Draft Wastewater Asset Management Plan 2015 - 2025

Nelson City Council
te kaunihera o whakatū

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WASTEWATER

Asset Management Plan

2015-2025

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Cover Photo

Nelson Waste Water Treatment Plant

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INTRODUCTION

This Asset Management Plan, produced for the public wastewater assets owned and managed by the Nelson City Council provides a 12 year outlook commencing July 2015. The Asset Management Plan identifies issues that underpin expenditure and demonstrates how the Nelson City's goal, strategic targets and delivering the agreed levels of service, will be achieved through effective, sustainable management of the wastewater assets.

Central Government has signalled a likely requirement for Councils to develop an infrastructure strategy covering the foreseeable issues associated with key infrastructure for a 30 year future timeframe.

In order to contribute to this strategy financial tables for the 30 year period have been prepared for this asset management plan.

ASSETS INCLUDED IN THIS PLAN

The Nelson City Council provides a reticulated wastewater collection service from Glenduan in the north to Champion Road in the south with 20,000 plus connected properties.

Wastewater from Stoke and Tahunanui is treated at the Nelson Regional Sewerage Business Unit Treatment Plant on Bells Island (details of Nelson Regional Sewerage Business Unit are shown in the Nelson Regional Sewerage Business Unit Wastewater Asset Management Plan). The NRSBU is a joint venture between Tasman District Council and Nelson City Council. The day to day contract administration is contracted out to Nelmac.

Fish processing water from factories at Port Nelson is screened and discharged beyond the Boulder Bank into Tasman Bay via the fisheries outfall which is owned by the Council. Day to day operation and compliance with resource consent conditions is managed by Sealords.

Effluent from the remainder of the city is treated at the Nelson Wastewater Treatment Plant.

The replacement value (2012) of the wastewater infrastructural assets is $202million.

Goal of the wastewater activity

To provide a wastewater system to Nelson City that is capable of collecting, containing and treating wastewater in an efficient, safe and sustainable way whilst ensuring that the cultural, ecological and recreational values of waterways and the marine environment are recognised and enhanced.

Rationale for Council's involvement

Legislative requirements:

The Nelson City Council is a local authority established under the Local Government Act 2002 (the Act) with purpose and responsibilities set out in the Act. In particular the purpose as it relates to infrastructure is as follows:

10 Purpose of local government

(1) The purpose of local government is-

a) to enable democratic local decision-making and action by, and on behalf of, communities; and

b) to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.

*(2) In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are—*

(a) efficient; and

(b) effective; and

(c) appropriate to present and anticipated future circumstances.

and the Act further defines core services to the community as:

11A Core services to be considered in performing role

In performing its role, a local authority must have particular regard to the contribution that the following core services make to its communities:

(a) network infrastructure:

(b) public transport services:

(c) solid waste collection and disposal:

(d) the avoidance or mitigation of natural hazards:

(e) libraries, museums, reserves, recreational facilities, and other community infrastructure.

Wastewater supply is a network infrastructure (sec 197(2)) and a water service (sec 124).

Council has specific obligations under section 130 of the Act to continue to provide existing water services. These also recognise the requirement to take a sustainable development approach, set out in section 14 of the Act, which takes into account:

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

Public Health and Safety: Adequate treatment of sewage is essential for community well being - The Health Act 1956 places an obligation on Council to improve, promote and protect public health within the District.

Reliable provision: Human health, tourism and industry, in particular, rely on the reliable provision of this service - The Local Government Act 1974 provides the authority for the Council to own and operate the Wastewater service.

WASTEWATER PRIORITIES FOR THE PERIOD 2015 TO 2025

Council's priorities between 2015 and 2025 for the wastewater activity will focus on the following areas:

- Accidental Discharges;
- Inflow and Infiltration;
- Te Tau Ihu Settlement Bill
- Waste Water network odour issues;
- Neale Park and Corder Park Pumping Station Upgrades;
- Atawhai Rising Main Remediation;
- Natural Hazards - Security of the network in light of the recent Canterbury Earthquakes and Nelson storm events, including wider network hazards- Earthquake fault line, liquefaction and climate change;

- Awatea Place – Pumping Station, Rising Main and Trunk Main upgrades;
- Pump Station and Network Storage;
- Reticulation renewal strategy;
- Rising Mains and Swallows (gravity pressure main) renewals strategy;
- SCADA Review and upgrade of radio telemetry;
- Sustainable Development;
- Nelson North Wastewater Treatment Plant resource consent renewal;
- 30 year Infrastructure Strategy signalled in the Local Government Act 2002 Amendment Bill (No 3).

