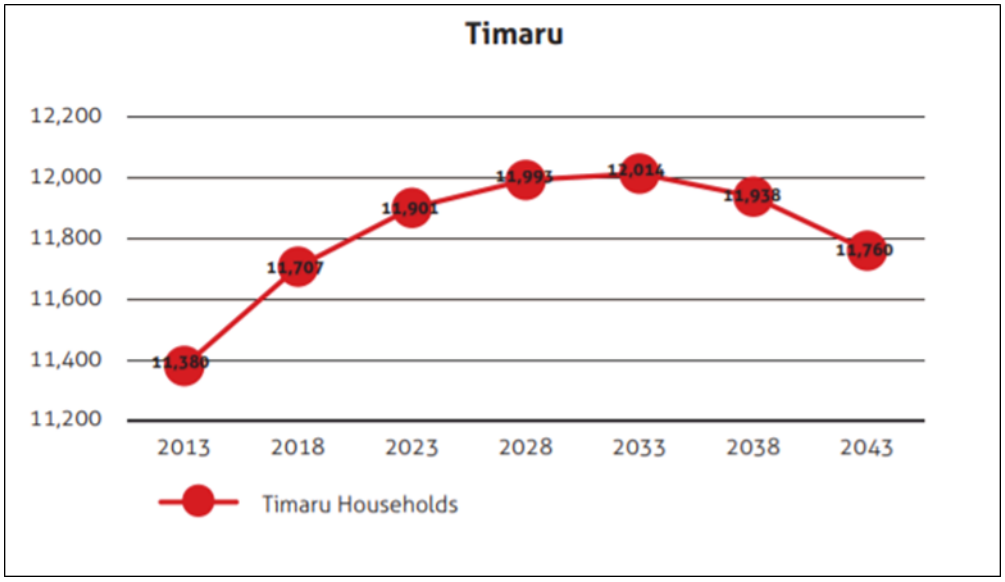


Figure 38: Timaru Forecast Household Growth

- Residential growth in the Timaru township will be focused to existing zoned (but undeveloped) urban areas and greenfield areas (capacity exists for some 667 households). Infill opportunities will be promoted around the Timaru Town Centre, and through minor dwellings (additional small scale self-contained living accommodation in addition to the main dwelling on a site). Provision is made for limited peripheral rural residential options.
- Business intensification in the Port and Washdyke Industrial areas to cater for the projected growth.
- Timaru town centre is consolidated and provides higher amenity and a wider range of services.

- Forecast demand for water is as follows (30 year planning period to 2046):

Peak Daily Demand

Current Peak Demand	= 29,000 m^3/d (unrestricted) = 24,500 m^3/d (L4 restrictions)
including current Industrial Peak Demand	= 12 – 15,000 m^3/d
Current Population	= 26,000
Projected population increase	= 3,000 people
Projected Future Peak Demand (with no additional industry)	= 30,500 m^3/d (unrestricted)

The significance of these projections for the Timaru township will be monitored and any potential impact will be assessed through the hydraulic model of the scheme.

Scheme boundary changes in the periphery may be requested.

The actual change in demand is assumed to be within the projected levels.

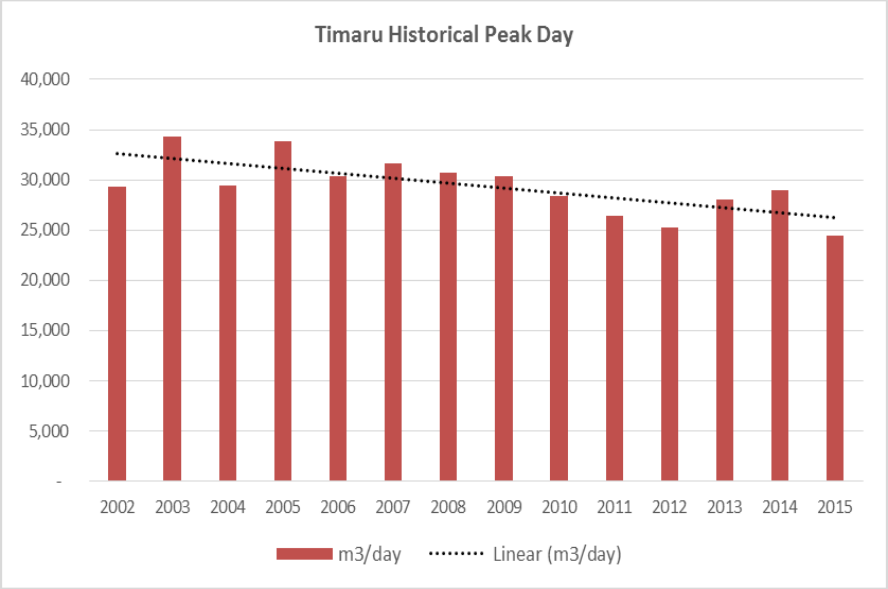
C. Demand Management

The data in Table 45 show the trend in water use and loss within the scheme:

Table 44: Timaru Water Demand

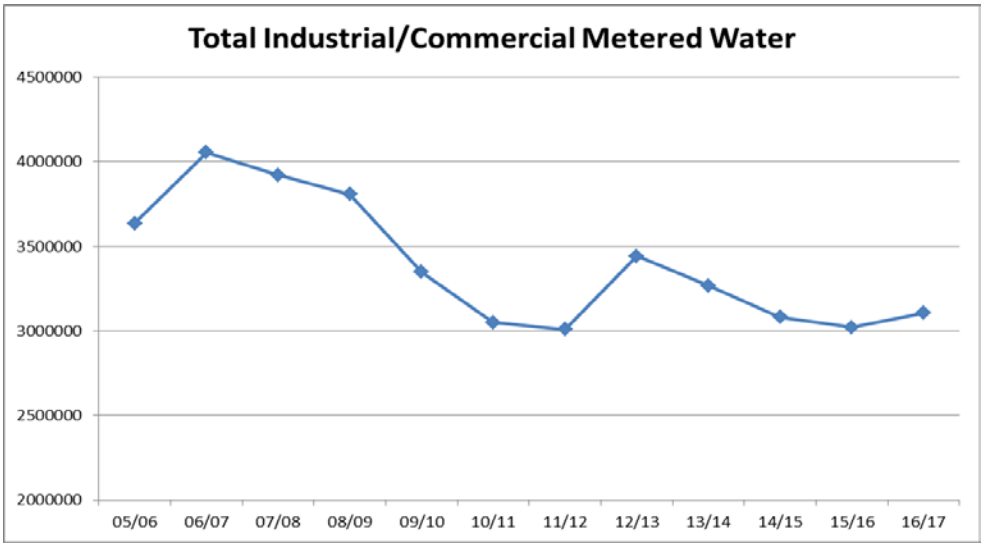
Year	Volume of Demand Timaru (including Hadlow (m^3)	Volume of Demand Timaru (excluding Hadlow (m^3)	Infrastructure Leakage Index (ILI)
2016/17	6,774,680	6,724,130	3.5
2015/16	6,937,375	6,874,202	2.2
2014/15	6,835,971	6,776,134	3.1
2013/14	7,021,997	6,959,464	5.9
2012/13	6,946,886	-	2.5
2011/12	6,595,205	-	1.4

Timaru peak day demand:



** 2015 shows peak daily demand with Level 4 restrictions*

Industrial water use trend:



Demand management approaches:

Asset that requires development or upgrade will be in the form of approved strategy to ensure the LOS can still be maintained to cater additional demand, including:

- The 30-Year Water Supply Strategy for Timaru (discussed in B6.1a) is intended to address demand issues for the longer term. Options for securing supply sources have been investigated, including affordability considerations, and public feedback is being sought through the Consultation Document of the current Long Term Plan process. Timaru 30year Water Strategy will provide direction whether there will be other Asset Development required. The options include urban universal metering and

pricing to manage demand (and save water), upgrading the existing Opihi, or developing new sources.

- Washdyke Water Network Improvement – To improve capacity to allow future industrial growth and demand in Washdyke. Security of supply to Washdyke will be taken account to ensure improve the resilience of the supply to the Washdyke industries.
- Port Water Network Improvement – To improve greater fire flow capacity to the Port due to high industrial fire risk and economic importance in this subject area.

Strategic sampling and renewal of small diameter AC mains around Timaru has been programmed in this AMP period to ensure water leakages and maintenance to the reticulation is reduced.

Leak detection will be programmed annually to ensure medium to high leakages are identified and repaired. Leakage report will be produced by the contractor to the Council to be able to analyse and monitor the leakage level and trend in the area.

B6.5 SUMMARY OF ISSUES AND REQUIREMENTS

Ageing Infrastructure

1. Small diameter AC mains (less than Nominal Diameter 100mm) replacement program is in place which will be renewed in the next 10 years.
2. A significant portion of Steel pipes will be due for renewal on the Pareora trunk mains in the next 20 years.

Ageing infrastructure/Meeting Demand

3. Renewal of TP components – ongoing
4. Buildings strengthening – TBD from seismic assessment
5. Remedial work on Gleniti reservoir roof and floor
6. Replacement of Claremont reservoir covers
7. High leakage in the network
8. Water capacity to Washdyke Industries is close to maximum
9. Fire fighting flow and pressure deliveries deterioration in the network

Security of Supply

10. Install duplicate main rom Gleniti Pump Station to Gleniti Road
11. Gleniti pump station upgrade
12. Intake renewals - Orari source upgrade?
13. Develop new groundwater source/s?
14. Water metering and pricing?

B6.6 FINANCIAL PLAN

B6.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 45: Timaru Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Port Network Improvement	Renewal and Upgrade, Level of Service and Growth	1,000	2017 to 2019
2	Washdyke Network Improvement	Renewal and Upgrade, Level of Service and Growth	6,000	Strategy to be confirmed
3	Pareora Pipeline Renewal	Renewal	21,000 2,100	2020 to 2022 18/19
4	Gleniti Pump Main Duplication and Gleniti Pump Station Upgrade	Level of Service	500	2019
5	Remedial work on the Gleniti reservoir roof and floor is required at a cost of $5000 *(B6.2.2)*		5	
6 7 8 9 10 11	Telemetry Renewals - Claremont Claremont Plant Electrical Renewals and Upgrades Timaru Intakes Renewal (Opihi source upgrade?) Gleniti Reservoir Pipework renewals Urban watermain reticulation renewals and upgrades Utilities maintenance contract		10 125 100 20 1,228 (all urban) 160	18/19 18/19 18/19 18/19 18/19 18/19
12	Claremont reservoir covers renewal *(B6.2.3)*			Within next 10 years
13	ozone treatment plant renewal *(B6.2.3)*			Next 10 years

B6.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B7 WINCHESTER WATER SUPPLY

B7.1 SCHEME OVERVIEW

The Winchester Water Supply is a small on-demand scheme supplying the Winchester township. Water is supplied from the Temuka Water Supply.

Table 47 summarises some key information about the scheme and Figure 39 shows the boundary of the scheme.

Table 46: Winchester Water Supply Scheme Key Information

Item	Description
Scheme population	Approximately 264
Number of connections (Water NZ NPR definition)	Residential = 119 Non-residential = 11
Firefighting availability	No
Resource consent//Expiry date	Refer Temuka Section in B5
Sources	Refer Temuka Section in B5
Average daily demand	245m^3
Peak day demand	543 m^3
Treatment requirement and process used	NA
Location of treatment plant	NA
Number and storage capacity of reservoirs	1 (8 tanks)
Reservoir Storage Buffer (days of treated water storage in reservoir)	1 day average demand 0.5 day peak demand
Number of pump stations	1
Length of reticulation	4.4 km
Rating	• Urban targeted rate of fixed amount per rating unit (rate is set yearly in the Annual Plan) • A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit within the Winchester scheme which has been fitted with a water meter
WSP Review	Refer Temuka Section in B5

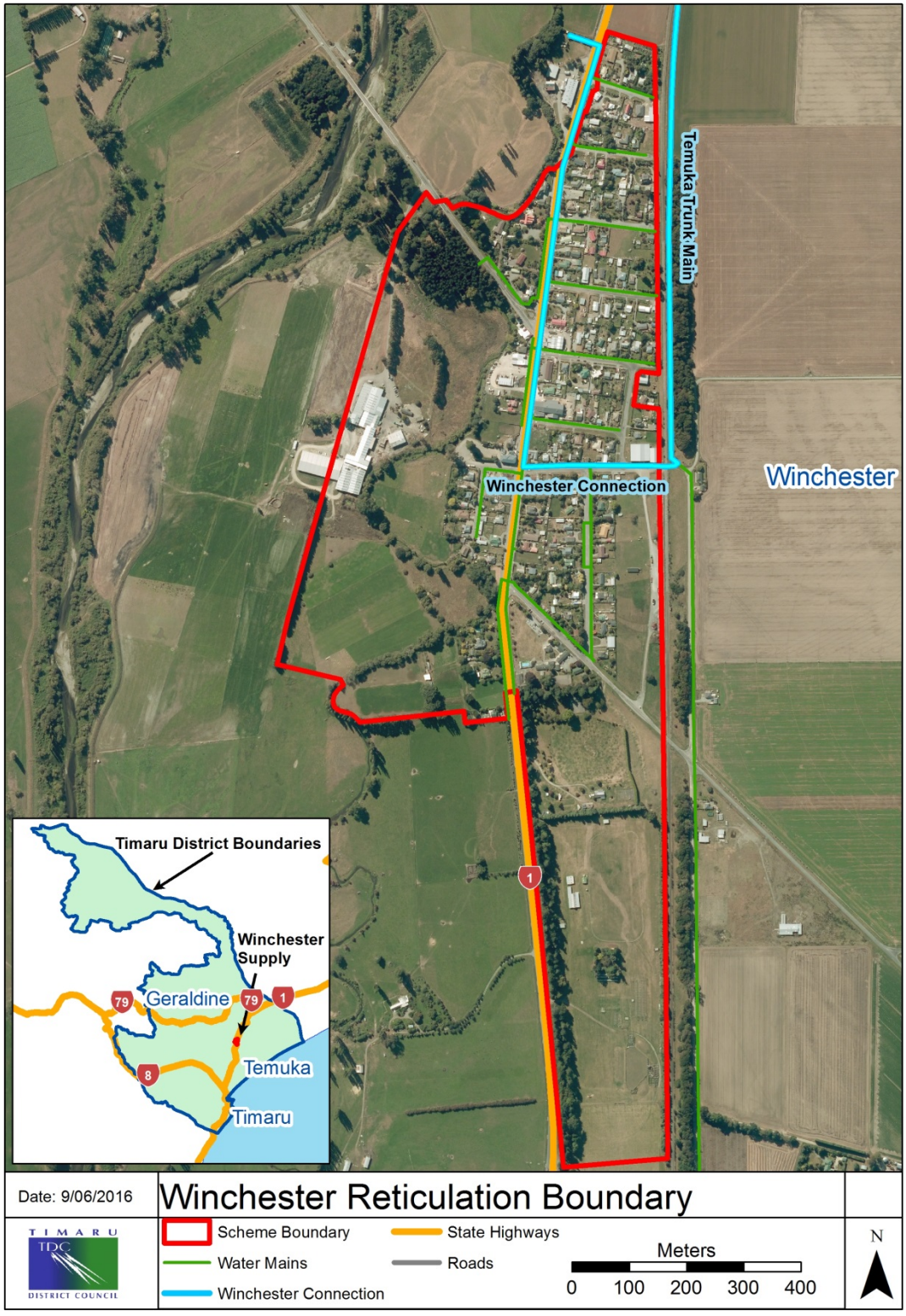


Figure 39: Winchester Water Supply Scheme Boundary

B7.2 SCHEME MANAGEMENT

B7.2.1 ASSET SUMMARY

A. Plant Assets

In 2016 the Winchester water source and treatment plant was decommissioned and the water is now supplied from Temuka. The storage and booster pump station remains on the site at 513 Temuka Orari Highway.

A schematic diagram of the Winchester Water Supply is shown in Figure 40.

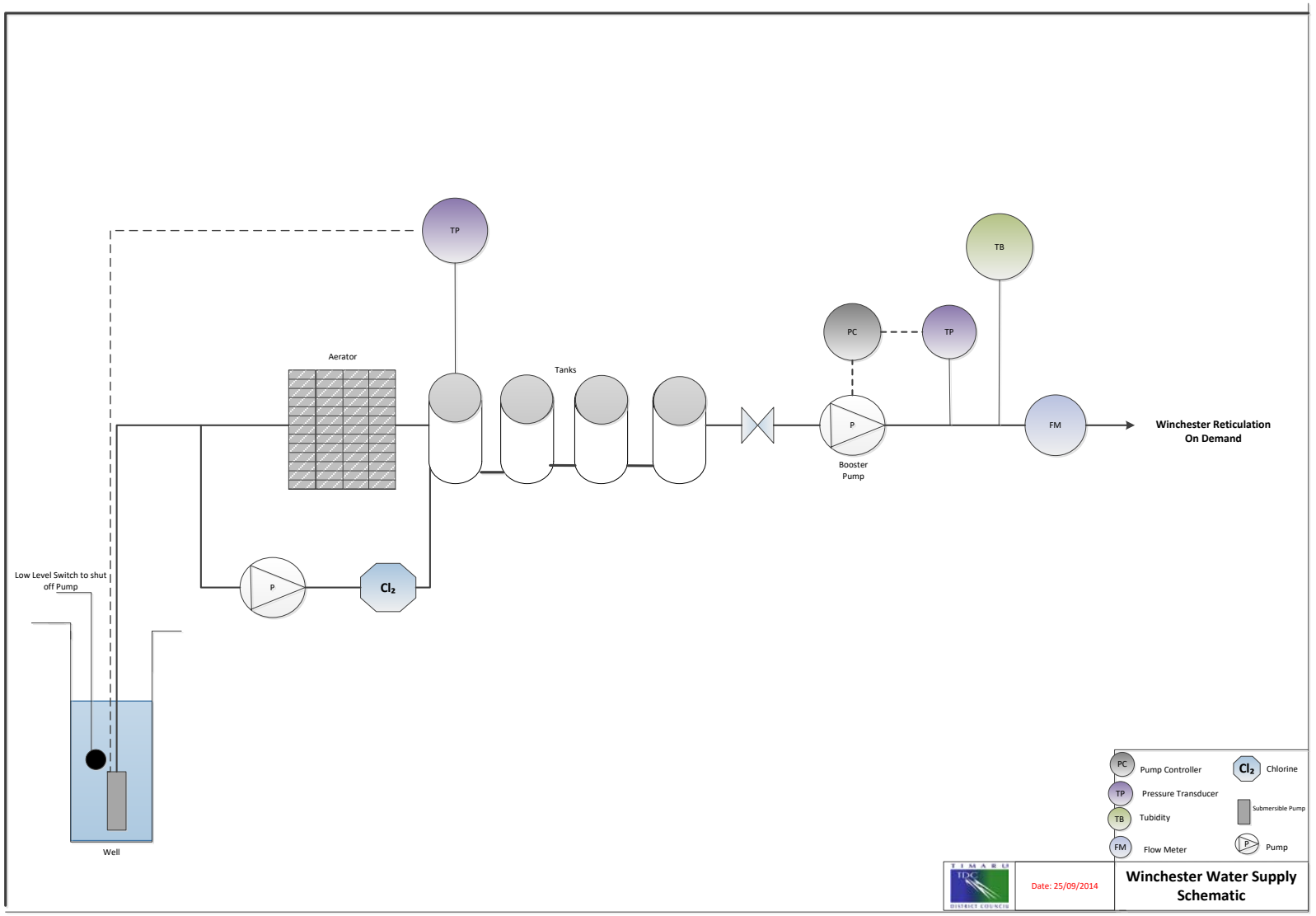


Figure 40: Winchester Water Supply Schematic

B. Reticulation

Length of reticulation is approximately 4 km. Table 48 below shows the profile of the network.

Table 47: Winchester Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)				Total
	PVC	PE	AC	ST	
000-049	583	120		14	716
050-099	1,183	702			1,884
100-149		296	1,360	8	1,664
150-199			108		108
Total	**1,765**	**1,118**	**1,467**	**22**	**4,373**

B7.2.2 Asset Condition and Performance

A. Plant Assets

Storage and Pump station

The scheme has a total storage of 240 m^3, which consists of eight 30 m^3 tanks at ground level linked together.