Accidental discharges

During rain events stormwater enters the wastewater network through faults in pipes and as a result of cross connections between private stormwater pipes and the sewer network. When the volume of wastewater within the reticulation exceeds the design capacity, accidental discharges can occur from the wastewater pump stations and some manholes throughout the network.

On 1 April 2012, Resource Consent (RM105388A) was granted for accidental discharges. The consent duration is 20 years. The consent considers the impact the wastewater has on the receiving environments where the pump stations are located.

A feature of the consent is the requirement that Council reduces overflows from pump stations over the next twenty years and establish a compliance and liaison monitoring group with community representatives to provide a means of disseminating information. Representatives from the following organisations, identified in the resource consent, are invited to annual meetings: Nelson City Council, Department of Conservation, Tiakina Te Taiao Ltd, Ngati Toa, Ngati Kuia, Friends of Nelson Haven and Tasman Bay Inc, New Zealand Fish and Game Council, and Nelson Public Health Services. The group has met twice to review overflow information and Council response

Inflow and Infiltration

The ingress of stormwater from rainfall events into the sewer system through direct inflow and subsurface infiltration, known as inflow and infiltration, requires proactive intervention to control, given the significant effects on the sustainability and operation of the wastewater systems.

Monitoring of wastewater flows during rain events has shown that inflow and infiltration can lead to peak flows in excess of 6 times average dry weather flow (the normal base flow in the network) with extreme spikes in excess of 10 times average dry weather flow. As a result, wastewater overflows due to wet weather do occur within the wastewater system. Also additional volumes during wet weather lead to an increase in pumping and treatment costs.

Addressing the problem of inflow and infiltration control requires the ongoing installation and upgrading of the stormwater reticulation in the city, targeted initiatives to replace aging sewer lines, both public and private, and to educate the public to stop the discharge of stormwater to the sewer reticulation from downpipes and sumps.

Controlling inflow and infiltration is a long term commitment, and reductions in wet weather flows are likely to be gradual. Inflow and infiltration reduction receives financial commitment in:

- Stormwater upgrades within existing reticulation and new capital works;
- Sewer renewal programmes (dependant on age profile/catchment area);
- Nelson City Council inflow and infiltration reduction programmes;
- Public education.

To achieve reduction in inflow and infiltration, Council is continuing to target areas of the city where known historical overflows are experienced in high rainfall events. City wide programmes checking for unauthorised connections to the sewer network have been carried out in the past with mixed success. A more targeted inspection and remediation programme is currently in place. A feature of the work that directly impacts on the overall success is the need to carry out a full inspection of the network section being considered and have adequate resources to follow up on issues until they are addressed. In 2011/12 Arapiki Road/Panorama Drive, Upper Ngawhatu valley and the Gracefield Street area were checked. Some significant issues were identified as a result of inspection and smoke testing. Council prefers to work with property owners rather than use legislation to affect repairs. This approach has been very successful and a number of owners have begun works to seal drains and redirect stormwater away from sewer entry points.

Te Tau Ihu Settlement Bill

The Te Tau Ihu Claims Settlement Bill (The Bill) provides statutory obligations for Council in respect to general decision making processes. The Bill is the culmination of Central Government's resolution of claims lodged by eight iwi for redress of past wrong's and provides for Cultural, Relationship and Financial redress.

Statutory acknowledgments may impact works programmes within the Asset Management Plan and the eight iwi will potentially be considered as affected parties under section 95E of the Resource Management Act, which the settlement legislation provides for. The proposal to establish a Freshwater Advisory Committee under the settlement legislation would be a potentially effective tool for achieving a forum to involve the iwi of Te Tau Ihu in the development of future asset management planning, infrastructure strategies and Long Term Plans.

Wastewater network odour issues

Odour complaints from different areas of the network do occur. Most complaints come from the operation of pump stations and the Nelson Waste Water Treatment Plant. The majority of the complaints relating to the treatment plant originate from structures such as the trickling filter and the oxidation ponds during seasonal changes, which tend to produce the conditions allowing products of anaerobic (absence of oxygen) processes to be released. The pond sludge is primarily organic material and can create odours as it decays in an anaerobic environment.

The waste water treatment plant upgrade, substantially completed in 2008, was designed to comply with the requirements of a suite of 2004 resource consents. The design of the new plant has allowed for better management of variable inflows and allows adjustments in operation to be made to reduce the negative effects of winter conditions on the pond operation.

Additional work includes removal of sludge from the ponds and the construction of a roof over the trickling filter, both planned to commence in 2013/14. The removal of sludge from the pond has been identified as the primary response to the odour issues and will cost approximately $1.5million. The sludge will be removed from the ponds and allowed to dry in specially woven filter socks, to reduce the water content, before being disposed of to landfill over the next three to four years. The total project will be completed by 2018/19.

Odour complaints from pump stations have resulted in the construction of activated carbon filters which have proved to be very successful. Ongoing issues at Neale Park are expected to be addressed with the redevelopment of the site.

Neale Park and Corder Park Pumping Station Upgrades

Wastewater from the central city is reticulated to Neale Park pump station and then pumped 8.5km to Nelson Waste Water Treatment Plant. The route of the rising main

(pressurised pipe) follows Atawhai Drive and then the state highway. Along the route to the treatment plant smaller catchments connect to the rising main with injector pump stations.

Due to the distance of Neale Park Pump Station from the treatment plant the pumps pump at elevated pressures to get the flows to the treatment plant. This means that as the city grows and flows increase, the rising main will be put under greater stress from high pressure flows. In order to reduce the pressure profile of the flow in the rising main, upgrading the existing pump station at Corder Park has been identified as the most desirable option. This would mean Neale Park pump station would pump to Corder Park and then Corder Park pump station would pump to the treatment plant. Upgrading Corder Park means that while the flows in the rising main can increase, which will manage the increasing flows as the city grows, the pressure in the rising main can stay at a lower level to maximise the working life of the rising main.

Detailed design and costing for the upgrade of Corder Park pump station has been completed as a first priority. Some additional remediation of the rising main will be carried out in conjunction with the pump station construction to address areas where failures have occurred since the original remedial works were carried out in 1997. Table 6.6 outlines the Capital Expenditure for this project.

Council has undertaken a comprehensive upgrade of most of the injector pump stations in recent years, to standardize electronic controls and install variable speed drive units. These units electronically control the speed of the pumps to match the pumping rate with the flow of wastewater into the pumpstation. This extends the life of the pumps and reduces electricity costs. Additionally the majority of pump stations have had at least one of the pumps replaced with a modern unit. Some further works will be required when the Corder Park and Neale Park pump station upgrade works are completed.

As a result of damage to the pumps at Neale park during the December 2011 extreme rain event, where very high volumes of wastewater lead to one of the pumps burning out, a new large storm pump has been installed. The two pumps now at Neale Park are able to cope with current flows but lack the necessary pumping security of backup pumps. Additionally the building housing the pumps and electronic drive equipment is considered to be at some risk of damage in a moderate earthquake and must be strengthened or demolished at some point in the future. The importance of the pump station to the city suggests that either a new pump station is constructed or the necessary upgrading and expansion of the existing facility should happen in the next 5 plus years.

The proposed redevelopment of the Neale Park Pump Station will allow for the construction of new larger wastewater collection wells (wet wells), with some ability to pre-screen wastewater and upgrade odour control. Odours from the wet wells and open grit channels are a feature of the existing station, particularly in the summer months.

Currently, seismic upgrading efforts have been directed to the drinking water assets. A review of the remaining wastewater assets will follow that work.

Atawhai Rising Main

The Atawhai Rising Main was constructed in the mid 1960's from reinforced concrete pipes with approximately 50mm thick walls. Failure of this pipe in the early 1990's from sulphuric acid attack on the underside of the top of the pipes (soffit) lead to a comprehensive inspection and remediation project to extend the rising main's service life. Remediation works consisted of replacing the worst affected pipes with fibreglass pipes, relining others with acid resistant fibre reinforced resin sleeves and grouting pipe joints. The remediated pipeline was expected to have a service life out to 2046.

In 2012/13 there have been three failures in the main. Two from pipe failures in the section immediately downstream of Corder Park and one from a displaced rubber ring joint in a pipe close to Founders Park on Atawhai Drive.

To address the risk to the city of ongoing pipe failures the following broad strategy has been developed.

The renewal of the rising main is currently being looked at in five stages:

Stage 1 – construction of the new pump station and section of rising main upgrade at Corder Park, earmarked to be constructed in 2014/15 and 2015/16. This reduces the pressure in the line between Neale Park and Corder Park.

Stage 2 – construction of the new pump station at Neale Park in 2017/18 and 2018/19. This allows installation of additional pumps which will ensure a smoother pressure profile that better matches flows.