The switchboard was renewed in 2016 with the decommissioning of the source. The booster pump remained unchanged.

B. Reticulation

Figure 41 shows the age profile of the reticulation network. The reticulation is meeting its performance to meet the LOS in this AMP except delivering firefighting capabilities. Strategic sampling on small diameter AC is being undertaken to ensure prioritisation for renewal. Studies have shown these are assets that could reduce associated maintenance costs when replacement has been completed.

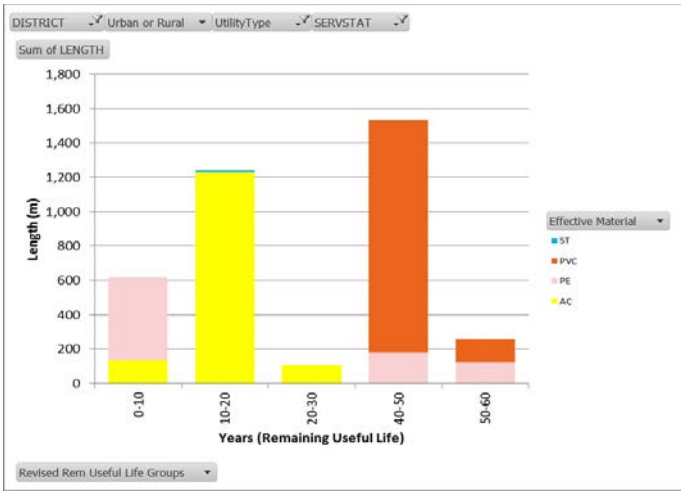


Figure 41: Winchester Water Supply Network Remaining Useful Life

B7.2.2 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are in the Temuka Operations Manual - document #1073049.

Additional details are in Section A9.1 of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

Renewal of plant assets are based on life expectancy.

The reticulation renewal forecast for this AMP period is shown in Figure 42. Majority of the renewal is targeting Small AC mains.

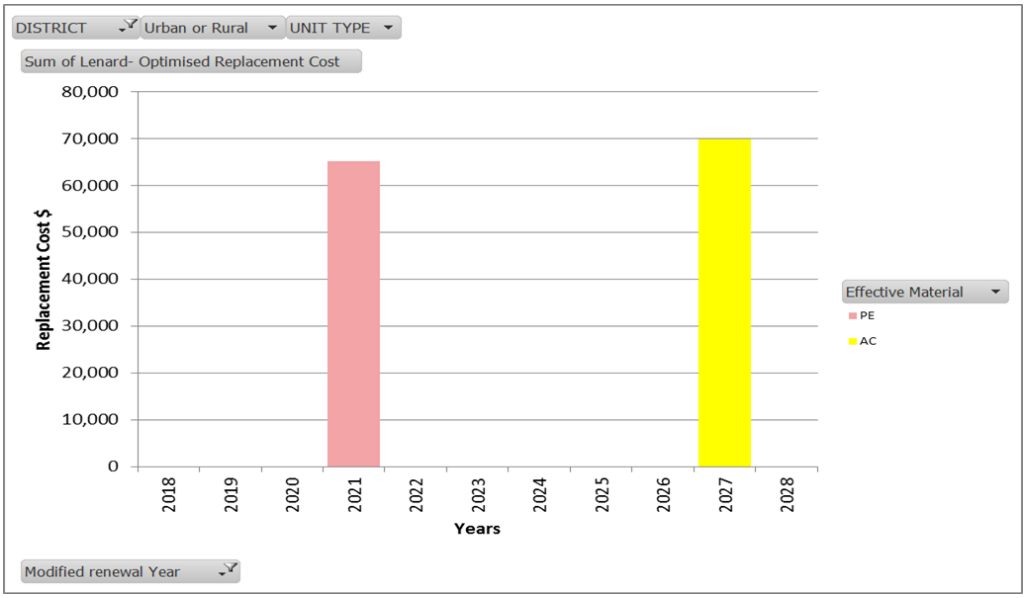


Figure 42: Winchester Water Supply Network Renewal Programme 2018-28

C. Asset Development

There are no forecast asset development works in this AMP period.

B7.3 RISK MANAGEMENT

A. Water Safety Plan

The Water Safety Plan has been approved but in future Winchester will be a component of the Temuka Water Safety Plan. With the new source for Temuka the risks identified will be similar to those in the Temuka Water Safety Plan.

A number of other improvements have commenced and are on going.

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 49 below were extracted from the water assets criticality assessment report in document #829869.

Table 48: Winchester Water Supply Facility Asset Criticality

Winchester Facility Asset	Criticality Rating*	Condition Rating**	Risk
Reservoir	A	1	Insignificant
Pump Station	A	1	Insignificant

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
**1 = near as new condition with no defects. Asset is fully serviceable.

Figure 43 shows the criticality rating of the Winchester reticulation network.

Criticality assessment of plant assets and watermains will be reviewed and updated as part of this AMP's Improvement Plan.

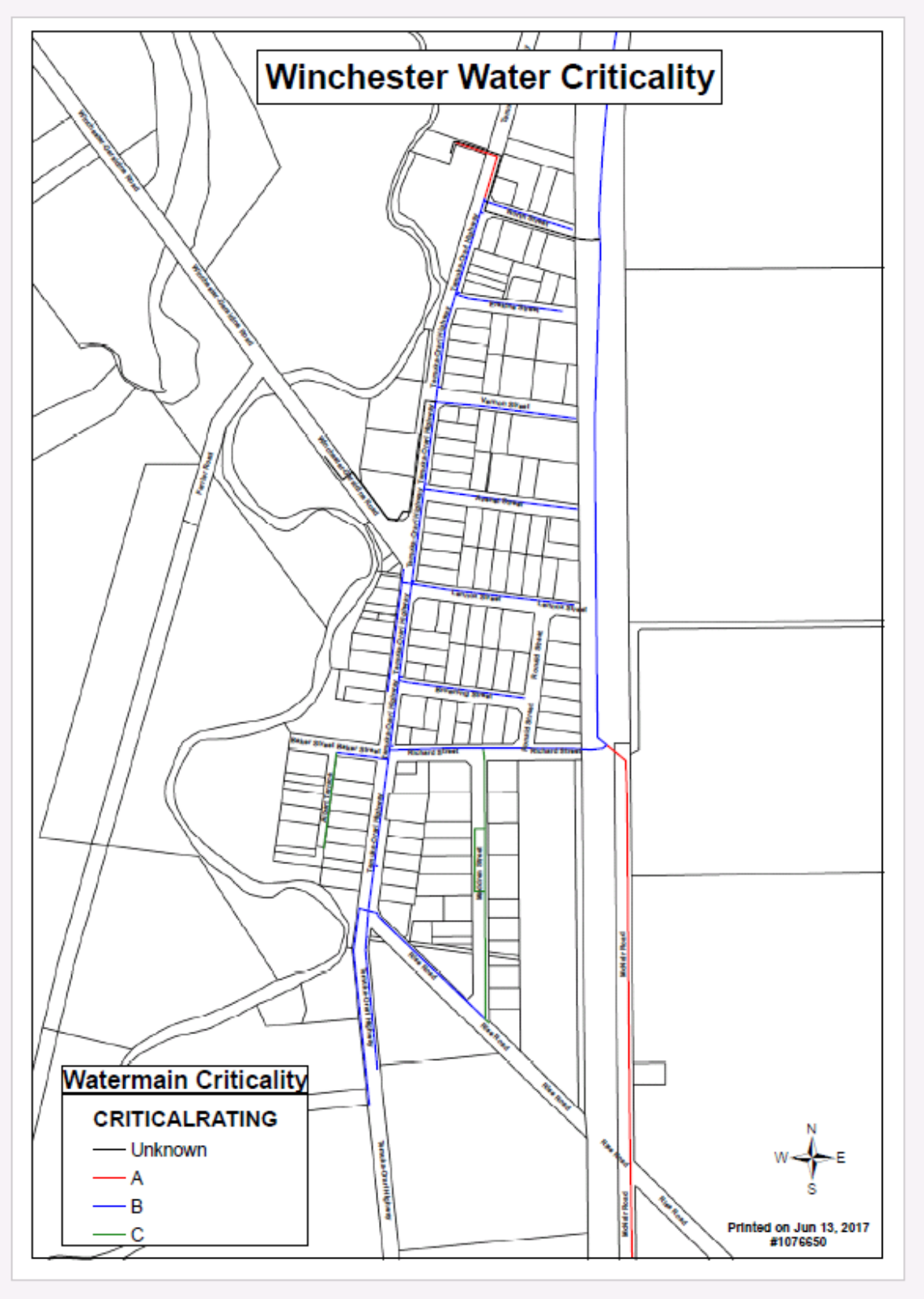


Figure 43: Winchester Water Supply Network Criticality

B7.4 DEMAND MANAGEMENT AND FORECASTING

A. Demand Drivers

The Winchester Water Supply is an on-demand system for domestic water.

Customers of the Winchester Scheme are predominantly domestic or related to a domestic and farming population. It includes a school, rest homes, restaurants and food outlets, and small businesses.

The scheme has around 130 connections.

There are 4 metered connections within the scheme for extra-ordinary use of water.

B. Demand Forecast

- Any actual change in demand is assumed to be within the projected levels and capacity of the assets.
- The scheme does not meet the New Zealand Fire Fighting Code of Practice (COP) and there is no plan to meet the COP in future. The area is not a gazetted fire district.
- Current network capacity is sufficient to meet the required Levels of Service in this AMP period.

C. Demand Management

The data in Table 50 show the trend in water use and loss within the scheme:

Table 49: Winchester Water Demand

Year	Volume of Demand (m^3)	Infrastructure Leakage Index (ILI)
2016/17	82,788	19.6
2015/16	82,233	5.2
2014/15	100,220	1.7
2013/14	103,946	3.0
2012/13	97,232	-
2011/12	81,426	-

There are no unique demand management issues in Winchester. Refer to Section A7.3 for discussion of the common demand management approaches that apply to all schemes.

B7.5 SUMMARY OF ISSUES AND REQUIREMENTS

Ageing Reticulation

1. Majority of the renewal is targeting Small AC mains.

B7.6 FINANCIAL PLAN

B7.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 50: Winchester Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Winchester treatment upgrade and trunkmain connection			
2	Urban watermain reticulation renewals and upgrades		1,228 (all urban)	18/19
3				

B7.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B8 RURAL WATER SUPPLY SCHEMES

TDC has four rural water supplies. These are the Downlands, Orari, Seadown and Te Moana Schemes. Descriptions of the assets in each scheme, their condition and performance, associated risks, demand and priority issues are discussed in the following sections.

Each scheme is funded separately. Details of planned works and indicative budget are presented.

B9 Downlands Water Supply

B9.1 Scheme Overview

Downlands is a restricted water supply which means that the daily allocation is supplied into the consumer's tank at a constant flow over a 24 hour period. Once the tank is full, the ballcock shuts off the flow.

Neither the Pareora township nor the St. Andrews township are restricted although 2000 litres minimum storage capacity is required.

Table 52 summarises key information about the scheme. Tables 52a to 52d summarises key information on the sub-scheme components of the Downlands Water Supply.

Figure 44 shows the boundary of the scheme.

Table 51: Downlands Water Supply Scheme Key Information

Item	Description
Scheme population	Approximately 5,103
Number of connections (Water NZ NPR definition)	Residential = 1,978 Non-residential = 334
Firefighting availability	Nil
Length of reticulation	Approximately 1000km
Rating – Domestic Charge, School Charge, Service Charge, Unit Charge	• Domestic charge - A fixed amount for each separately used or inhabited part of a rating unit within the Pareora Township and for rating units used as halls within the scheme. • School charge – a fixed amount per rating unit for rating units used as schools within the Pareora Township. • Service charge – a fixed amount for each separate connection (excluding Pareora Township) to the water supply except where there is more than one connection to any rating unit as a technical requirement of the scheme, in which case only one charge will apply. Unit charge – in addition to the assessed Service Charge, a fixed amount per unit of water or where water supplied in one half units a fixed charge (being 50% of the amount per unit) per half unit.

Table 52a: Downlands Water Supply - Rural

Item	Description
Resource consent//Expiry date	Tengawai CRC012184 9/10/2030 Waitohi CRC0128183 9/10/2030 Camerons water purchased from Timaru WS
Sources	Tengawai River, (Waitohi) Opihi River, Pareora Pipeline at Camerons
Average daily demand	4150
Peak day demand	5600
Treatment requirement and process used	Chlorination only. Does not meet DWSNZ.
Location of treatment plant	Tengawai - Tengawai River accessed via Albury Park Waitohi - Opihi River accessed from River Road Camerons - Pareora Gorge Road
Number and storage capacity of reservoirs	7 with 14310m3 capacity
Reservoir Storage Buffer (days of treated water storage in reservoir)	24% of water sold prior to any scheme storage Reservoirs hold 0.5 to 11 days storage.
Number of pump stations	6
WSP Review	2017

Table5.2b: Downlands Water Supply – Pareora

Item	Description
Resource consent//Expiry date	CRC010392 27/10/2035
Sources	Shallow ground water (bore)
Average daily demand	108
Peak day demand	170
Treatment requirement and process used	UV compliant with DWSNZ section 10 Chlorine.
Location of treatment plant	King St Pareora
Number and storage capacity of reservoirs	1 120m3
Reservoir Storage Buffer (days of treated water storage in reservoir)	0.5 120
Number of pump stations	1
WSP Review	September 2018

Table 5.2c: Downlands Water Supply – Hadlow

Item	Description
Resource consent//Expiry date	NA water is purchased from Timaru
Sources	Gleniti Reservoir (Hadlow)
Average daily demand	
Peak day demand	
Treatment requirement and process used	NA water is purchased from Timaru
Location of treatment plant	NA
Number and storage capacity of reservoirs	Nil
Reservoir Storage Buffer (days of treated water storage in reservoir)	Nil
Number of pump stations	Nil
WSP Review	NA

Table5.2d: Downlands Water Supply – Springbrook

Item	Description
Resource consent//Expiry date	CRC010393.1 27/10/2035
Sources	Springbrook bore
Average daily demand	135m3
Peak day demand	180m3
Treatment requirement and process used	Chlorination only. Does not meet DWSNZ.
Location of treatment plant	Pareora River Road
Number and storage capacity of reservoirs	120m3
Reservoir Storage Buffer (days of treated water storage in reservoir)	<0.5
Number of pump stations	1
WSP Review	April 2020

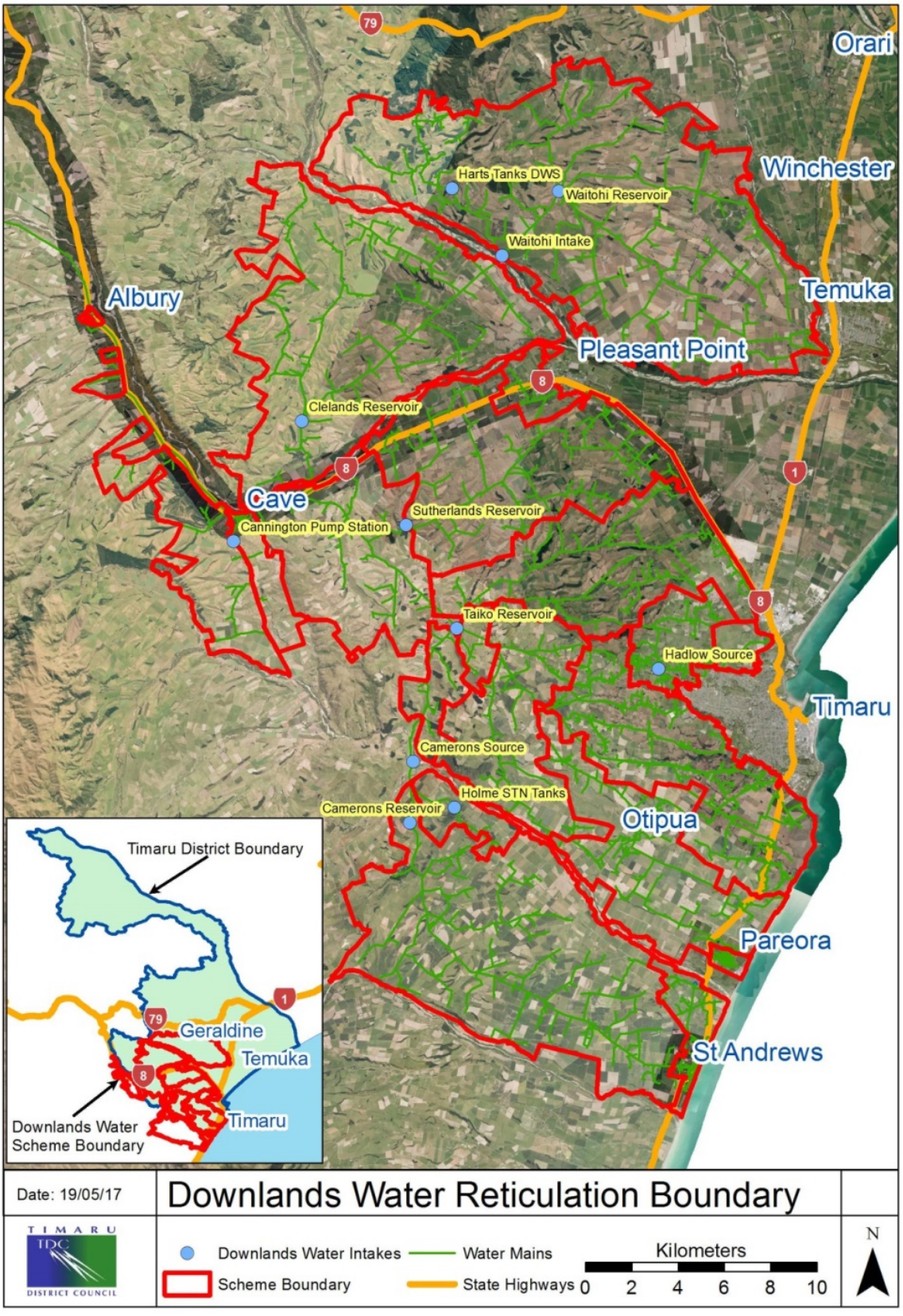


Figure 44: Downlands Water Supply Scheme Boundary

B9.2 SCHEME MANAGEMENT

There is a Downlands Joint Standing Committee made up of 5 representatives appointed by TDC and 3 members appointed by the Mackenzie and Waimate District Councils to oversee the governance of the scheme.

TDC is responsible for the management and operation of the water supply and uses contractors to carry out maintenance work.

B9.2.1 ASSET SUMMARY

A. Plant Assets

Plant facilities consist of the following:

Rural –

- Tengawai intake, treatment plant and pump station
- Waitohi intake, treatment and pump station
- Camerons pump station and treatment
- Cannington pump station
- Camerons reservoir (in ground) and booster pump
- Cleland reservoir (in ground) – solar powered
- Sutherlands reservoir (in ground) – solar powered
- Taiko reservoir (in ground) and booster pump
- Waitohi reservoir (in ground)
- Harts tanks
- Holmes Station tanks

Hadlow – pump

Pareora –

- Pareora bore, pump station, treatment and storage tanks

Springbrook –

- Springbrook bore, treatment and reservoir (above ground)

A schematic diagram of the Downlands Water Supply is shown in Figure 45.

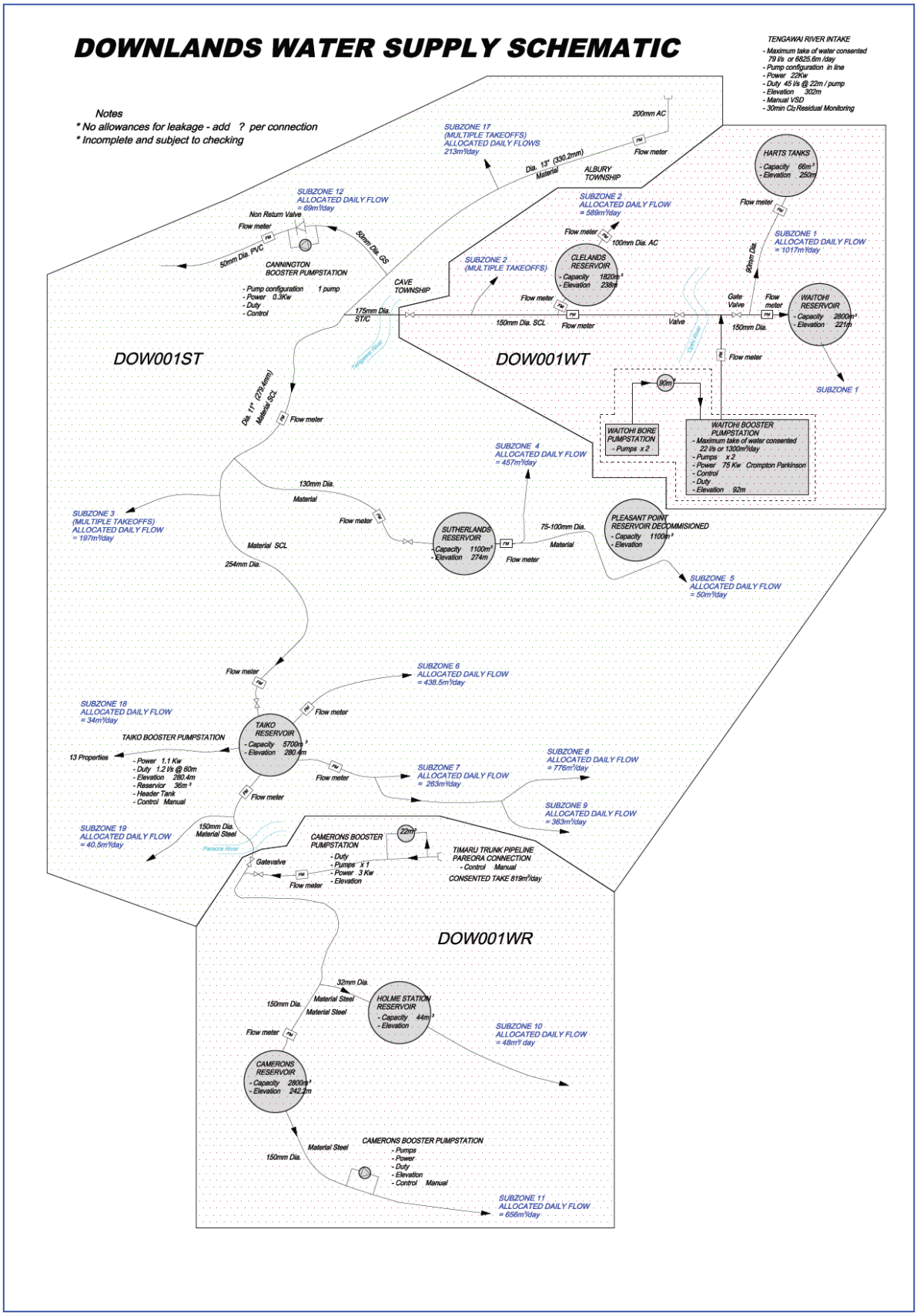


Figure 45: Downlands Water Supply Schematic

B. Reticulation

The reticulation network of the Downlands Scheme has approximately 1000 km of water mains within the reticulation. Table 53 below shows the profile of the network.

Table 52: Downlands Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)						Total (m)
	PVC	CC	PE	AC	ST	UNKNOWN	
000-049	629,582	318	50,073	15	53,568	4	733,560
050-099	79,262		18,875	1,905	39,962		140,004
100-149	5,375	1,973	37	35,690	5,756	176	49,008
150-199	977		532	9,277	29,424		40,211
200-249	11			1,383	28		1,421
250-299				2,021	9,107		11,128
300-399					23,194		23,194
Total	**715,208**	**2,291**	**69,517**	**50,292**	**161,038**	**180**	**998,525**

B9.2.2 Asset Condition and Performance

A. Plant Assets

Tengawai Intake and Treatment Plant

The entire intake and treatment plant is due for replacement and has been deferred with a review of the Tengawai Renewal Project timing.

A number of assets are due for replacement but will only be maintained to extend the life or on failure.

The performance of the intake and treatment plant meets the existing requirements but will be inadequate to meet future demands.

Waitohi Intake and Treatment Plant

The intake and treatment plant was proposed to be mothballed following the Tengawai upgrade. It was not intended to be reused when an upgrade was proposed.

As the water quality from this intake and treatment plant has taste and odour issues it is used between 0 and 3 months each year. Renewals are being deferred and will only occur following failure. There is currently duty and backup pumps.

Camerons Treatment Plant

The treatment plant was proposed to be mothballed following the Tengawai upgrade. It was not intended to be reused when an upgrade was proposed.

Renewals are being deferred and will only occur following failure.

Pareora Treatment Plant

There are no asset condition or performance issues.

St Andrews Intake and Treatment Plant

The intake has no asset condition or performance issues.

The current treatment is chlorination only. A new treatment plant is programmed to occur in 2020 (check data).

Reservoirs

The 5 reservoirs are all around 80 years old and nearing the end of their life. Leakage from the reservoir and pipe failure is suspected.

Optimiser to the network is currently being undertaken by Opus to determine if 4 reservoirs (i.e. excluding Taiko) should remain or whether modern technology (e.g. pressure reducing valves) could improve scheme efficiencies.

Any reservoir which remains, including Taiko, will be upgraded with on-site pipe renewal, a reservoir liner and a replacement cover.

Harts Tanks

This reservoir is in good condition. The concrete tanks are nearing the expected end of life.

Booster Pump Stations

Camerons - the pump is operating adequately but boosts pressure to a significant area (150 tanks). Only about 4 tanks need this increased pressure.

Taiko – no condition or performance issues.

Cannington Pump Station – no condition or performance issue. This asset will not be required on completion of the Tengawai Upgrade Project.

B. Reticulation Assets

Majority of the Downlands trunkmain is close to the end of its useful life. Figure 46 shows the profile of the pipe network. Leakage along the trunkmain is high and is programmed within this AMP to be upgraded to meet the additional demand. Due to the increase of demand in the future, some pipes have been identified to be upgraded at the time of renewal, or ensuring it can meet the LOS when the demand increases whichever come to the highest priority.

Current network capacity is sufficient to meet the required Levels of Service in this AMP period although no additional allocations are permitted in the rural sector until parts of the Downlands reticulation has been upgraded.

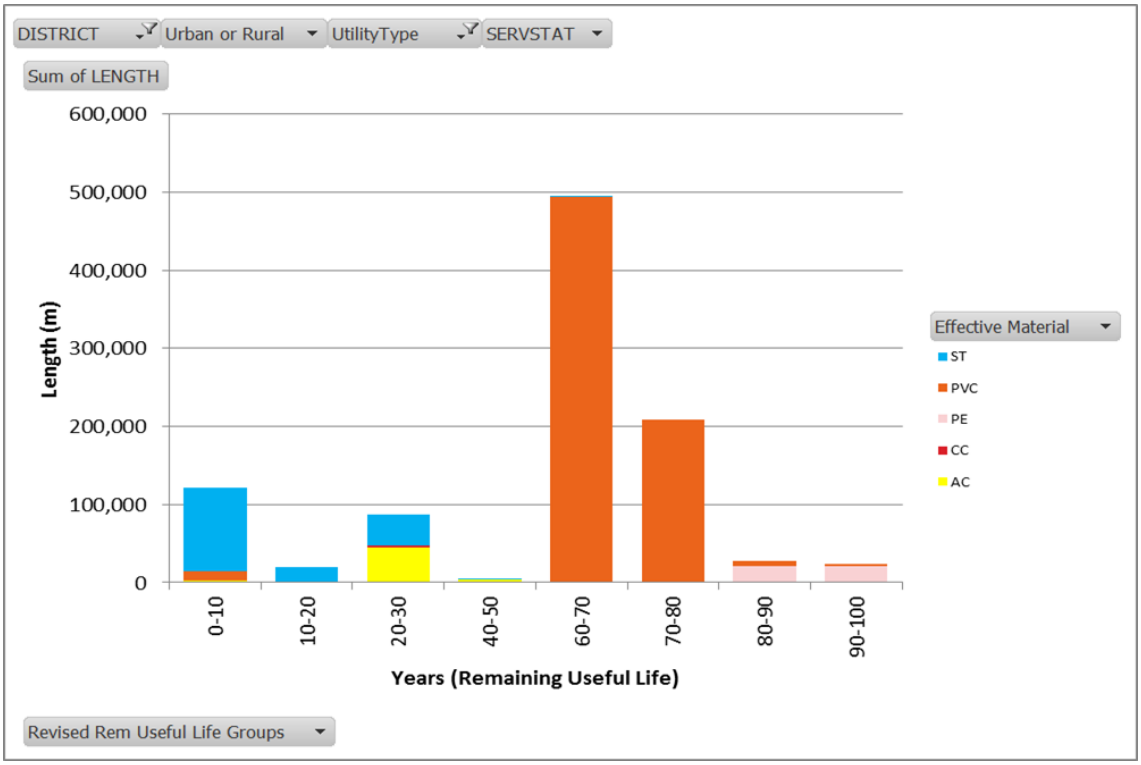


Figure 46: Downlands Water Supply Network Remaining Useful Life

B9.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are contained in the following Operations Manuals:

Scheme Component	Document Number
Tengawai	1073155
Waitohi	1073154
Camerons	1072848
St Andrews	1072826
Pareora	1072845
Downlands	1042829

Additional details are in Section A9.1 of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

The forecast renewal of the reticulation is shown in Figure 47 below.

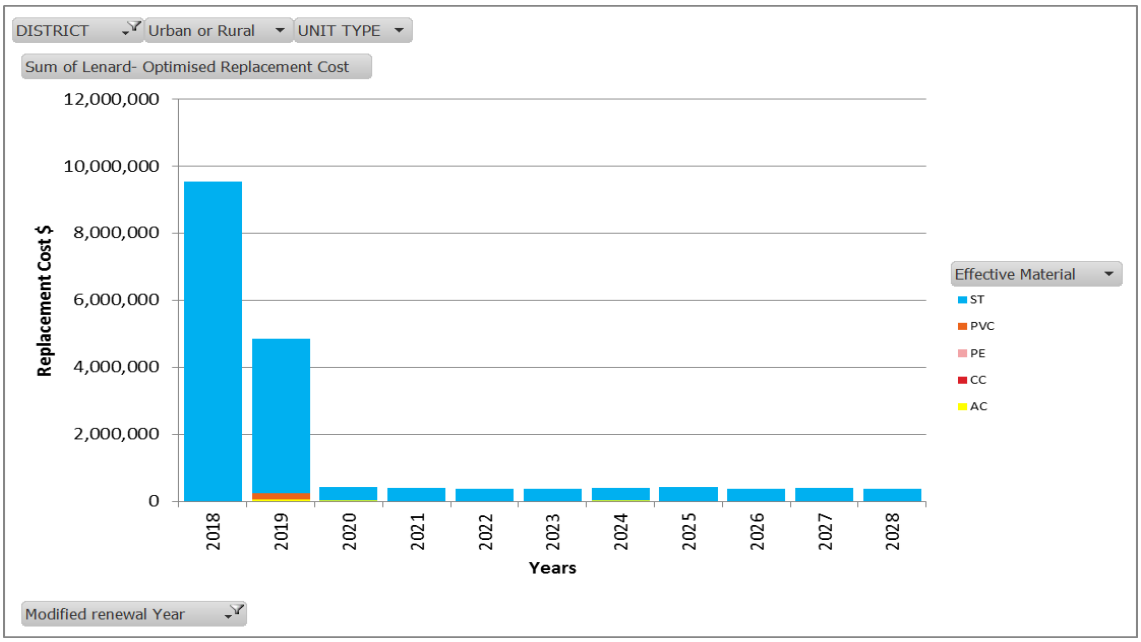


Figure 47: Downlands Water Supply Network Renewal Programme 2018-28

C. Asset Development

Asset development as listed below is required to be implemented within this AMP as part of the Downlands Water Supply Upgrade to be able to supply 100l/s to the scheme and provide increase allocation from 56L/ha/day to 65L/ha/day. In addition, the upgrades will also increase resilience to security and reliability of supply.

- New Downlands Water Treatment Plant
- Water Intake and Pump Station Upgrade
- New Downlands Raw and Treated Water Storage
- Water Treatment Plant in Waitohi
- New Treated Water Storage in Waitohi
- Identified Pipe Upgrades within the Network
- New Pressure Reducing Valves installation

D. Asset Disposal

After the new Downlands Water Treatment Plant, Pump Station and Trunkmain Upgrade have been implemented, majority of the existing reservoirs and storage in the network downstream is currently being assessed on the hydraulic performance and resilient consideration whether it will be proposed to be abandoned to be replaced with Pressure Reducing Valve or retain it in the system.

B9.3 RISK MANAGEMENT

A. Water Safety Plan

Risks to public health from the Downlands Water Supply Scheme were identified and assessed during the development of the scheme's Water Safety Plans.

Downlands Rural Water Safety Plan (Document #787287)

A number of risks were identified, together with mitigating measures. Improvements to the water supply were identified, together with a time frame.

The improvements identified in 2013 and not yet completed are:

Improvement ID	Improvement	Timeframe
3	Reassess Tengawai intake system	2014-15
4**	Install treatment plant at Tengawai (protected from the river)	2018
5**	Consider raw water storage	2015
6*	Renew trunk main to Cave (to reduce dependency on Waitohi and Camerons)	2014
7**	Consider treated water storage at treatment plant	2015
8	Consider installing Cl2 monitor at Waitohi and Camerons	2030
10*	Renew cover	2015-2020
11	Consider lining reservoir when cover replaced	2015-2020
12	Consider additional treated water storage	2030
13*	Reticulation renewal on-going	2014-2022

* *In LTP 2012*
** *Timeframe is an indicative timetable*

A number of other improvements have been completed, or commenced and are on-going.

This plan stated it would be reviewed in July 2017. As it was approved in May 2013 this review could be legally delayed until May 2018.

The current upgrade timetable may need to be reassessed.

Hadlow Water Safety Plan (Document #872129)

All improvements identified in 2014 have been completed, or commenced and are ongoing.

St Andrews Water Safety Plan (Document #940562)

The improvements identified in 2015 and not yet completed are:

Improvement ID	Improvement	Timeframe
2	Install treatment process	2019-2020
3	Install generator connection	2019-2020

A number of other improvements have been completed, or commenced and are on-going.

Pareora Water Safety Plan (Document #835437)

All improvements identified in 2014 have been completed, or commenced and are ongoing.

Additional Risks

- The Tengawai Treatment Plant sits alongside the Tengawai River. Floodwaters can cut off access and inundate the treatment plant. This occurs approximately 1 year in ten.
- Pipe bridges
- Unstable land
- Access to private property for reservoir (Harts and Holme Station) and pipe maintenance

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 54 below were extracted from the water assets criticality assessment report in document #829869.

Table 53: Downlands Water Supply Facility Asset Criticality

Downlands Facility Asset	Criticality Rating*	Condition Rating**	Risk
Springbrook Bore	C	1	Insignificant
Springbrook Treatment	A	2	Low
Springbrook Reservoir	A	3	Moderate
Tengawai Intake and Treatment	B	3	Low
Waitohi Intake	C	2	Insignificant
Waitohi Treatment	A	2	Low
Waitohi Reservoir	A	2	Low
Camerons Reservoir	A	3	Moderate
Camerons Pump Station	C	2	Insignificant
Cleland Reservoir	B	2	Insignificant
Sutherlands Reservoir	A	2	Low
Taiko Reservoir	A	3	Moderate
Hart's Tanks (holmes station)	C	2	Insignificant

Pareora Bore	C	2	Insignificant
Pareora Treatment	A	2	Low
Pareora Reservoir	A	1	Insignificant
Cannington Pump Station	C	2	Insignificant

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
* B = asset components that are important to the effective day to day operation of the system where redundancy or contingency should be available for the restoration of service within a reasonable time.
* C = asset components can fail without affecting the operation and service, and where repairs or renewal can be realistically deferred.
**1 = near as new condition with no defects. Asset is fully serviceable.
**2 = asset has superficial deterioration and minor issue with reliability. Minor maintenance only is required.
**3 = asset has significant deterioration. Assets are operational but display efficiency deficiencies. Routine maintenance and/or refurbishment is required.

Within Downlands Water Supply the Tengawai Treatment Plant is the preferred source for the water and for six to nine months each year the Tengawai source supplies the entire scheme. The area affected by a failure of the Tengawai Treatment Plant is restricted to the Downlands Water Supply. The reservoirs within the Downlands Water Supply have at least 2 days storage but only supply 16% of the water at average daily demand and consumers should have at least two days storage.

Figure 48 shows the Downlands water network criticality.

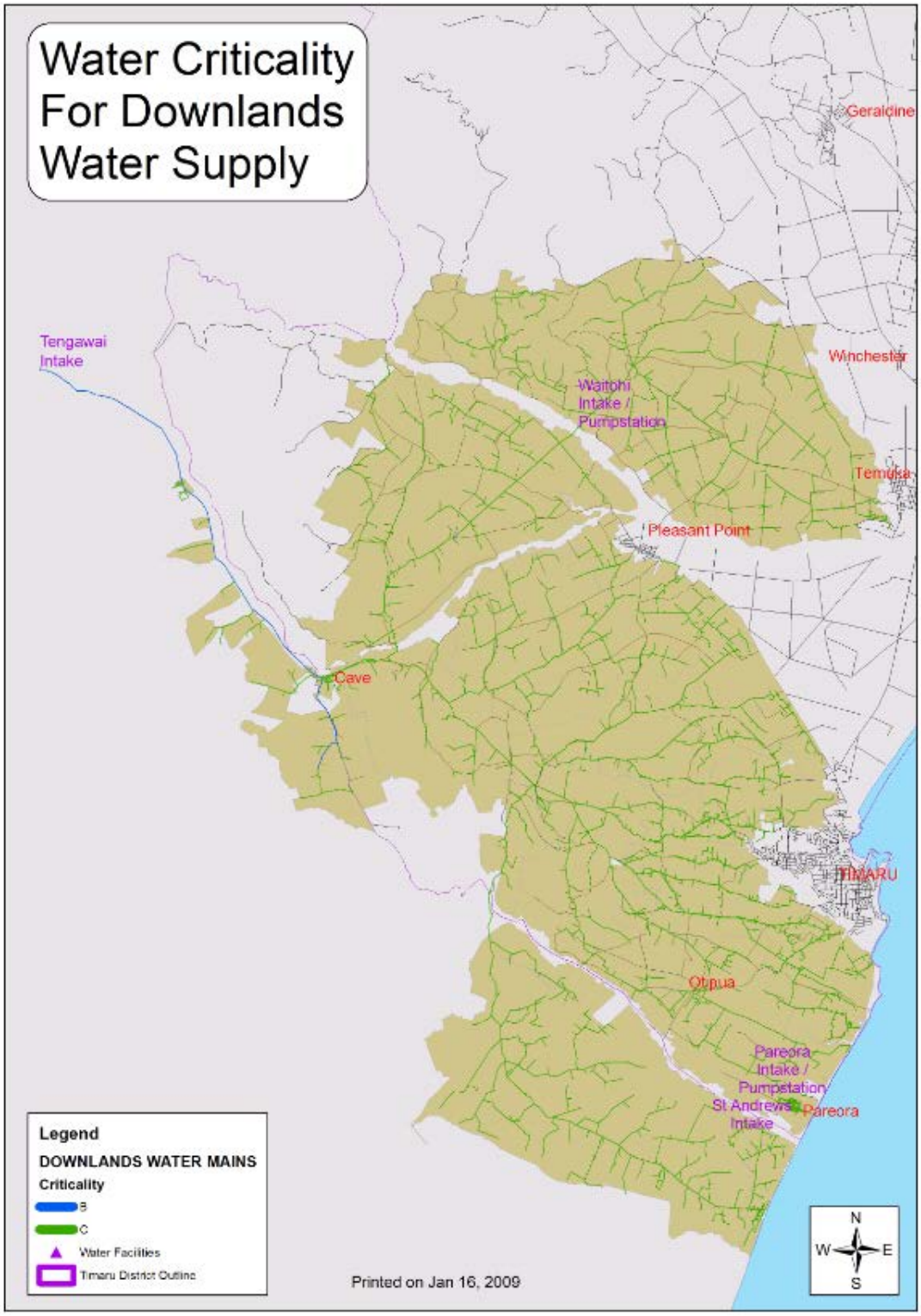


Figure 48: Downlands Water Supply Network Criticality

B9.4 DEMAND MANAGEMENT

A. Demand Drivers

- Customers of the Downlands Scheme are either residential or farm properties. Water is supplied for domestic and stock water use.
- It is a restricted supply which requires on-site storage. The allocation to consumers is based on a supply of 56 L/ha/day, plus 900 L/dwelling/day where this allocation has been approved. The volume is then rounded to the appropriate unit.
- Water is sold by the unit. Each unit allows for a supply of 1,000 L/day, provided there is storage capacity available. Over recent years the subdivision of land has resulted in some reallocation of units. This reflects the changes to the District Plan allowing lifestyle blocks.
- The actual demand for stock water is uncertain. Assessed demand for stock water in the Downlands scheme will be in the range of 80-150 L/ha/day by 2030, compared to the scheme design of 56 L/ha/day. The estimate was based on scenarios of conversion/intensification in livestock farming.
- Currently, the Downlands scheme does not have sufficient capacity over and above the existing scheme design allocations to provide for any additional demand which could be a result of increased agricultural demand. This is part of the Downlands Water Supply Additional Water Strategy (Doc# 724458).