Stage 3 -duplication or re-lining of the rising main from Neale Park to Brooklands Road 2030/31 and 2031/32. This work secures the rising main either through Founders Park or relocates it around the Founders Park- Miyazu Park area.

Stage 4 -duplication or relining of the rising main from Brooklands Road to Corder Park 2032/33 and 2033/34.

Stage 5 -duplication or re-lining of the rising main from Corder Park to Boulderbank Drive 2034/35 and 2035/36.

Natural Hazards

Council has ongoing responsibilities to manage impacts to the city from natural hazards to ensure the safety of residents and maintain commercial activity.

Recent work by Council has focussed on natural hazards that might impact on the city, in particular:

- Direct damage from Earthquake shaking
- Damage from liquefaction in susceptible areas
- Damage from Tsunami
- Damage from Flooding and major storm events
- Impact of potential climate change and sea level rise

Natural hazards impact on the security of the wastewater network and forms part of the risk section of this plan. In light of the recent Canterbury Earthquakes and Nelson storm events a review of the resilience of the water based utilities from these particular forms of hazard is required. The review will also include wider network hazards such as Earthquake fault line, liquefaction and climate change.

Future work will focus on near fault proximity of the network, possible impacts of liquefaction on existing and future infrastructure, impacts of flooding and the long term planning required as a result of climate change.

The Christchurch Earthquakes of 2010 /2011 lead to significant damage to that city's infrastructure, including wastewater treatment plant, pump stations and the underground pipe network from direct shaking and liquefaction. Recognising this and the results of other natural hazard investigation post the Nelson storm events of December 2011 and April 2013, Nelson City Council is reassessing the risk to the network from earthquakes (including liquefaction, tsunami and direct shaking), flooding, storms and sea level rise.

In particular a series of reports have been compiled, as part of the city's wider hazard planning, as follows:

- *TSUNAMI MODELLING AND EVACUATION ZONE MODELLING FOR TASMAN AND GOLDEN BAY- GNS FEBRUARY 2012 (A261963)*
- *REVIEW OF TSUNAMI HAZARD IN NEW ZEALAND (2013 UPDATE)- GNS AUGUST 2013(A371109)*
- *ASSESSMENT OF THE LOCATION AND PALEOEARTHQUAKE HISTORY OF THE WAIMEA-FLAXMORE FAULT SYSTEM IN THE NELSON-RICHMOND AREA WITH RECOMMENDATIONS TO MITIGATE THE HAZARD ARISING FROM FAULT RUPTURE OF THE GROUND SURFACE- M. R. JOHNSTON A. NICOL GEOLOGICAL CONSULTANT GNS SCIENCE 395 TRAFALGAR STREET PO BOX 30368 NELSON LOWER HUTT GNS SCIENCE CONSULTANCY REPORT 2013/186 AUGUST 2013(A673742)*

- *REVISED PRELIMINARY ASSESSMENT OF THE LIQUEFACTION HAZARD IN TASMAN AND NELSON FEBRUARY 2013 (A597463)*
- *TAHUNANUI AREA LIQUEFACTION ASSESSMENT- TONKIN AND TAYLOR LTD NOVEMBER 2013(A1117884)*
- *MAITAI RIVER FLOOD HAZARD MAPPING MODELLING REPORT TONKIN AND TAYLOR LTD AUGUST 2013(A677152)*

A further report is expected in 2015, to update the 2009 report by the National Institute of Water and Atmospheric studies (NIWA) looking at the latest state of knowledge of the impact of climate change on sea level rise.

The wastewater network activity is likely to be impacted by sea level rise more than other utilities because the reticulation is essentially gravity based, with pipes of varying depth, age and integrity. Inflow and infiltration rates would be expected to rise, with base ground water levels likely to become elevated and high tides enhancing this effect. Pump stations and treatment plants are mostly positioned on lower level ground with potential for direct tidal impact, particularly in the Port Nelson and Tahunanui areas.

Liquefaction was seen in Christchurch to have an extreme impact on the network, through floating manholes and sand and silt infiltration into pipelines and manholes.

Climate change is expected to bring with it more extreme weather in the form of higher intensity and longer duration rain events (with associated flood damage and inflow and infiltration issues) and drought periods. The issue will be monitored and future asset management plans will be adjusted to address impacts as they become better understood.