B. Demand Forecast

- Increase scheme demand from 56l/hec/day to 65 L/hec /day
- The assessed stockwater demand within the scheme is estimated to be at 80-150 L/ha/day by 2030
- The performance of the existing facilities and network meets the existing requirements but will be inadequate to meet future demands.

C. Demand Management

The data in Table 55 show the trend in water use and loss within the scheme:

Table 54: Downlands Water Demand

Year	Volume of Demand (m^3)	Infrastructure Leakage Index (ILI)
2016/17	1,500,186	0.5
2015/16	1,625,875	0.7
2014/15	1,653,881	0.8
2013/14	1,646,184	No data
2012/13	1,745,963	No data
2011/12	1,587,684	No data

Demand management approaches:

- The primary method of managing demand is by not approving any additional sale of water in the rural area.
- Prior to increase allocation to the network in any area, it will be managed in accordance to the completion of the upgrades in the network as mentioned in B9.2.3 - Asset Development.
- Occasional water shortages due to dry weather or high demand are managed through TDC's stepped hosing restriction policy that is imposed to reduce demand to the required level.
- At times the Tengawai Intake struggles to meet the leakage plus consumption demand. The flows through the Tengawai flow meter are closely monitored and when the difference is higher than the consumption sold between the meters leak detection occurs. Repairs reduce the demand by up to 10 L/s. This occurs approximately 4 times each year.
- New houses have utilized rain water unless there has been an alternative private system, usually a bore to supplement the stock water. In these cases a stock allocation is often transferred to a domestic allocation.
- Implementation of infrastructure improvements/renewals (approved by the Downlands Joint Standing Committee)

Refer to Section A7.3 for discussion of the common demand management approaches that apply to all schemes.

B9.5 Summary of Issues and Requirements

Meeting DWSNZ and Ageing Infrastructure

Treatment Plants:

1. Waitohi TP – intake and treatment plant has water quality issues; renewals are being deferred until failure
2. Camerons TP – treatment plant renewals being deferred until failure
3. St Andrews TP - new treatment plant programmed in 2020

Reservoirs:

4. The 5 reservoirs are all around 80 years old and nearing end of life.
5. Any reservoir which remains will be upgraded with on-site pipe renewal, a reservoir liner and a replacement cover
6. Harts tanks – concrete tanks are nearing expected end of life
7. Opihi River Pipeline Crossing programmed in 2018/19 to be renewed due to high maintenance and repair cost to repair the poor condition pipe

B9.6 FINANCIAL PLAN

B9.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 55: Downlands Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Downlands Water Treatment Plant	LOS and Growth	7,100	2010/21 to 2021/22
2	Downlands Raw and Treated Reservoir	LOS and Growth	2,600	2019/20 to 2020/21
3	Low Head Lift Pump and Intake Upgrade	Renewal, LOS, Growth	1,500	2017/18
4	Waitohi Treatment Plant upgrade and New Treated Storage	LOS	2,000	Within the 10 years of the AMP
5	Harts Pump Station	LOS	200	??
6	Te Ngawai Trunkmain	Renewal, LOS, Growth	12,100	2017/18 to 2018/19
7	Opihi River Pipeline Crossing	Renewal	200	2018/19
8				

B9.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B10 ORARI WATER SUPPLY

B10.1 SCHEME OVERVIEW

The Orari Water Supply Scheme is a rural restricted supply. The scheme does not have its own plant facilities. Its water is fed from the Temuka Water Treatment plant. Water supply is for domestic and stock water use only.

Table 57 summarises key information about the scheme and Figure 49 shows the boundary of the scheme.

Table 56: Orari Water Supply Scheme Key Information

Item	Description
Scheme population	Approximately 169
Number of connections (Water NZ NPR definition)	Residential = 68 Non-residential = 2
Firefighting availability	Nil
Resource consent//Expiry date	Refer to Temuka Section in B5
Sources	Refer to Temuka Section in B5
Average daily demand	76 m^3
Peak day demand	120 m^3
Treatment requirement and process used	Refer to Temuka Section in B5
Location of treatment plant	Refer to Temuka Section in B5
Number and storage capacity of reservoirs	Refer to Temuka Section in B5
Reservoir Storage Buffer (days of treated water storage in reservoir)	Refer to Temuka Section in B5
Number of pump stations	Nil
Length of reticulation	7 km
Rating – Service Charge	A targeted rate of a fixed amount per unit of water supplied
WSP Review	Refer to Temuka Section in B5

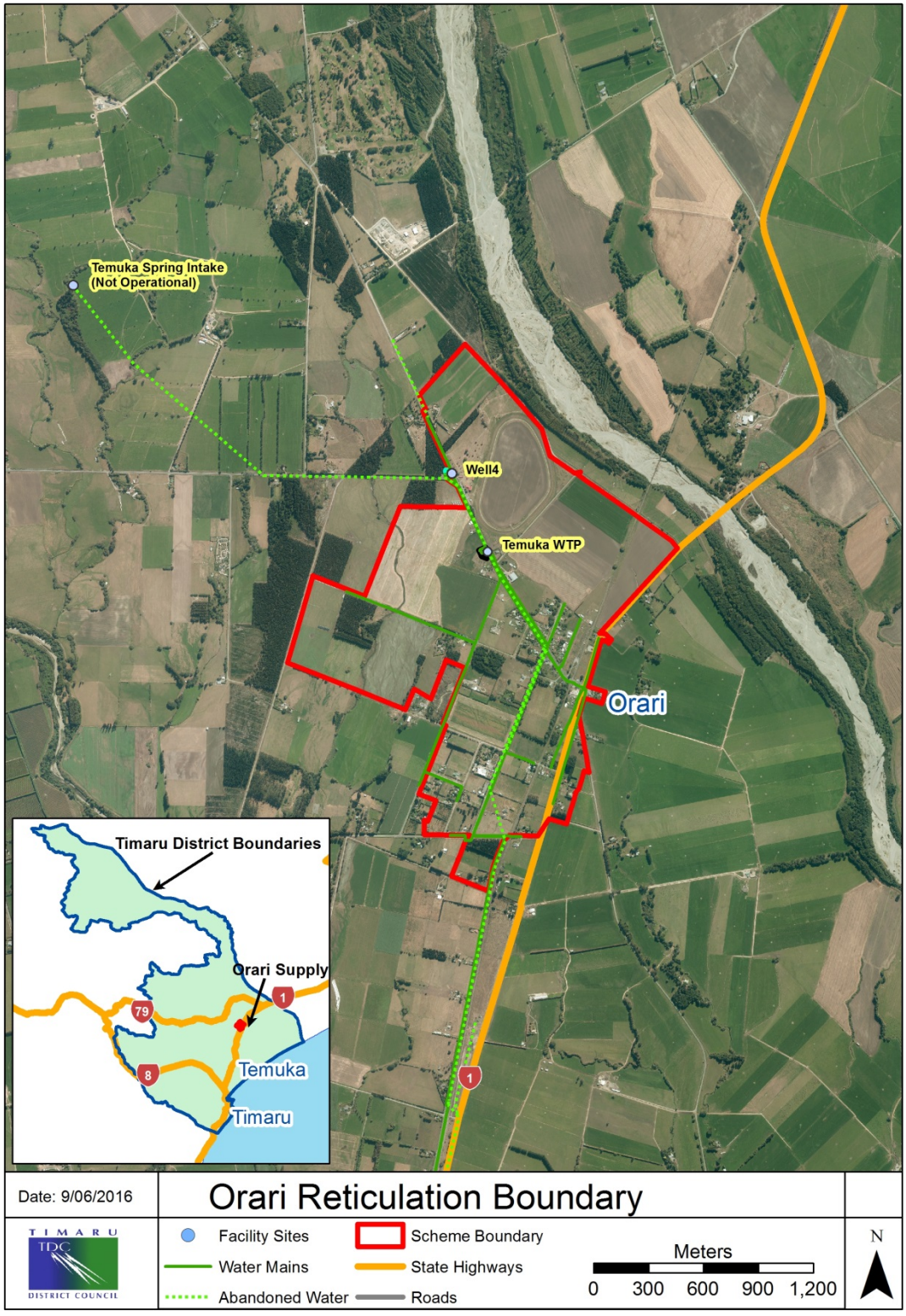


Figure 49: Orari Water Supply Scheme Boundary

B10.2 SCHEME MANAGEMENT

B10.2.1 ASSET SUMMARY

A. Plant Assets

There are no plant facilities for Orari Water Supply. Treated water is supplied from the Temuka Water Supply.

B. Reticulation

There are about 7 km of pipes in the Orari reticulation network. Table 58 below shows the profile of the network.

Table 57: Orari Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)			Grand Total
	PVC	PE	ST	
0-049		5885		5885
050-099	1425		2	1427
100-149	3			3
Grand Total	**1428**	**5885**	**2**	**7315**

B10.2.2 ASSET CONDITION AND PERFORMANCE

A. Plant Assets

There are no plant facilities for Orari Water Supply. Treated water is supplied from the Temuka Water Supply.

B. Reticulation

Majority of the water mains currently have 60 or more years remaining useful life as shown in Figure 50. Some renewals are identified in the reticulation due to high number of repairs on the defective mains and have assessed to have reduced useful life.

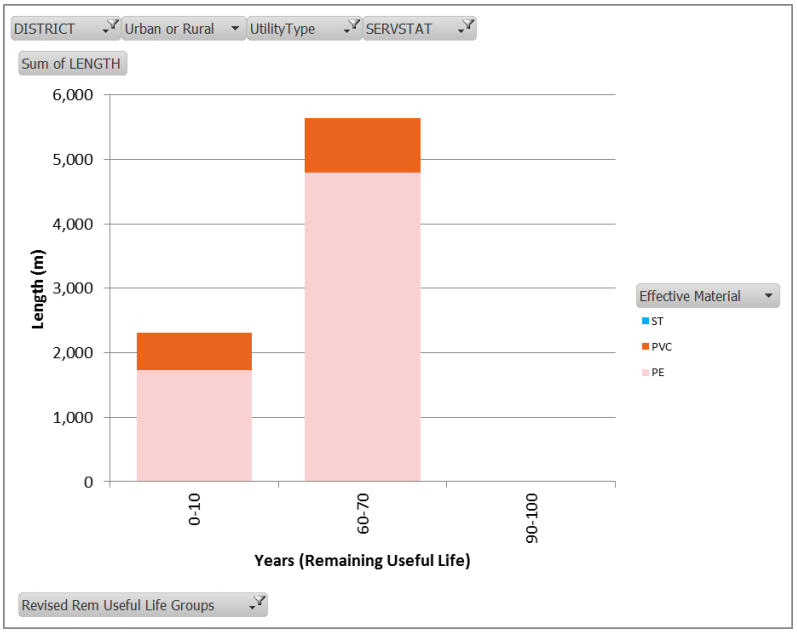


Figure 50: Orari Water Supply Network Remaining Useful Life

B10.2.3 Asset Life Cycle Management

A. Operations and Maintenance

There are no unique operations and maintenance activities in the Orari Water Supply Scheme. Part A Section A9.1 discusses details of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

There are no plant facilities for Orari Water Supply. Treated water is supplied from the Temuka Water Supply. The forecast reticulation renewal programme for this AMP period is shown in Figure 51.

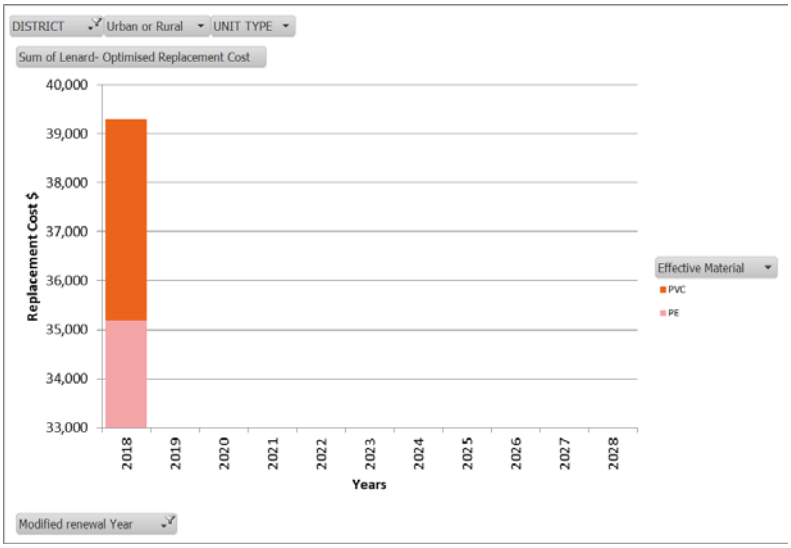


Figure 51: Orari Water Supply Network Renewal Programme

C. Asset Development

There are no forecast asset development works within this AMP period.

B10.3 RISK MANAGEMENT

A. Water Safety Plan

As Orari purchases the water from Temuka its risks were addressed in the Temuka WSP. These risks are discussed in Section B5.6.

No improvements were identified for Orari Water Supply reticulation.

B. Criticality of Assets

Refer to Temuka Section for critical plant assets.

Criticality rating of the Orari water reticulation network is shown in Figure 52.

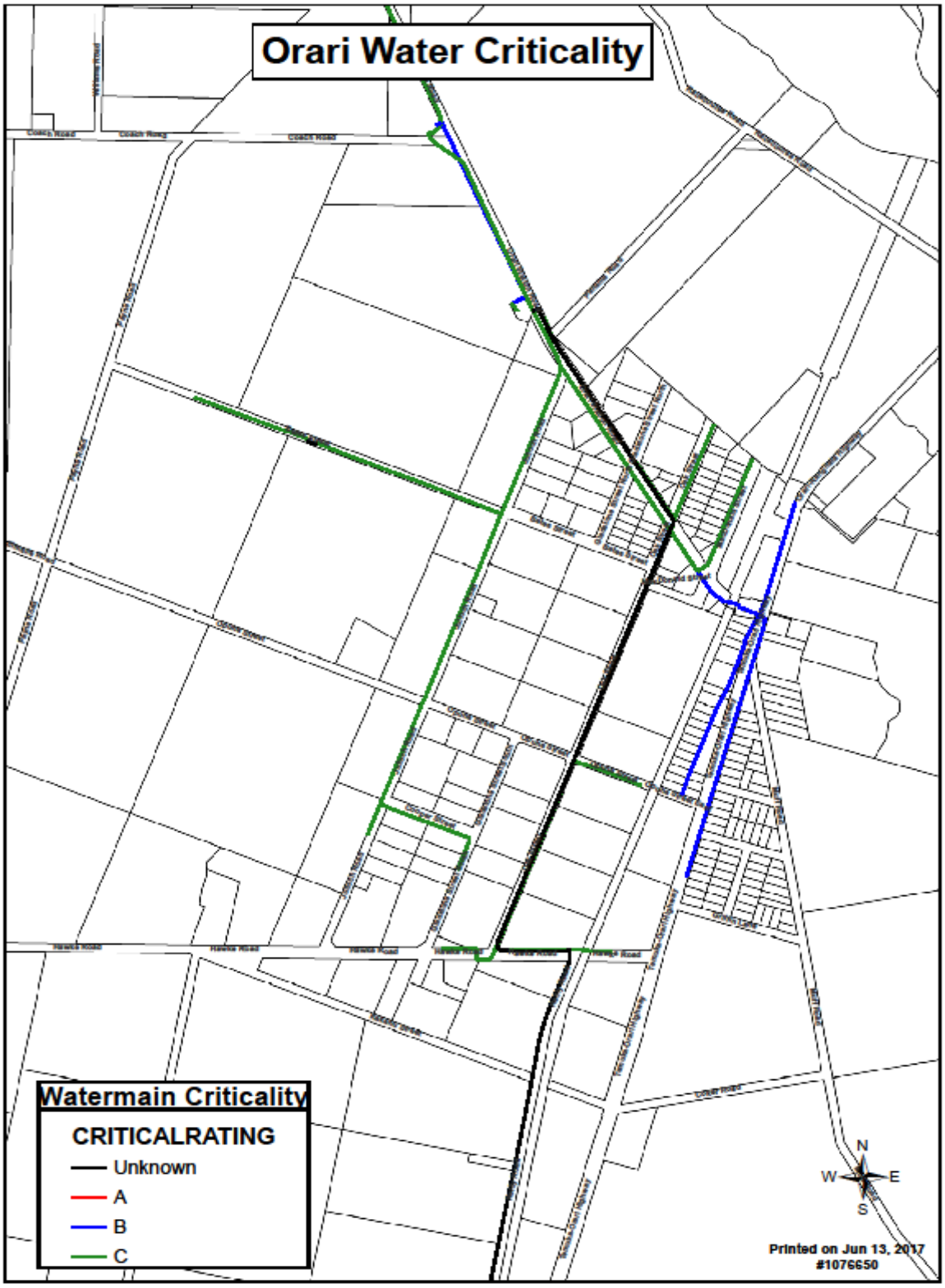


Figure 52: Orari Water Supply Network Criticality

B10.4 DEMAND FORECASTING AND MANAGEMENT

A. Demand Drivers

- The Orari water supply is restricted for domestic and stock water use.
- Customers are predominantly domestic or lifestyle property owners.
- There are no large consumers of water on the scheme.
- The Orari water supply has minimal stock water demand.

B. Demand Forecast

- The Temuka Scheme which supplies Orari has sufficient capacity to meet potential increased stock water demands on the Orari scheme should they occur.

C. Demand Management

The data in Table 59 show the trend in water use and loss within the scheme:

Table 58: Orari Water Demand

Year	Volume of Demand (m^3)	Infrastructure Leakage Index (ILI)
2016/17	27,721	11.3
2015/16	27,584	2.3
2014/15	29,235	5.5
2013/14	27,660	No data
2012/13	29,744	No data
2011/12	24,076	No data

There are no unique demand issues in the Orari Water Supply.

Refer to A7.3 for additional details on approaches used to manage common demand issues across Council's water supply schemes.

B10.5 Summary of Issues and Requirements

Ageing Infrastructure

1. Some renewals are identified in the reticulation due to high number of repairs on the defective mains and have assessed to have reduced useful life.

B10.6 Financial Plan

B10.6.1 Proposed Capital Works Programme 2018-28

Table 59: Orari Capital Works Programme 2018-28

Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1			
2			

B10.6.2 Operations and Maintenance (O&M) Programme

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B11 SEADOWN WATER SUPPLY

B11.1 SCHEME OVERVIEW

The Seadown Scheme draws water from a shallow bore located on Mill Road just east of Pleasant Point. The supply is treated at the intake by aeration and chlorination. From the reservoir immediately adjacent to the bore the supply is pumped into the reticulation to maintain a constant operating pressure. The scheme supplies water to properties between Pleasant Point and Seadown including the Seadown township.

The scheme consists of both demand and restricted connections. Troughs are on demand and domestic supplies are generally restricted.

Table 61 summarises key information about the scheme and Figure 53 shows the boundary of the scheme.

Table 60: Seadown Water Supply Scheme Key Information

Item	Description
Scheme population	Approximately 896
Number of connections (Water NZ NPR definition)	Residential = 356 Non-residential = 85
Firefighting availability	No
Resource consent//Expiry date	CRC010349 21L/s 1227m^3/day average
Sources	Shallow bore Seadown Intake and Treatment Plant
Average daily demand	890 m^3/day
Peak day demand	1500 m^3
Treatment requirement and process used	3 log UV
Location of treatment plant	Mill Road
Number and storage capacity of reservoirs	1x 500 m^3
Reservoir Storage Buffer	0.25 -0.5 day
Number of pump stations	x1 at treatment plant
Length of reticulation	Approximately 175km
Rating - • Area Charge and Domestic Charge • Water by Meter	• A targeted rate of a fixed amount per hectare within the rating unit and a targeted rate of a fixed amount per separately used or inhabited part of a rating unit. • A uniform targeted rate for water supply per cubic meter of water consumed by any rating unit within Seadown scheme which has been fitted with a water meter
WSP Review	February 2019

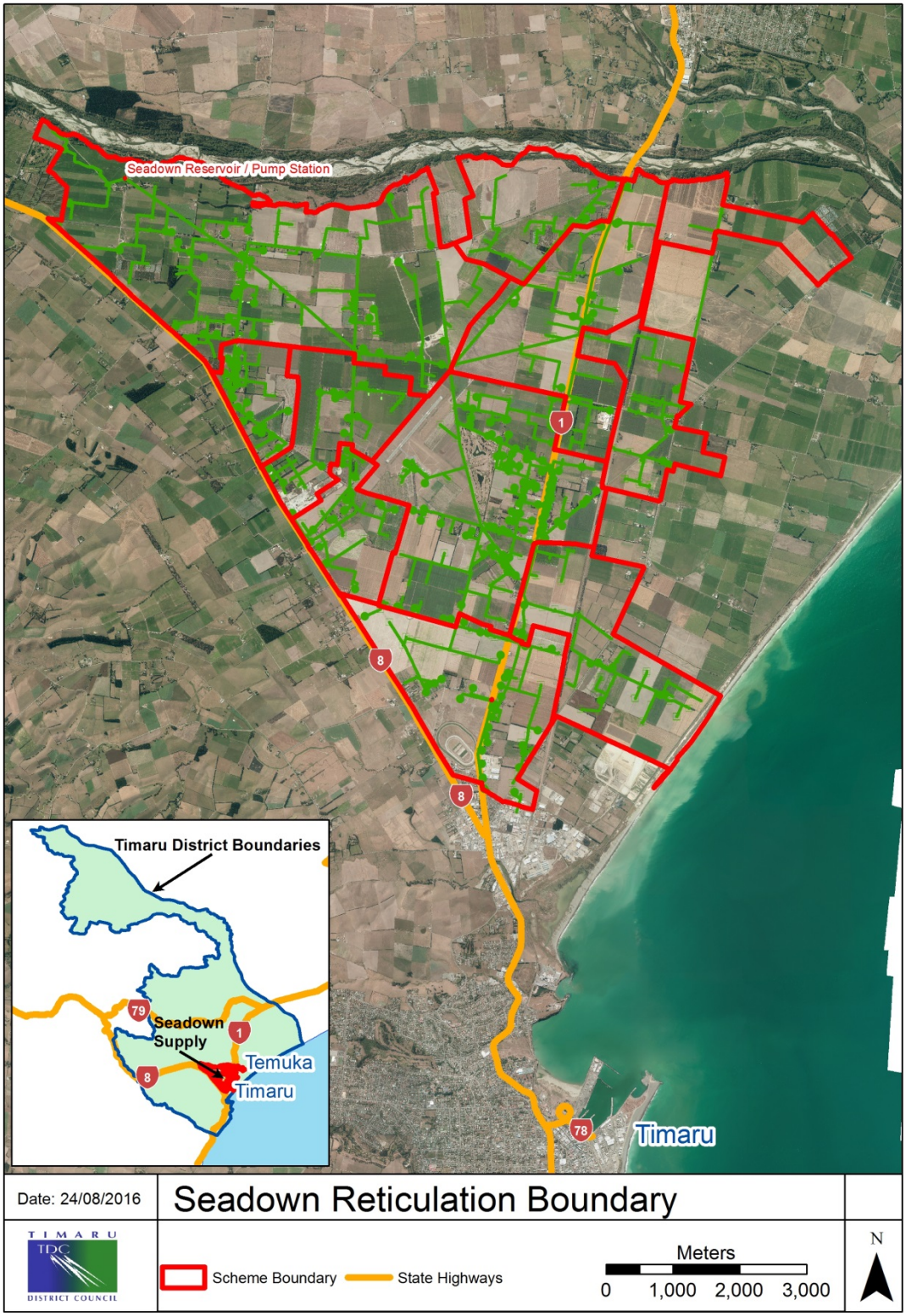


Figure 53: Seadown Water Supply Scheme Boundary

B11.2 SCHEME MANAGEMENT

B11.2.1 ASSET SUMMARY

A schematic diagram of the Seadown Water Supply is shown in Figure 54.

A. Plant Assets

The plant facility consists of a bore, pumps, treatment plant and a reservoir.

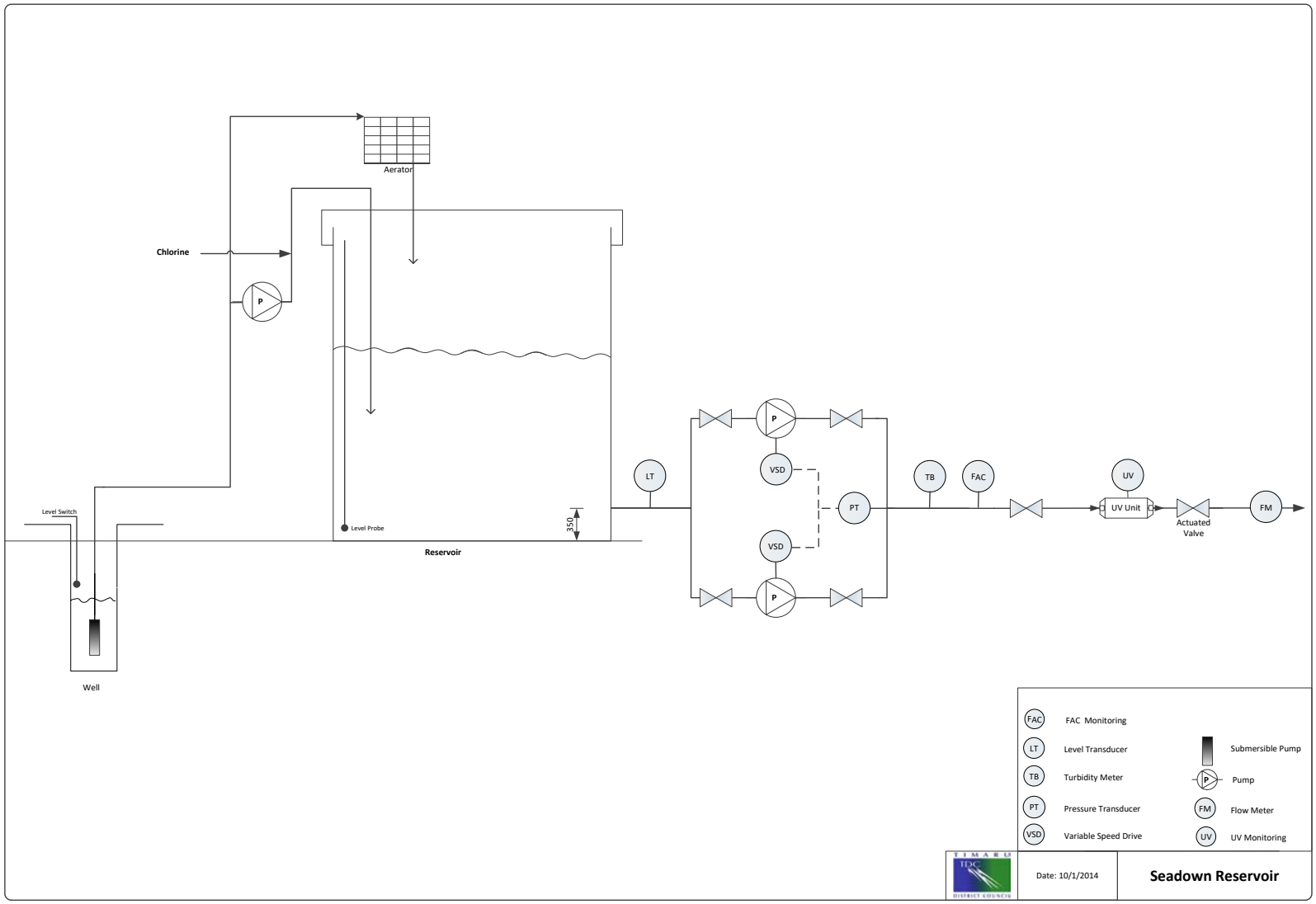


Figure 54: Seadown Water Supply Schematic

B. Reticulation

The scheme has approximately 175 km of water mains within the reticulation. Table 62 shows the profile of the pipe network.

Table 61: Seadown Water Supply Network Profile

Diameter Group (mm)	Pipe Material and Length (m)					
	PVC	PE	AC	ST	Unknown	Total
000-049	129,572	7,887		2,224	7,433	147,116
050-099	15,413		820			16,233
100-149	852		3,656			4,508
150-199			3,182		1,752	4,934
200-249			1,408		233	1,641
Total	**145,837**	**7,887**	**9,067**	**2,224**	**9,417**	**174,431**

B11.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

The pump within the bore has reached the expected end of life. As it is a critical asset the replacement pump was installed in 2017 giving a duty and standby pump.

Treatment

The UV reactor is validated to treat water > 90 UVT. In a wet period the UVT of the water can drop below 95% of this resulting in non-compliance. It is at the end of life.

Storage

A report in 2016 states the remaining life is 20 years. A seismic assessment has not been carried out.

B. Reticulation

Figure 55 shows the remaining useful life of the water mains in the Seadown Scheme.

Seadown Water Scheme has issues with maintaining LOS and unsustainable to supply to the properties in high demand. Majority of the connections are directly connected to the troughs instead of reticulated tanks with unlimited demand. With the combination of unrestricted demand and high water losses throughout the scheme, the performance of the network to meet the LOS could not be achieved in times of high demand especially during drought conditions.

TDC is carrying out sustainable water management strategy to this scheme. Seadown Rural Water Supply Model Review and Analysis is undertaken to produce feasible options to be assessed and approved by the Council.

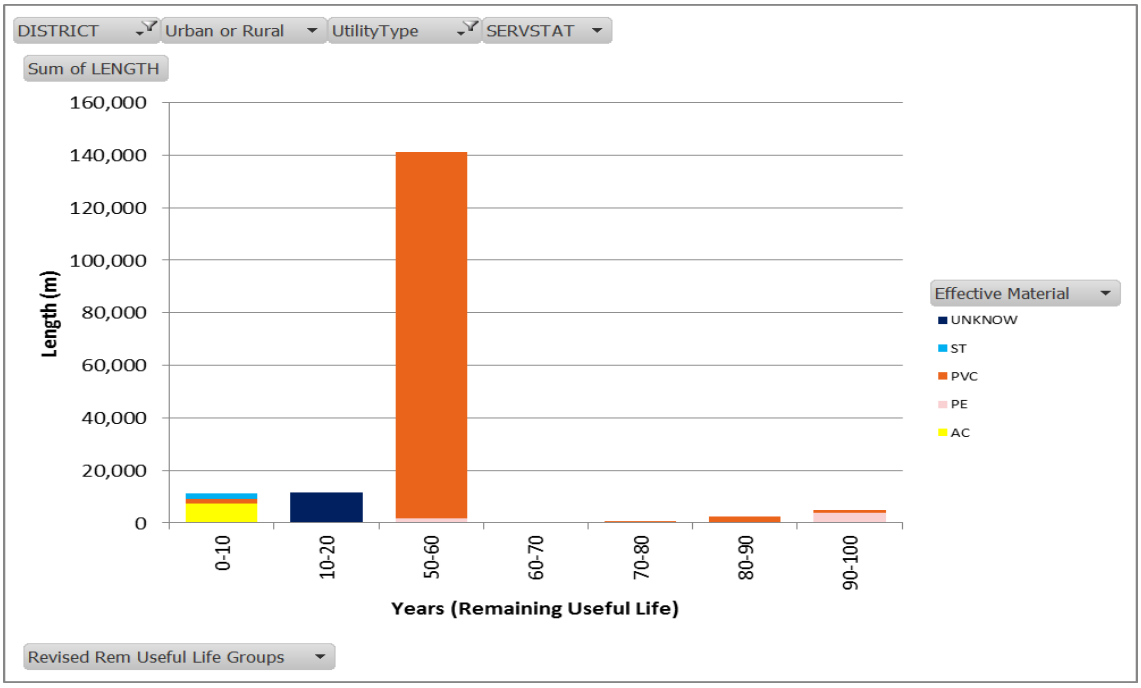


Figure 55: Seadown Water Supply Network Remaining Useful Life

B11.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are contained in the Operations Manual (Document #1076301).

Currently, the scheme is supplied to consumer troughs and domestic tank supplies. Continuous supply to consumers is unsustainable during periods of high demand. Consumers connected on the out areas of the reticulation receive intermittent supply.

The scheme pipe reticulation installed at a shallow depth in areas. This creates issues for farmer carrying out cultivation operations.

Additional details are in Section A9.1 of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals –

- UV - 2017/18
- Booster pump – 2026
- Switchboard - 2025

The forecast reticulation renewal programme is shown in Figure 56 below.

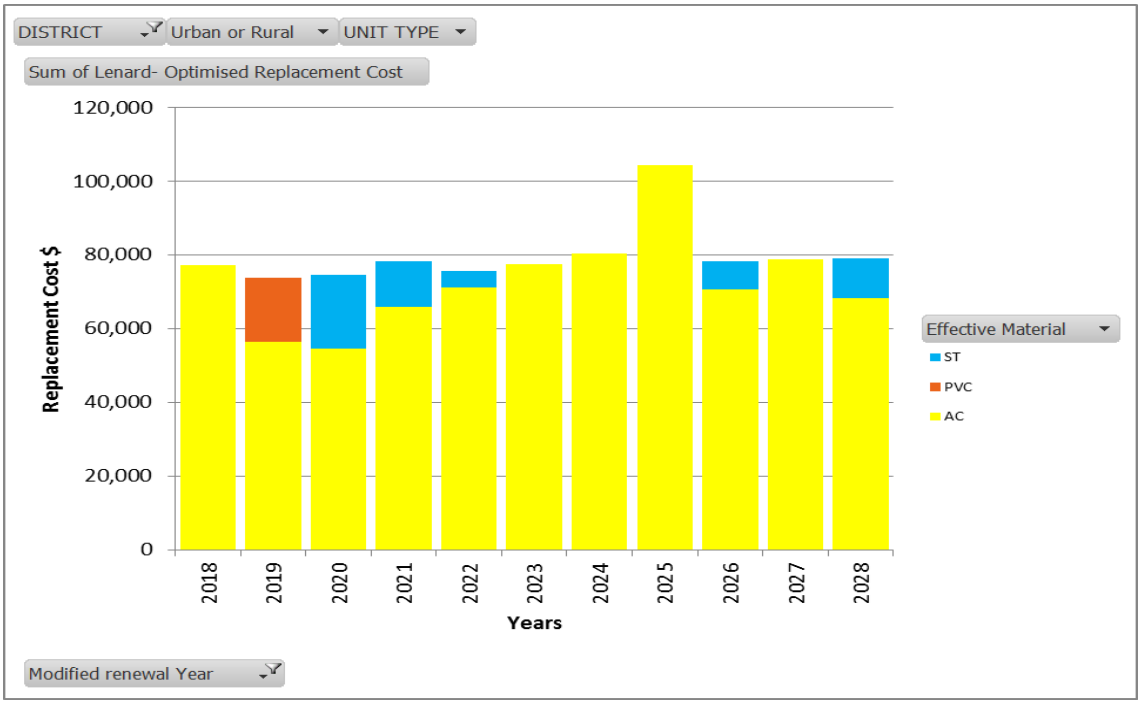


Figure 56: Seadown Water Supply Network Remaining Useful Life

Within this period of AMP subject to the strategies approval, the approach to network renewals will be reactive approach and utilising the asset as much as possible. Pipes that are due to be renewed will be monitored closely to ensure LOS can still be maintained in normal demand and minimal liability to the Council infrastructure.

C. Asset Development

A reservoir is planned but will not be constructed until the scheme review is completed. This will impact on the replacement of the booster pumps.

Depending on the approved option from the Seadown Rural Water Supply Model Review and Analysis will provide direction whether there will be other Asset Development to be carried out within the AMP period.

B11.3 Risk Management

A. Water Safety Plan

Risks to the Seadown Water Supply were identified and assessed during the development of the scheme's Water Safety Plan (Document #858144).

Improvements identified:

- Consider Treated Water Storage 2015
- Review scheme operations 2014/15

The scheme review has commenced.

A number of other improvements have commenced and are on going.

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 63 below were extracted from the water assets criticality assessment report in document #829869.

Table 62: Seadown Water Facility Asset Criticality

Seadown Facility Asset	Criticality Rating*	Condition Rating**	Risk
Seadown Bore	C	2	Insignificant
Seadown Treatment	B	2	Insignificant
Seadown Reservoir	A	2	Low

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
* B = asset components are important to the effective day to day operation of the system where redundancy or contingency should be available for restoration of service within a reasonable time.
* C = asset components can fail without affecting the operation and service, and where repairs or renewal can be realistically deferred.
**2 = asset has superficial deterioration and minor issue with reliability. Minor maintenance only is required.

The Seadown Scheme serves approximately 2% of the total connected population of the District. The area affected by a failure of the Seadown Treatment Plant is restricted to the Seadown Water Supply. The reservoir has approximately ½ day storage at average daily demand and consumers have at least 1,800litres storage. Therefore, in case of a district wide event, the Seadown Water Supply has a lower district wide priority ranking for emergency water supply.

A generator is located in the TP and will automatically start up in the event of a power failure, and has capacity to run the entire Seadown Treatment Plant system. However, Seadown TP is not prioritised for generator start up in the event of a total network wide power failure. Development of a priority ranking and generator requirement of utility facilities is an improvement item in the scheme's operational plan.

Figure 57 shows the criticality of the Seadown water network.

The criticality assessment of the scheme's assets will be reviewed and updated as part of the AMP's Improvement Plan.