Awatea Place – Pumping Station, Rising Main and Trunk Main upgrades

In the Stoke/Tahuna area the twin pump stations in Parkers Road are programmed to be replaced with a single new pump station in Awatea Place. The current pump stations are close to the end of their service life and being situated very close to residential buildings have their own odour control issues. The new pump station will connect to the Nelson Regional Sewerage Business Unit pump station at Nelson Airport via a new rising main. Upgrades to the trunk mains will be required to link the existing pipework with the new pump station. Installing a single larger pump station in Awatea Place will significantly reduce operating and maintenance costs, allow for the installation of modern odour control equipment and provide a level of storage in event of emergency - Parkers No. 1 and No. 2 pump stations will stay within the reticulation network as extra emergency storage.

Pump Station and Network Storage

The issues of significance for pump stations is the need to provide 4 hours average dry weather flow storage where possible, under the conditions of the resource consent for accidental discharges, and to formalise the use of generators to provide coverage in an emergency situation. All new pump stations are designed with this level of storage, and additional storage will be considered for existing pump stations where this is practical. Significant storage is also available within the reticulation network as well (from pipes and manholes only flowing part full most of the time) and work is ongoing to quantify this. Main pump stations at Neale Park and Vanguard Street have an emergency generator installed onsite as part of the design. A fleet of trailer mounted emergency generators is maintained to enable other pump stations to be operated in the event of either localised or wide area power failure.

Reticulation renewal strategy

Council renews components of the wastewater network as they reach the end of their service 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 City's wastewater infrastructure is maintained.

The gravity pipe network is made up of a variety of materials with different service lives. Where pipes remain in good condition it is anticipated that lives of 80-100 years can be achieved. Current renewal strategies focus on renewing pipelines that show high infiltration rates and/or a history of multiple repairs. A constant renewal programme is

undertaken to even out the rate of renewal and avoid the need for very high expenditure in the years when the pipes reach the end of their service lives.

Rising Mains and Swallows (gravity pressure main) renewals strategy

Rising mains are pipes that take the flow from pump stations to other pump stations or treatment plants. The main feature of these pipes is that they are constantly full of wastewater under pressure. Swallows are gravity pressure mains where the pipes are generally full, but at a lower pressure. It is difficult to inspect these mains and assess the condition as they are in constant use, which makes renewal programming challenging. Historically this has meant that monitoring has not been possible on a regular basis and failures are likely to be the first indication of problems. This is common throughout New Zealand and has been demonstrated by the recent failures of the Atawhai rising main.

Some investigations of the swallows have been undertaken with closed circuit television, and a condition assessment and renewal strategy is currently being developed.

The rising mains will be more difficult to inspect and investigation for renewals will focus on pipeline materials, such as concrete, that are likely to be at greater risk of chemical attack. Each assessment will require careful planning as it is likely a section of the pipeline will have to be taken out of operation for short periods of time. This brings with it a risk of overflows that can be addressed in part with suction trucks.

SCADA Review and Upgrade

All of the Nelson City Council's strategic utility components are monitored remotely, at Civic House or by duty staff using laptop computers at home, utilising a telecommunication package called SCADA (Supervisory Control And Data Acquisition). SCADA has given Council the ability to ascertain faults and instigate repairs without affecting the service to the consumer and has significantly increased efficiency and reliability of the utility schemes. This function has become critical to the operation of the network and has been supported by Council's in house Information Management team up to now. There is a need to upgrade this package and at the same time consider how the technical requirements can be accommodated with the essentially "office" based computer network used by the majority of Council staff.

Sustainable Development

Overview of Sustainability

The Local Government Act 2002 requires that local authorities take a sustainable development approach to everything they do. The publication, Nelson 2060 (June 2013) was developed by Council through an inclusive process called "Framing our Future" and sets out Nelson's sustainability strategy.

The framework and checklist outlined in this document will be used to guide the management of the city's infrastructure.

Community infrastructure is installed and maintained on the understanding that the assets are provided in perpetuity for the benefit of future generations. Longevity of an asset is a prime consideration when design and planning is undertaken for new or replacement components in the network.

Actions for Future Improvement

Further action in promoting the sustainability of this activity centres on the following areas:

- More strategic monitoring of the condition and operation of the asset to identify most appropriate renewal priorities;
- Enhanced network modelling to aid prediction of performance and renewal strategies;
- Additional effort to reduce infiltration rates and overflow risks;

- Re-development of Corder Park and Neale Park pump stations to extend life of the existing single main to the Nelson Wastewater Treatment Plant;
- Ongoing monitoring of wastewater quality and advances in treatment options to reduce odour and improve quality of eventual discharge to sea;
- Further investigation of recovery and treating wastewater from Bell Island for sports field irrigation via return pipeline.