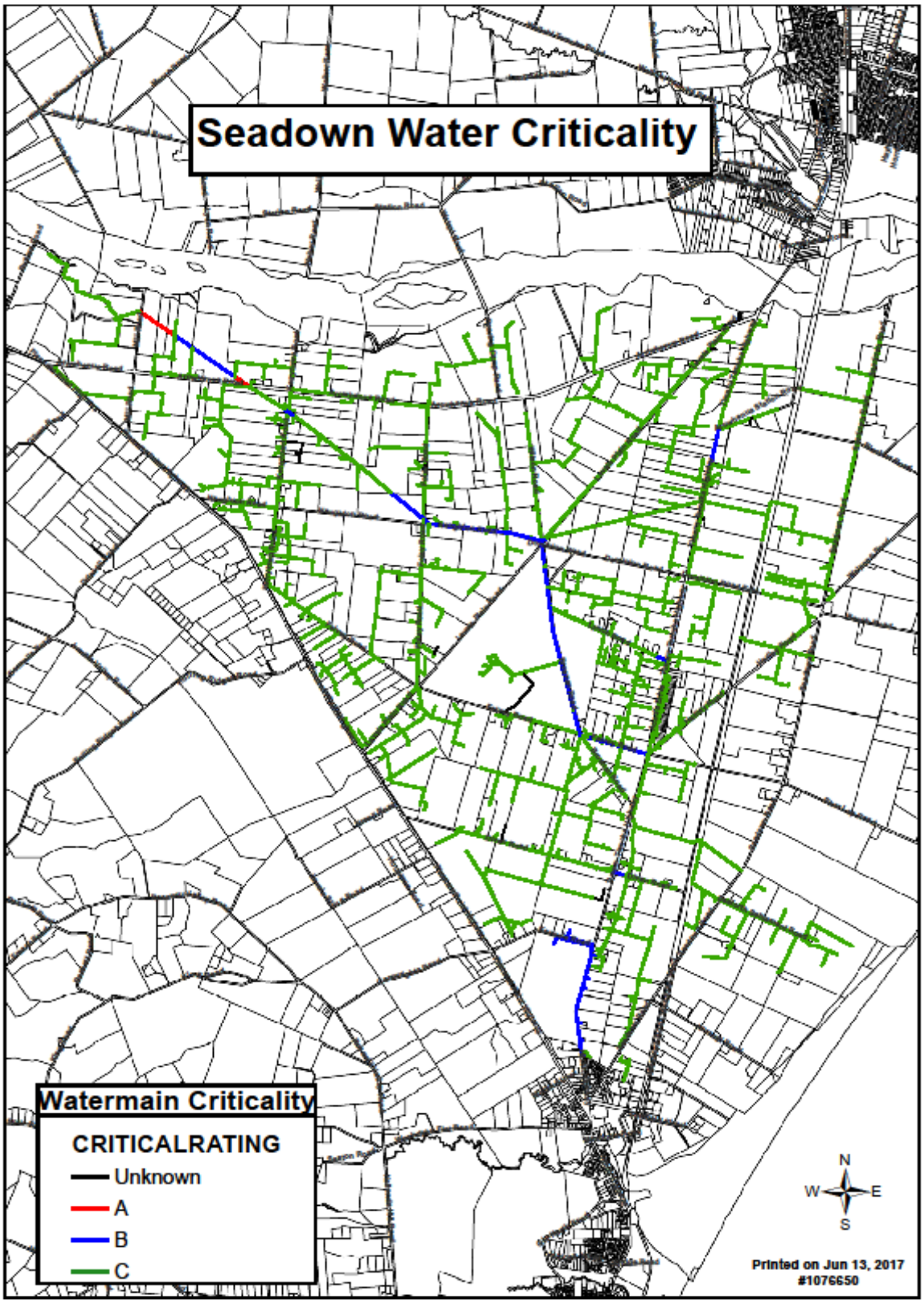


Figure 57: Seadown Water Network Criticality

B11.4 DEMAND FORECASTING AND MANAGEMENT

A. Demand Drivers

- Customers of the Seadown Scheme are predominantly domestic or farmers.
- The scheme services around 234 private tanks and 364 troughs across approximately 641 land parcels
- The resource consent conditions limit the daily total abstraction for both of the Seadown public water supply sources to a rate not exceeding 21 L/s, with a volume not exceeding 149,743 m^3 in any period of 122 consecutive days.

If the level in Lake Opuha drops and is unable to supplement the Opihi River the consented volume drops to 892 m^3/day. When the Opuha Dam was designed, this was calculated to occur one year in twenty years. Although demand does drop below these levels for a significant period each year it will be difficult to reduce demands to these levels in the prevailing drought conditions.

Additional water is available from a consent to take on additional 100 L/s at 3 sources including at Mill Road. This water is not available when Lake Opuha is low.

B. Demand Forecast

- The assessed stockwater demand within the Seadown scheme is estimated to be 60-130 L/ha/day by 2030.
- The expansion of dairying could result in major supply issues as there is no control over the volume supplied, only the number of troughs.
- The Seadown scheme does not have any additional capacity to increase stock water delivery in the current manner over the existing levels. Any additional stock troughs must now be supplied through a restricted tank system.

C. Demand Management

The data in Table 64 show the trend in water use and loss within the Seadown Scheme:

Table 63: Seadown Water Demand

Year	Volume of Demand (m^3)	Infrastructure Leakage Index (ILI)
2016/17	295,878	0.6
2015/16	332,156	1.6
2014/15	314,297	1.5
2013/14	325,880	No data
2012/13	351,077	No data
2011/12	331,808	No data

Major issues:

- Seadown has issues with supply to farm properties with connections directly to troughs instead of reticulated tanks. Water wastage from troughs is very high and could reduce the LOS during high demand. This gives issues with water conservation and quantity.
- Continuous supply to consumers is unsustainable during periods of high demand. Consumers connected on the out areas of the reticulation receive intermittent supply.

TDC is carrying out sustainable water management strategy to this scheme. Seadown Rural Water Supply Model Review and Analysis is undertaken to produce feasible options to be assessed and approved by the Council.

TDC will be assessing whether to keep the current set-up of the scheme or to convert to a restricted supply.

Refer to Part A Section A7.3 for additional details on approaches used to manage common demand issues across Council's water supply schemes.

B11.5 Summary of Issues and Requirements

Meeting Demand

1. Combination of unrestricted demand and high water losses throughout the scheme
2. Continuous supply to consumers is unsustainable during periods of high demand
3. Consumers connected on the out areas of the reticulation receive intermittent supply

B11.6 FINANCIAL PLAN

B11.6.1 PROPOSED CAPITAL WORKS PROGRAMME

Table 64: Seadown Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Seadown rural watermain renewals		2	2018-19
2	Seadown Water Storage		360	2018-19
3	Utilities Maintenance Contract		75	2018-19

B11.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
O&M										

B12 Te Moana Downs Water Supply

B12.1 Scheme Overview

The Te Moana supply is a restricted water supply based on units of supply of 1,000 L/day. The daily allocation is supplied into a tank at a constant rate over a 24 hour period. If the tank is full the ballcock shuts off the flow.

Customers of the Te Moana Scheme are predominantly domestic or farming. There are no large consumers of water on the scheme.

The Te Moana Scheme is partly supplied from the Geraldine Water Supply.

Table 66 summarises key information about the scheme and Figure 58 shows the boundary of the scheme.

Table 65: Te Moana Water Supply Scheme Key Information

Item	Description
Scheme population	Approximately 1,220
Number of connections (Water NZ NPR definition)	Residential = 536 Non-residential = 92
Design area	18,500 hectares
Firefighting availability	No
Resource consent//Expiry date	The resource consent for the water take at the Hae Hae Te Moana River headworks is for a maximum volume of 7,408 m^3 per any 7-day consecutive period.
Sources	Hae Hae Te Moana River Intake; Geraldine Water Supply at Tripp St
Average daily demand	1038 m^3
Peak day demand	1600 m^3
Treatment requirement and process used	Te Moana – chlorination does not meet DWSNZ; Supply from Geraldine – UV treated
Location of treatment plant	Mees Road
Number and storage capacity of reservoirs	NA
Reservoir Storage Buffer	Nil
Number of pump stations	3
Length of reticulation	Approximately 232km
Rating - Unit Charge and Tank Charge	A targeted rate of a fixed amount per unit of water supplied and a targeted rate of a fixed amount for each tank.
WSP Review	April 2019

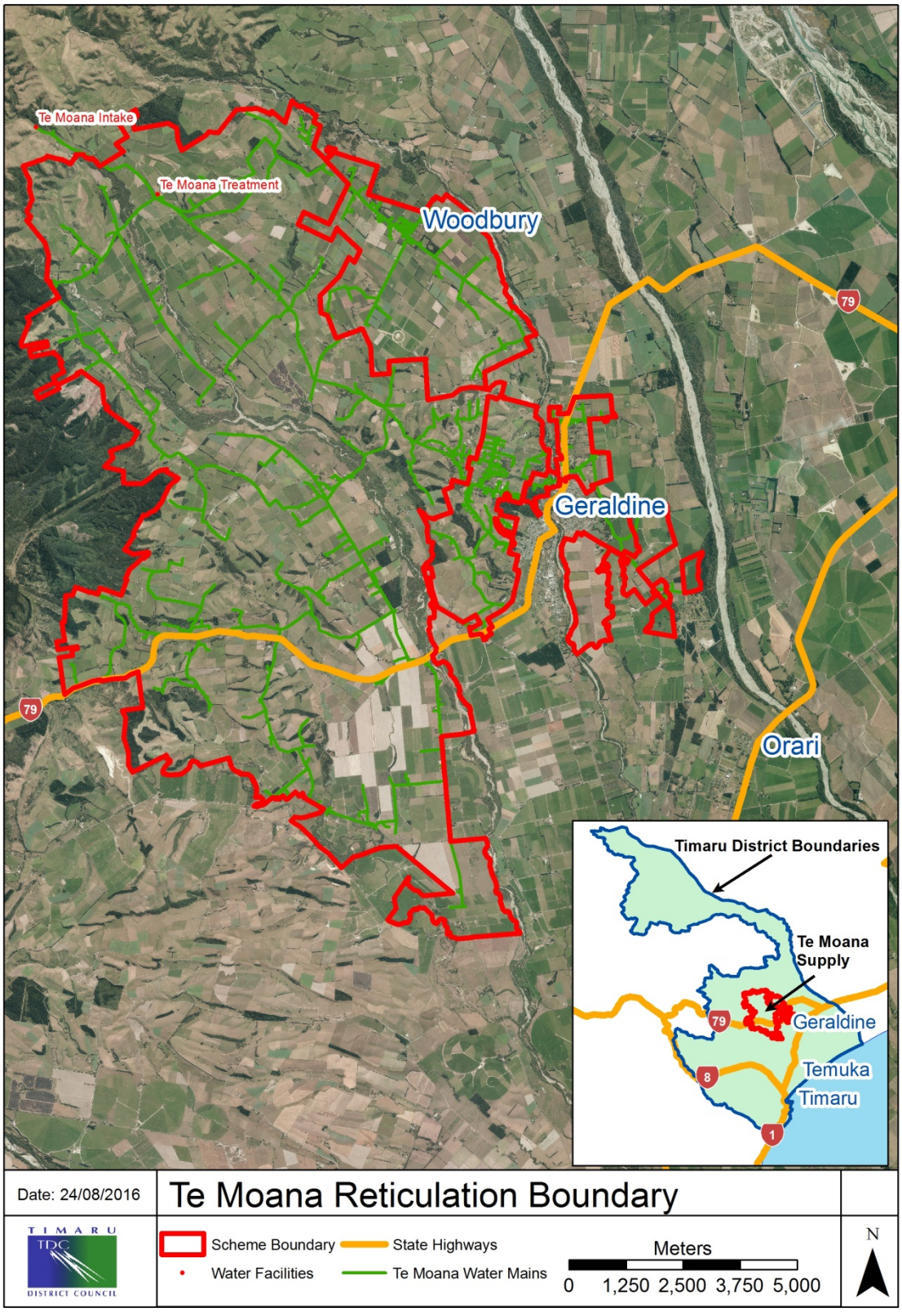


Figure 58: Te Moana Water Supply Scheme Boundary

B12.1a Geraldine Area Wide Water Strategy (GAWWS)

A strategic plan for the Geraldine Area Wide Water Supply is being implemented to address water supply issues in the area. **The strategy covers Geraldine urban and Te Moana rural schemes.**

The GAWWS covers issues on security of supply, drinking water quality, network and infrastructure condition and reliability, network capacity, operating costs, consumer charges, customer demand.

Various options have been assessed and a hybrid solution of supplying part of Te Moana from Geraldine has been determined as the preferred option. This option has significant advantages for affordability, minimising renewals and getting the best value from the existing infrastructure. This option supplies Geraldine Downs and Geraldine Flats from the existing Geraldine Tripp Street pump station, with the remainder of the Te Moana scheme supplied by a Te Moana source.

B12.2 Scheme Management

B12.2.1 Asset Summary

A. Plant Assets

Plant facilities consist of the following:

- Te Moana Intake and Filter
- Mees Road Treatment Plant and Pump Station
- Gapes Valley Pump Station
- Pleasant Valley Pump Station
- Woodbury Pump Station

A schematic diagram of the Te Moana Water Supply is shown in Figure 59 below.

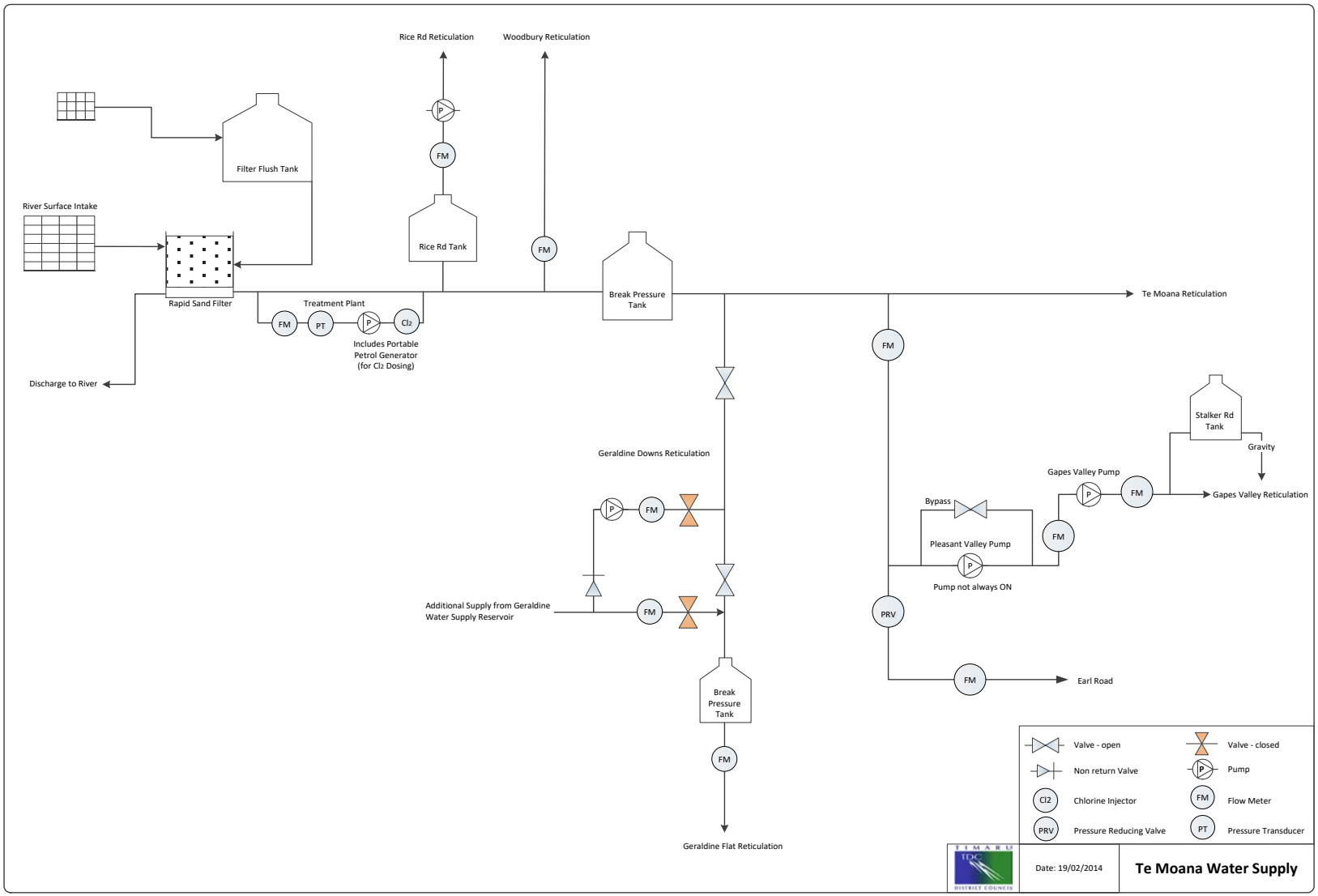


Figure 59: Te Moana Water Supply Schematic

B. Reticulation

The scheme has approximately 214 km of water mains within the reticulation. Table 67 shows the profile of the network.

Table 66: Te Moana Water Supply Network Profile

Diameter Group	Pipe Material and Length (m)						
	PVC	CC	PE	AC	ST	Unknown	Total
0-049	13271		133550	4	456	455	147736
050-099	9133		20702	6405	7		36247
100-149	7196			8573	24		15794
150-199	3959	1365		8822			14146
200-249		469					469
Total	**33559**	**1834**	**154253**	**23803**	**487**	**455**	**214391**

B12.2.2 Asset Condition and Performance

A. Plant Assets

Source/Headworks

The intake consists of a shallow concrete weir with an infiltration galley pipe (9m length of slotted screen) which has the facility for backwashing. A surface collection box is available at the intake for periods when the infiltration gallery is non-operational.

This source is proposed to be decommissioned in 2018.

Treatment

The rapid sand filter removes majority of the sediment within the water. The water is then chlorinated to kill bacteria and by maintaining a chlorine residual in the system minimises the risk of contamination in the consumer's water tank.

The Mees Road treatment plant is proposed to be decommissioned in 2018.

Pump Station

The Woodbury pump station will be commissioned in 2017.

B. Reticulation

Current network capacity is sufficient to meet the required Levels of Service in this AMP period provided leakage is managed.

Storage within the scheme is limited to onsite storage only. Each consumer's connection is required to have a minimum of three days storage or 10,000 litres for new or upgraded connections whose connections were required to have less storage.

Leakage in the reticulation has been an issue in this scheme. It has been identified in the leak detection and maintenance assessment that small diameter PE pipes (<100mm diameter) have been failing prematurely because of the low density PE material type and insufficient protection cover to the pipe causing leakages and increasing maintenance cost. AC pipes will be sampled and condition assessed to enable further understanding and reprioritization of pipe renewals.

Geraldine Area Wide Water Strategy (GAWWS) has been adopted to carry out the necessary upgrades and new installations within the scheme to be able to provide additional growth and demand within this AMP.

Remaining useful life of water mains is summarized in Figure 60 below.

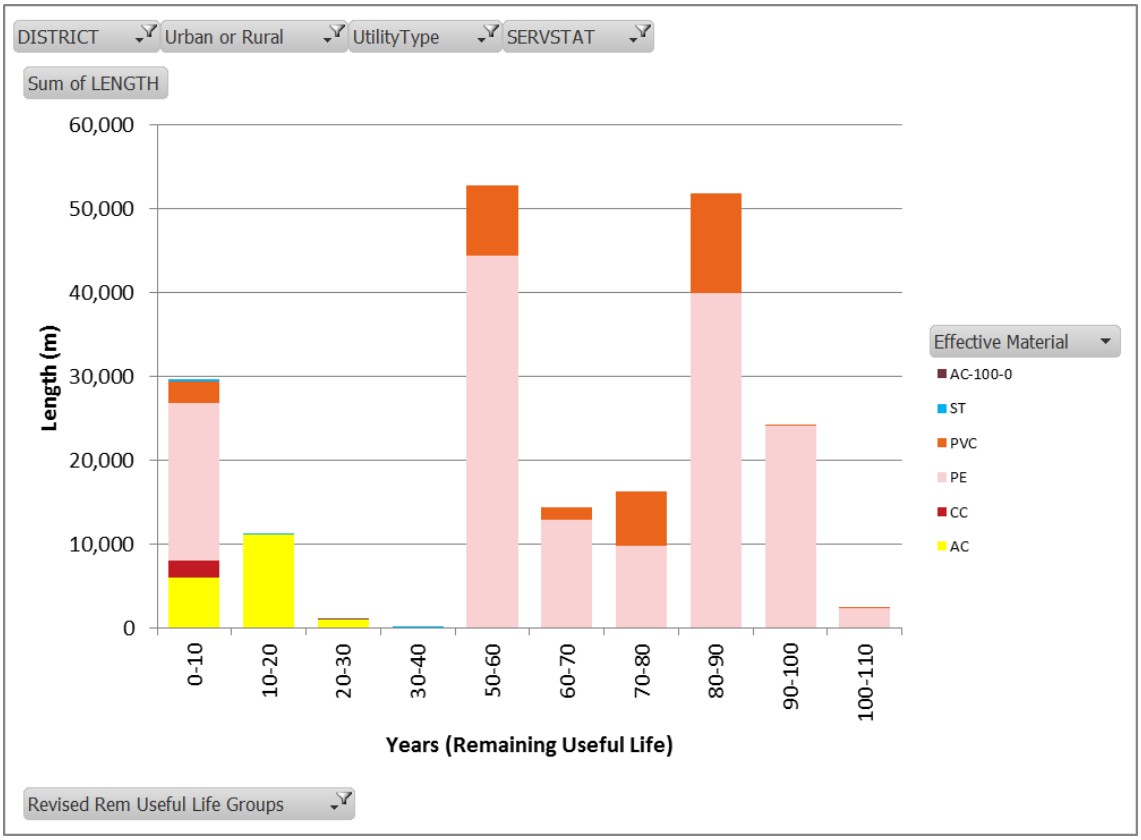


Figure 60: Te Moana Water Mains Remaining Useful Life

B12.2.3 Asset Life Cycle Management

A. Operations and Maintenance

Specific procedures for operating the scheme are contained in the Operations Manual - Document #1076304.

Additional details are in Section A9.1 of the common operations and maintenance activities that apply to all schemes.

B. Asset Renewals

There are no plant assets identified for renewal within the period.

Forecast renewal of the reticulation is shown in Figure 61 below:

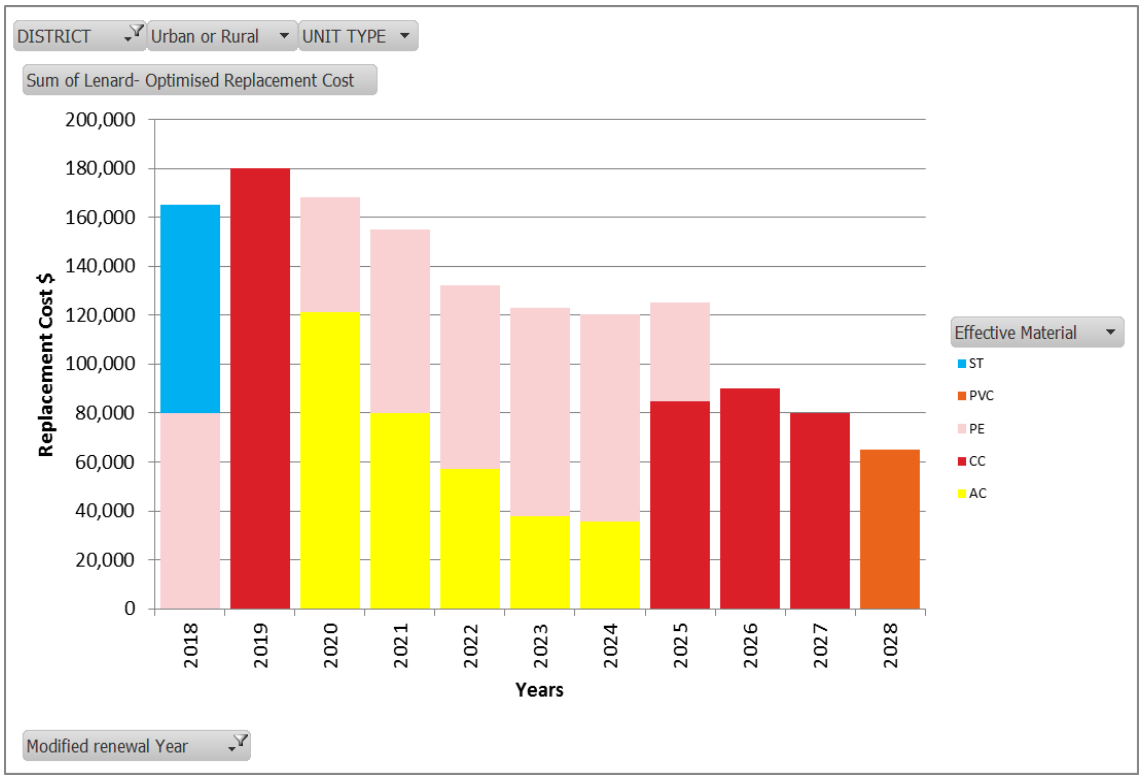


Figure 61: Te Moana Water Network Renewal programme 2018-28

C. Asset Development

GAWWS implementation:

- New source and Water Treatment Plant in Pleasant Valley Hall to be implemented by 2018/19.
- Pump station upgrade in Pleasant Valley and in Gapes Valley (2018/19)
- New pump station in Woodings Road (2018/19)
- Pipe Upgrade along School Road, Pleasant Valley Road, Te Moana Road, Four Peaks and Sheep Dip Road.

D. Asset Disposal

Once the new Water Treatment Plant is commissioned, the existing Te Moana River headworks and Mees Road Treatment Plant, and approximate 400m of 225mm diameter concrete trunkmain will be disposed of. This will include removal of assets and disposal of land (0.13 ha).

B12.3 RISK MANAGEMENT

A. Water Safety Plan

Risks to the Te Moana Water Supply were identified and assessed during the development of the scheme's Water Safety Plan (Document #866698).

Improvement identified in 2014 and not yet carried out:

Chlorination of the water purchased from Geraldine	2015/16

The plan was developed when it was planned to supply all water from Geraldine. It therefore did not address the treatment process.

A number of other improvements have commenced and are on going.

The risks to the new source and treatment plant will be analysed and minimised at the time of the installation.

B. Asset Criticality

Asset criticality information is used in the risk-based investment decision-making to determine when an asset should be replaced to avoid the consequences of failure. The data in Table 68 below were extracted from the water assets criticality assessment report in document #829869.

Table 67: Te Moana Water Facility Asset Criticality

Te Moana Facility Asset	Criticality Rating*	Condition Rating**	Risk
Mees Road Treatment	A	2	Low
Gapes Valley Pump Station	C	2	Insignificant
Te Moana Intake and Filter	A	4	High
Pleasant Valley Pump Station	C	2	Insignificant
Woodbury Pump Station	B	1	Insignificant

* A = asset components considered so important that contingency plans in the event of their failure must be in place to avoid unacceptable loss of service.
* C = asset components can fail without affecting the operation and service, and where repairs or renewal can be realistically deferred.
**1 = near as new condition with no defects. Asset is fully serviceable.
**2 = asset has superficial deterioration and minor issue with reliability. Minor maintenance only is required.
**4 = major or serious deterioration is evident. Asset is not operating effectively and major problems are imminent. Major maintenance or rehabilitation is required.

The area affected by a failure of the Te Moana intake is restricted to the Te Moana Water Supply. Consumers within the scheme have at least two days storage. Therefore, the Te Moana Water Supply has a lower priority rating for emergency supply in case of a district wide event

The Te Moana intake requires no power as water gravitates from the Hae Hae Te Moana river into the trunk main and reticulation. The treatment plant and booster pump stations requires power supply.

In the event of power failure, the pumps can be connected to mobile generators and/or a generator hardwired into the switchboard if and when required.

As the consumers have on-site storage, the Te Moana treatment plant and pump stations are not prioritised for generator start up in the event of a total network wide power failure.

The criticality of the Te Moana water network is shown in Figure 62.

Assessment of the criticality of the scheme's assets will be reviewed and updated as part of the AMP's Improvement Plan.

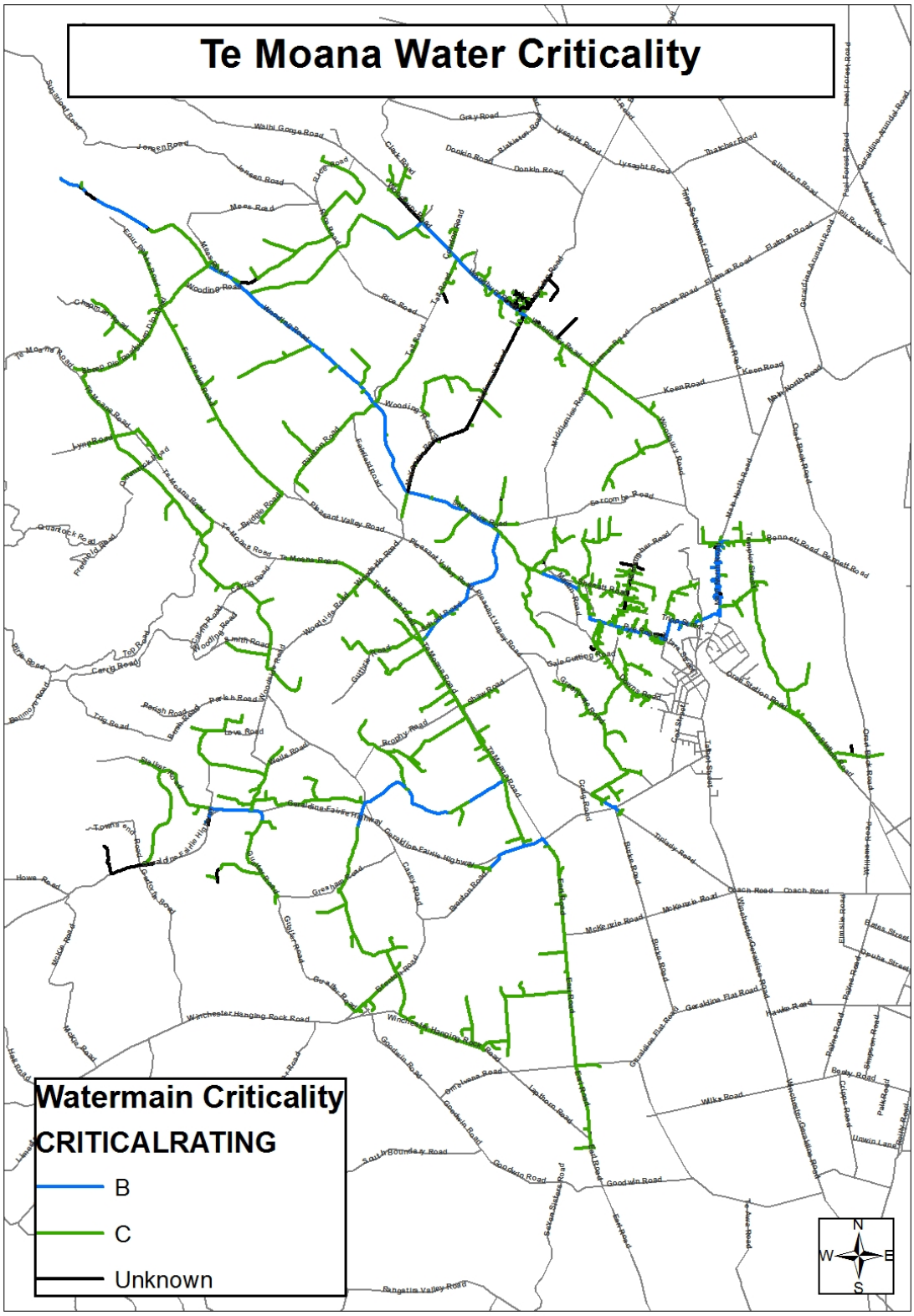


Figure 62: Te Moana Water Supply Network Criticality

B12.4 DEMAND MANAGEMENT

A. Demand Drivers

The design area of the scheme is 18,500 hectares. The supply is a restricted supply and the allocation is now based on 56 L/ha plus 900 L/dwelling/day. Many larger properties have less than this while smaller properties connected before 1998 may have an allocation of 1,800 L/day for domestic purposes.

All properties require storage. Current requirements are three days although when the scheme was installed 1800L tank was sufficient for all allocations. The resource consent conditions limit the daily total abstraction for both of the Te Moana Downs and Geraldine water supply source.

The volume of water sold is 1,228 m^3/day or units. The volume of water available for the Te Moana scheme is 7,408 m^3/week, an average of 1,058m^3/day. The Te Moana source is only able to supply all the water for approximately 200 days in a year. The balance of the water is supplied from Geraldine. This can be supplied either immediately upstream of the Tripp Street BPT and when operating supplies 15% of the consumers; or immediately after the Tripp Street pump in addition to the Tripp Street BPT. This supplies 45% of the consumers leaving 55% (650m^3/day) of the water supplied from the Te Moana source.

The Tripp Street pump is required between 360 and 365 days each year averaging 234 days.

B. Demand Forecast

Currently no new connections or units of water are being approved. This will be resumed once the Te Moana scheme review has been completed.

C. Demand Management

The data in Table 69 show the trend in water use and loss within the scheme:

Table 68: Te Moana Water Demand

Year	Volume of Demand (m^3)	Infrastructure Leakage Index (ILI)
2016/17	388,264	0.8
2015/16	379,511	0.5
2014/15	388,076	1.1
2013/14	352,881	No data
2012/13	385,990	No data
2011/12	403,816	No data

Demand management approaches:

- The Te Moana Downs has reached its original capacity. Additional water is being purchased from Geraldine to supplement the main intake.
- Pipeline upgrades are being carried out to allow additional consumers to connect to the scheme.
- Demand is required to be monitored when high leakage detection occurs.
- Te Moana scheme currently has limited ability to meet increased stock water demands. Additional water for increased demand is part of the Geraldine Area Wide Water Supply Strategy (Doc# 734515).
- Renewal of small PE main to reduce leakages.
- Pipe and infrastructure upgrade in GAWWS to meet the increasing demand.

Refer to A7.3 for additional details on approaches used to manage common demand issues across Council's water supply schemes.

B12.5 SUMMARY OF ISSUES AND REQUIREMENTS

Security of Supply

1. New source and water TP in Pleasant Valley Hall (2018/19)
2. Pump station upgrade in Pleasant Valley and Gapes Valley (2018/19)
3. New pump station in Woodings Road (2018/19)

Meeting Demand

4. Pipe upgrade along McKeown Road, School Road, Pleasant Valley Road, Te Moana Road, Four Peaks and Sheep Dip Road
5. Renewal of small PE main to reduce leakages.

B12.6 FINANCIAL PLAN

B12.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 69: Te Moana Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Water Treatment Plant	LOS and Growth	1,500	18/19
2	New Source in Pleasant Valley Hall	LOS and Growth	700	18/19
3	GAWWS Pump Stations Upgrade	LOS and Growth	500	Within the 10 years of AMP
4	GAWWS Watermain Upgrade	LOS and Growth	900	17/18 to 18/19
5	Te Moana Rural Watermains Renewal		290	18/19
6	Te Moana Network Analysis and Metering		20	18/19
7	Te Moana Treatment Upgrade (same as #1?)		1,500	18/19
8	Utilities Maintenance Contract		20	18/19

B12.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
O & M										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

B13 STOCK WATER ONLY SCHEMES

B14 BEAUTIFUL VALLEY

B14.1 SCHEME OVERVIEW

The Beautiful Valley stockwater supply is a constant flow, gravity fed scheme. It was designed based on 17.5 stock units/ha at 4 L/stock unit/day (or 70 L/ha/day) which also caters for garden and shed use but not domestic use. Therefore there is no treatment.

TDC owns and maintains the water supply network from the source through to and including the restrictor units at the consumers' site storage tanks.

Table 71 summarises key information about the scheme and Figure 63 shows the boundary of the scheme.

Table 70: Beautiful Valley Water Supply Scheme Key Information

Item	Description
Number of connections	41 rating units
Design area	Around 1800 hectares
Resource consent//Expiry date	The existing resource consent to take water (CRC992621) allows a maximum take of 2.8 L/s, with a volume not exceeding 900 m^3 in any period of seven consecutive days.
Source	Stony Creek
Average daily demand	No data available
Peak day demand	No data available
Number and storage capacity of reservoirs	1 x 22,000 litre tank to buffer inlet flow (approximately five hours storage) Every farm is required to have 1.5 days storage
Length of reticulation	Approximately 18 km
Rating – Area Charge	A targeted rate per rating unit of a fixed amount per hectare in the Beautiful Valley Water Supply District

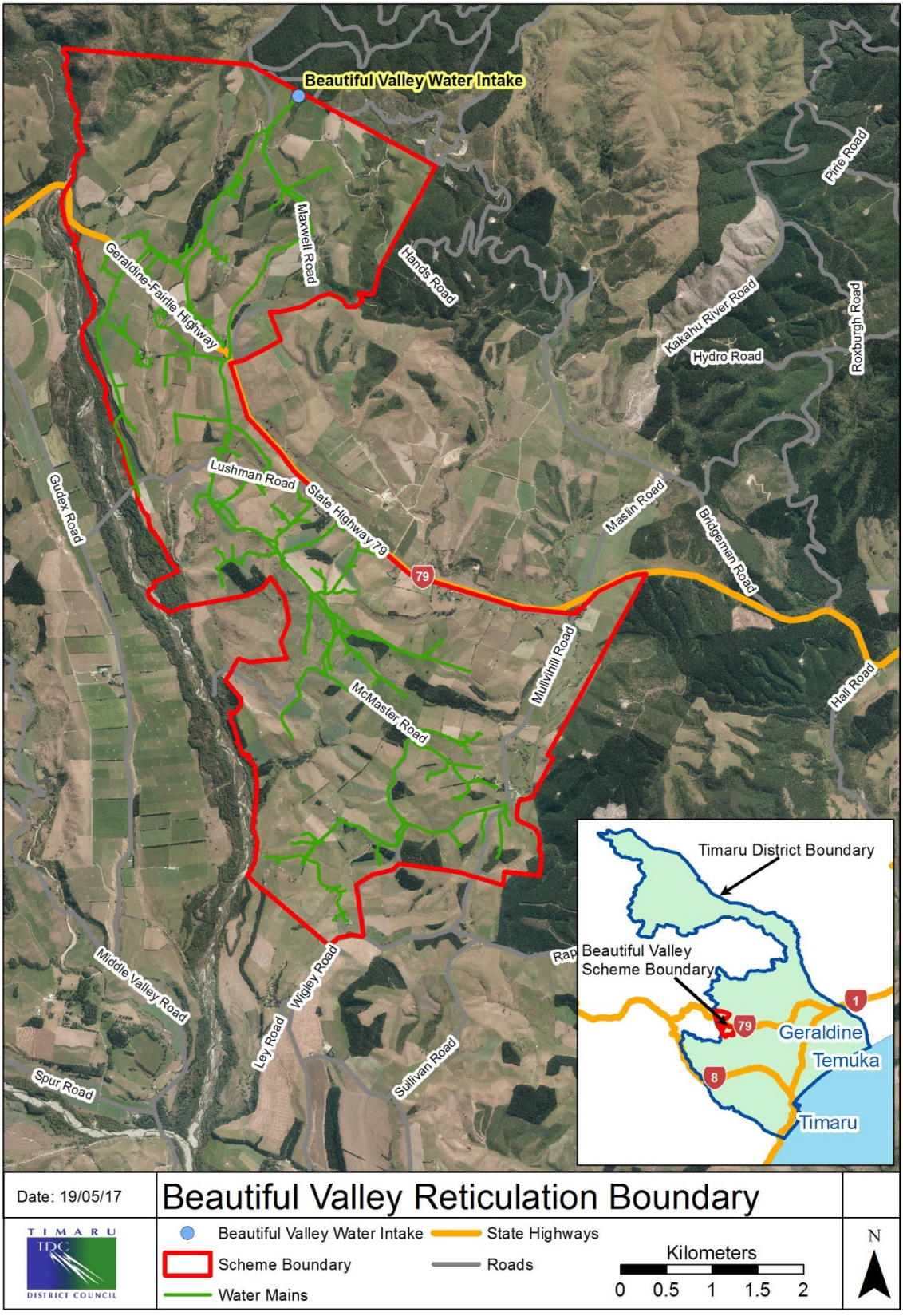


Figure 63: Beautiful Valley Stockwater Scheme Boundary

B14.2 SCHEME MANAGEMENT

B14.2.1 ASSET SUMMARY

A schematic diagram of the Beautiful Valley Stock Water Supply is shown below.

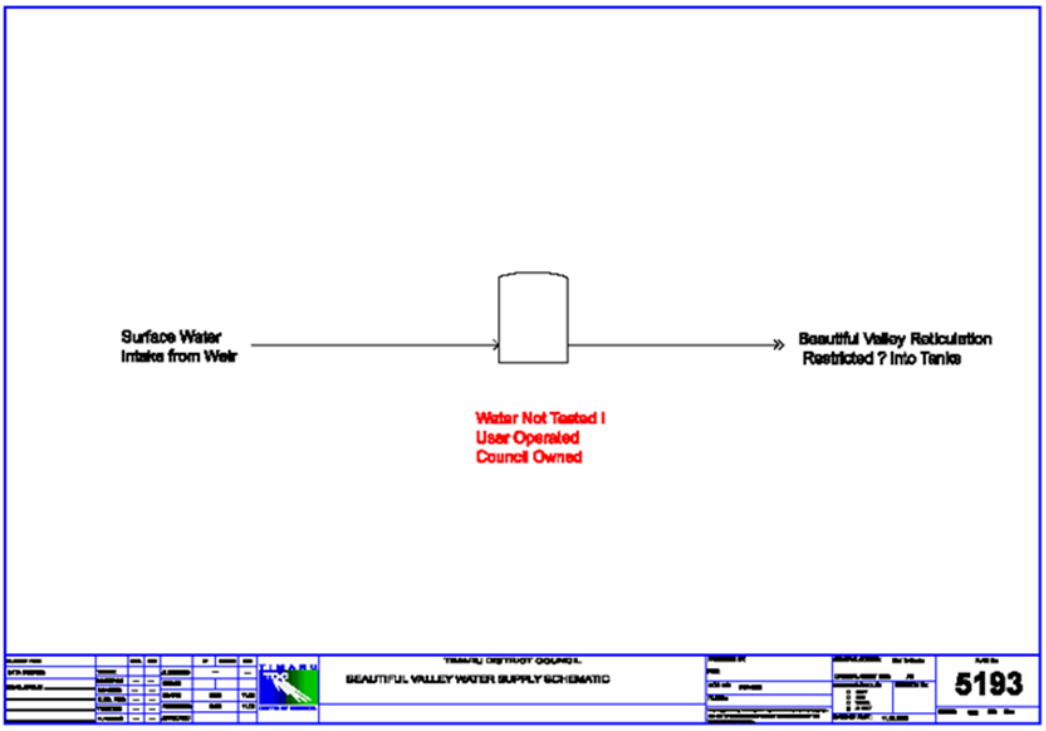


Figure 64: Beautiful Valley Stockwater Schematic

A. Plant Assets

Headworks (infiltration pipe attached to a small weir)
Break pressure tanks

B. Reticulation Assets

The scheme has approximately 18 km of water mains within the reticulation. Table 72 shows the profile of the network.

Table 71: Beautiful Valley Stockwater Network Profile

Diameter Group	Material Type and Length (m)		Total
	PVC	PE	
000-049	12247	557	12804
050-099	4851		4851
Total	**17098**	**557**	**17656**

B14.2.2 Asset Condition and Performance

A. Plant Assets

TDC owns and maintains the water supply network from the source through to and including the restrictor units at the consumers' site storage tanks.

The headworks is a short slotted infiltration pipe attached to a small weir on Stoney Creek, a tributary of the Kakahu River. Supply is by gravity direct into the reticulation. The first break pressure tank is a 22.5 m^3 concrete tank that acts as a settling tank for sediment in times of high creek flow. The assets are in good condition. They are low criticality and low risk assets.

Three break pressure tanks along the main line have approximately five hours storage which acts as a buffer for minor maintenance. This is the only scheme storage. Every farm is required to have 1.5 days storage.

The capacity of this scheme is sufficient to supply existing customers.

B. Reticulation Assets

The network is in good condition and is sufficient to meet the required Levels of Service in this AMP period. Figure 65 below shows the age profile of the network.

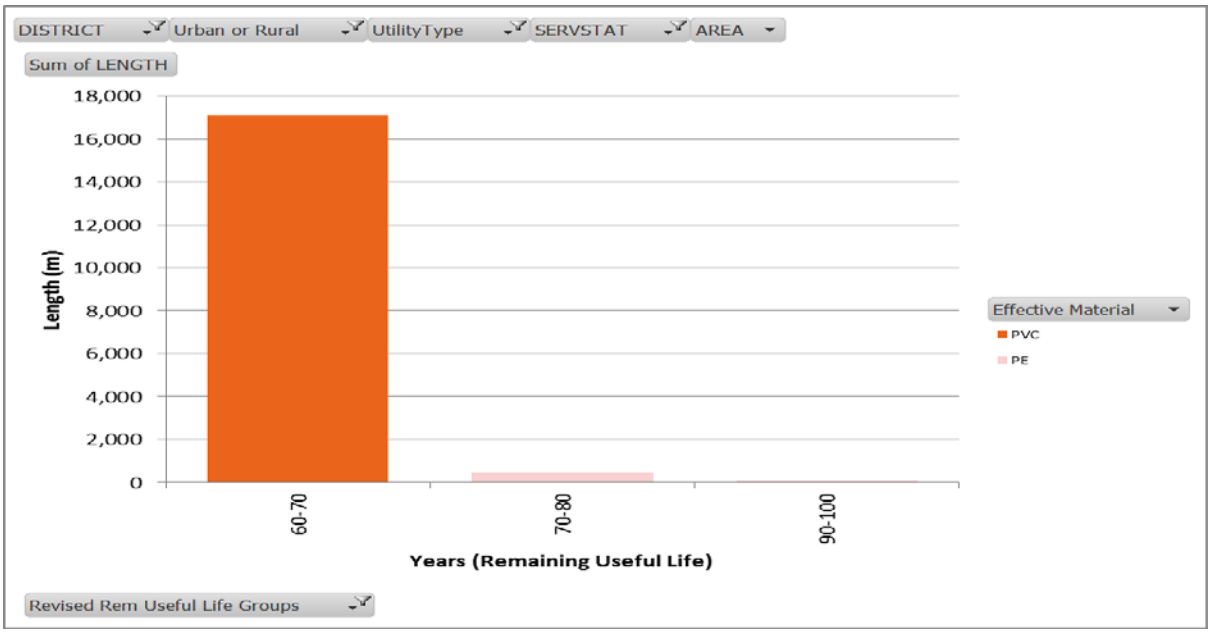


Figure 65: Beautiful Valley Pipe Network Remaining Life

B14.2.3 Asset Life Cycle management

A. Operations and Maintenance

The intake is observed by the scheme users who will contact the council if work is needed. It is only visited by staff every 2-3 years.

Refer to A9.1 for details on the Operation and Maintenance strategies and procedures common to all schemes.

B. Asset Renewals

The intake will be renewed in year 7 of this AMP.

The three break pressure tanks are likely to be renewed in the next 30 years.

The pipes still having lots of remaining useful life and in good condition to meet the required Level of Service. No network renewals are required within this AMP.

C. Asset Development

No development works have been planned for the scheme. See related discussion of future demand in the next section.

D. Asset Disposal

None identified.

B14.3 Risk Management

There are no extreme or high risk events identified in the scheme.

As the supply is a stock-water supply only, there are no health risks to the local or the general public.

A criticality rating of the reticulation network is shown in Figure 66. This will be reviewed and updated within the period of this AMP.

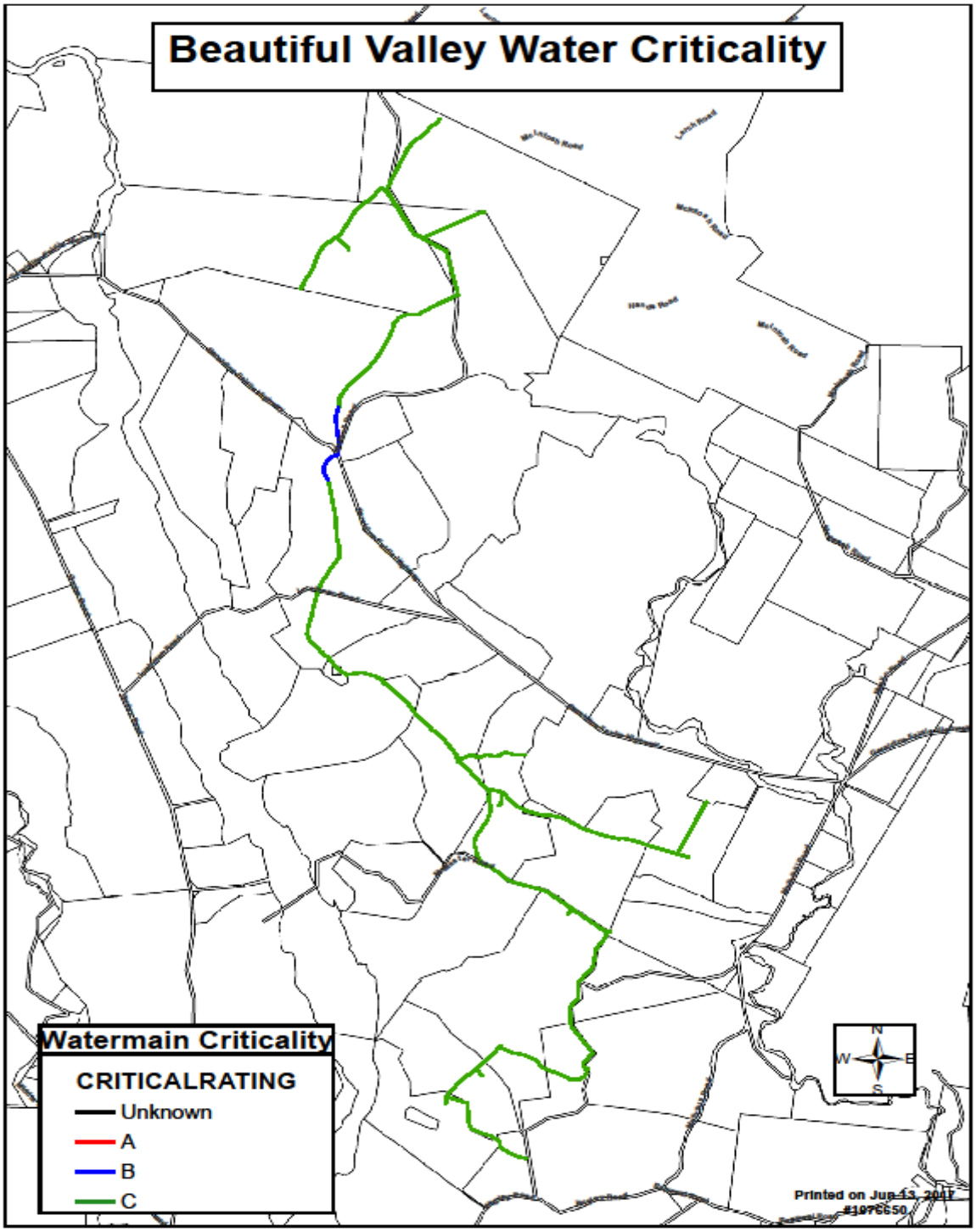


Figure 66: Beautiful Valley Stockwater Network Criticality

B14.4 DEMAND MANAGEMENT

A. Demand Drivers

Customers of the Beautiful Valley Scheme are predominantly farm related stock troughs and other stock water facilities.

The scheme covers around 1,800 hectares. There are currently 41 units rated within the scheme.

Water is charged by the hectare within the scheme. It is based on 70 L/ha/day. A restrictor unit is used with a jet which controls the volume of water to be supplied to a property's storage tank.

B. Demand Forecast

The assessed stock water demand for Beautiful Valley is estimated to reach 95-170 L/ha/day by year 2030.

Beautiful Valley is a very small scheme and no additional water is available at the source.

The consent is fully utilised by the stockwater allocation. If any house uses the water for domestic purposes it is from the stock water allocation. The existing source could not supply any additional water during low flow periods.

Demand has remained unchanged and is expected to remain unchanged within the AMP period. The scheme has no expansion capacity to cater for additional demand.

C. Demand Management

There are no unique demand issues in the Beautiful Valley Stockwater Scheme.

Refer to A7.3 for additional details on approaches used to manage common demand issues across Council's water supply schemes.

B14.5 SUMMARY OF ISSUES AND REQUIREMENTS

There are no significant issues identified.

The intake is observed by the scheme users who will contact the council if work is needed. It is only visited by staff every 2-3 years. Intake renewal is programmed in year 7 of this AMP.

B14.6 FINANCIAL PLAN

B14.6.1 PROPOSED CAPITAL WORKS PROGRAMME 2018-28

Table 72: Beautiful Valley Capital Works Programme 2018-28

Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1 Intake renewal	Renewal		Year 7
2			
3			

B14.6.2 OPERATIONS AND MAINTENANCE (O&M) PROGRAMME

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

B15 RANGITATA-ORARI

B15.1 SCHEME OVERVIEW

The Rangitata-Orari (RO) water race is a stock water supply only. The water flows from the Orari River and is fed into a network of open water races. The water quality is dependant upon river conditions and possible contamination from stock upstream of each property. The RO stockwater scheme has been in existence for many years, drawing water from the Orari River and delivering stockwater via an extensive network of open races eastwards to the coast.

Some significant modifications to the water race network have occurred as a result of the establishment of the Rangitata South Irrigation Scheme in the area which is upgrading then utilizing parts of the races for conveying irrigation water. The final scope of the Scheme is still to be established. Stockwater is retained in farm ponds during the periods that the irrigation/stock races are not flowing.

Table 74 summarises key information about the scheme. Figure 67 shows the boundary of the scheme.

Table 73: Rangitata-Orari Stockwater Scheme Key Information

Item	Description
Number of connections	Approximately 540 units
Design area	Around 16,700 hectares
Resource consent//Expiry date	The resource consent to take water (CRC173644) allows a maximum take of 526L/s. Consent expires in 2044.
Source	Orari River
Number and storage capacity of reservoirs	NA
Reservoir Storage Buffer	NA
Length of reticulation	Approximately 170 km
Rating – Area Charge	A targeted rate of a fixed amount per hectare within the rating unit located in the Rangitata-Orari Water Supply District

Figure 67: Rangitata-Orari Stockwater Scheme Boundary

B15.2 Scheme Management

B15.2.1 Asset Summary

The headworks are located below the Orari Gorge. Water is fed into a network of open races, some 170 km long. There have been modifications in the RO scheme under agreement with Rangitata South Irrigation Limited to utilize some of the existing water races for transport irrigation water.

There has been about 115 km race closed now the irrigation scheme is completed. There is 83 km new race combined with irrigation. Around 13 km of race has been relocated. Of the original water race, 85 km remain. The Scheme is required to be completed as part of the efficiency audit in 2014. A new consent has been achieved in 2017 for continued use of the races.

Other assets of the scheme are the intake protection and fish screen.

Table 74: Rangitata-Orari Stockwater Race Profile

Race Type	Length (km)
Stock	85
Stock/Irrigation	83
Total	**168**

B15.2.2 Asset Condition and Performance

The reliability of the scheme, particularly at the eastern extent of the scheme, has at times been poor, and some property owners have installed private water supply systems. There have also been significant changes in land use in the area.

The consent is for 526 L/s (compared to Timaru Urban 544 L/s, or Downlands Rural 94 L/s consented or 82 L/s capacity).

If water is taken at the consented rate then the demand is 2,800 L/ha/day (about 50 times that of the Downlands Water Supply).

B15.2.3 Asset Life Cycle Management

A. Operations and Maintenance

The water race infrastructure is owned by the Timaru District Council. The administration of the scheme is carried out by Council who utilise a contractor for the day today operation and management of the scheme.

Specifically:

- The fish screen and rock intake structure have been re-established in the River bed in 2014. Maintenance of the rock screen is as agreed with the contractor or as needed after a fresh in the river to clear away silts etc. Works are monitored by council staff, ECAN and Fish and Game are consulted in advance of river works as a requirement of the current Resource Consent, and this is communicated to ECAN office.
- Programmed mechanical cleaning and spraying of weeds is carried out between the months of December and March or as required.
- Races are not replaced but can be relocated upon request from the land owner.
- Bank enhancement through planting has taken place at the intake. Otherwise, it is not encouraged due to the need to maintain.
- All consumers without storage will be disrupted by water outages. There is no storage within the scheme.

B. Asset Renewal

None identified in this period.

C. Asset Development

None identified in this period.

D. Asset Disposal

Any races abandoned are left to the land owner to retain or backfill.

B15.3 RISK MANAGEMENT

As the supply is a stock-water supply only, there are no health risks to the local or the general public.

Being an open water race, the scheme is susceptible to weather conditions. The scheme can fill with debris when windy, blocking culverts, freeze in extreme winter conditions, or cease to flow in hot conditions when weed growth is lush and evaporation high. TDC endeavours to maintain a flow at all times although in the extremity of the Scheme, water can cease flowing and take several days to recover. This situation however is not common.

The consent obtained in 2017 has a requirement to have all cattle and deer being fenced from races within the following 5 years.

Emergency response

Urgent or emergency situations are dealt with on a case by case basis. The river and intake structure are monitored by the contractor for failure or overtopping, and ECAN river engineers are advised of any risk.

B15.4 DEMAND MANAGEMENT

A. Demand Drivers

With the establishment of the Rangitata South Irrigation (RSI) scheme, the water races have been upgraded, under agreement, to be able to be used for the transport of irrigation water as well as stockwater. This provides a greater reliability in the delivery of stockwater.

B. Demand Forecast

A large number of RO ratepayers are also shareholders in the RSI. There are also a number of RO ratepayers who are not irrigation shareholders and who wish to remain on the RO stockwater scheme, and a number of ratepayers who wish to permanently withdraw from the scheme. A number of surveys have been conducted with ratepayers by the irrigation developer and Council, and an area of approximately 1,810 hectares has been identified as potentially withdrawing from the stockwater scheme.

The final scope of the scheme is still to be established.

C. Demand Management

Use of water:

- Water races shall not be operated with water flows higher than the designed capacity.
- Operational spills such as that resulting from blocked culverts will be kept to a minimum. Wasting of water will not be permitted. If a user is found to be wasting water, the Contractor will contact the user and work out a plan of action to avoid future unnecessary waste. A brief report of wastage to be completed and forwarded to TDC. Prosecution will take place for re-offending. Some operational spills are unavoidable, such as occurs after heavy rain.
- TDC's target for discharges from races is to limit individual discharges to approximately 10 litres/second under normal and low flow river conditions. If Contractor suspect discharges are regularly exceeding 10 litres/second then action will be taken to reduce wastage. Action may include adjustment of water take at source and /or inspection of race network to observe why surpluses exist.
- Intake structures and controls (e.g. flumes and sluice gates) are designed and operated to ensure that excess water diverted down intake channels is discharged back to rivers.
- Contractor will be expected to observe and give advice to reduce water wastage as part of their normal day-to-day operations.

Flow management:

- The source river is monitored for flow. Low flow conditions may require notification to consumers that no stock water can be supplied and they need to be stocked accordingly or locate an alternative source.

- Control gates are located at the intake structure to regulate flow. Splitter weirs are also located at various points to manage flow.
- Operator monitors flow at critical points and flows are adjusted to achieve even distribution of supply.
- Council holds a meeting with the contractor every two months or as required to discuss operational issues.

Refer to A7.3 for additional details on approaches used to manage common demand issues across Council's water supply schemes.

B15.5 Summary of Issues and Requirements

Meeting Demand

1. Greater control over water quantities flowing within the scheme
2. Need to finalise the scope of the scheme

B15.6 Scheme Management

B15.6.1 Proposed Capital Works Programme 2018-28

Table 75: Rangitata-Orari Capital Works Programme 2018-28

	Project	Category (Renewal; Level of Service; Growth)	Indicative Cost ($'000)	Year of Implementation
1	Flow Control	LOS	40	2018/19
2	Maintenance generated renewals		15	2018/19
3				

B15.6.2 Operations and Maintenance (O&M) Programme

The projected levels of O&M costs cover existing assets/activities plus associated O&M costs for new completed projects/assets.

Cost Item	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Operations and Maintenance										

NOTE: DETAILS FOR THIS SECTION WILL BE TAKEN FROM THE BUDGET DOCUMENT WHEN FINALISED.

AMP Associated Documents

Asset Management

1 Water and Sanitary Services Assessment Reports (various document number; by water supply scheme)

2 Remaining Life and Estimated Replacement Cost of Pipes (Doc# 548398)

3 Pareora River Scenic Reserve Management Plan (Doc# 160783)

4 Pipe Condition Assessment 2008 (Doc# 731897)

5 Pareora Pipeline Condition Assessment 2010 (Doc# 677030)

6 Pipe Condition Assessment 2014 (Doc# 908847)

7 Various Manual of Operations (by treatment plant)

Demand Management

8 Agricultural Demand from Stocking Rates in 2007 (Doc# 449777)

9 Issues and Options Report Residential, Retail and Industrial Development in the Timaru District (Doc#500378)

10 2030 Stockwater Requirements (Doc# 716659)

11 Geraldine Area Wide Water Strategy (Doc# 734515)

12 Downlands Water Supply Additional Water Strategy (Doc# 724458)

13 Timaru and Temuka 30 Year Water Supply Strategy (Doc# 1004172)

14 Timaru District 2045: Draft Growth Management Strategy (Doc# 1031387)

Risk Management

15 Water Facilities Criticality Rating (Doc# 730847)

16 Critical Assets (Doc#551581)

17 Water Safety Plans (formerly PHRMPs)

18 Water Supply Services 2005 Risk Assessment (Doc# 363894)

19 CDEM (Doc# 291104)

Information Management

20 Hansen Software Application (Doc# 11579)

21 TDC Resource Consent Management Manual using Hansen (Doc# 724191)

Financial Management

22 Asset Valuation Report (Doc# 371288)