Nelson Wastewater Treatment Plant Resource Consent

The resource consent for the operation of the plant, the marine outfall and the discharge of treated effluent expires 1 December 2024. As this is a critical operating authority, renewal planning will begin in 2020/21.

30 YEAR INFRASTRUCTURE STRATEGY

The requirement for an infrastructure strategy arose from advice provided by Better Local Government programme advisory groups. The strategy is intended to improve local authorities' delivery of core infrastructure and management of physical assets. It should identify strategic issues facing the council and the future implications and is intended to add transparency for residents and ratepayers about these issues and their consequences.

The strategy is included in the LGA 2002 Amendment Bill (No 3) which is expected to be passed in current form in June 2014.

This Asset Management Plan contains the information that would form the basis of the Wastewater utility section of an integrated strategy. Detailed information relating to the specific components of the strategy is set out in the appropriate sections of this asset management plan and is either shown directly or as an area that will require future work.

Appendix H sets out the specific areas to be covered in a 30 year strategy, with the reference to the appropriate sections of this asset management plan. The appendix also contains the 30 year budget tables.

LEVELS OF SERVICE

The levels of service provision for the Council's wastewater activity and the performance measures by which these will be assessed are defined with the service levels aimed at contributing towards the achievement of community outcomes and meeting the strategic goal.

Background

The Nelson City Council has undertaken a range of consultation processes on levels of service or the extent of infrastructure that Council has/will be required to install.

The community outcomes associated with the wastewater activity encompass the community's vision of the sort of place where they would like to live in the future. These outcomes guide the future development of the district and illustrate how the wastewater activity contributes to the high level goals and community outcomes. The table below details the linkages between the customer value, levels of service, and the community outcome that the level of service supports.

Proposed Levels of service 2015-25:

What Council will provide	Performance Measures	Current Performance	Targets			Targets in Years 4 - 10
			Year 1	Year 2	Year 3	
A fully operational wastewater treatment plant	Level of compliance of treatment plant with resource consent conditions	Not achieved Odour problems and one high biochemical oxygen demand (BOD) reading were recorded during the year	100% compliance	Maintain 100% compliance	Maintain	Maintain
Emergency response	Time taken to respond and	Not achieved Two categories failed to	Respond and investigate	Maintain	Maintain	Maintain

	investigate emergencies	meet the requirement: for overflowing manholes two of the 66 events did not meet the standard required; and for sewer main breaks one of the five events took longer than anticipated	emergency works within 30 min and ~~repairs~~ resolve emergency situations within eight hours			
Environmental protection	Level of compliance with resource consent conditions for accidental discharges from the network	Not achieved Consent was granted in 2011/12 for accidental discharges from the wastewater network, and during the 2012/13 year the timeframe for initiating sampling of background water environment was not met in one instance	100% compliance	Maintain	Maintain	Maintain
	Number of confirmed odour complaints per annum associated with a pump station	Achieved Two odour events from central Nelson pump station	No more than three confirmed odour complaints a year associated with any individual pump station	Maintain	Maintain	Maintain

WASTEWATER SYSTEM OVERVIEW

Background

Nelson City Council is responsible for 370km of mains, 25 reticulation pump stations, one wastewater treatment plant and one marine pipe line outfall at the Nelson wastewater treatment plant. The replacement costs of the wastewater assets are $202M based on the 2012 valuations as detailed below. The assets and costs associated with the Nelson Regional Sewerage Business Unit are detailed in the 2012 Nelson Regional Sewerage Business Unit Asset Management Plan.

Table 1-1: Summary of Wastewater Activity Assets (June 2012)

Asset Category	Quantity	Unit	Replacement Value $
Reticulation Mains	310	km	110,274,347
Trunk Mains	34	km	14,224,987
Swallow Mains	6	km	3,384,507
Rising Mains	28	km	20,892,267
Access points (pipe cleaning ports)	870	No	780,685
Manholes	6,547	No	26,868,888
Tanks (Overflow detention, meter enclosures)	11	No	86,321
Valves	139	No	183,206
Neale Park Detention Tank	1	No	575,542
Pump Stations	25	No	6,785,020
Nelson Waste Water Treatment Plant	1	No	18,397,500
Total			**202,453,270**

Treatment and Disposal

The Nelson Waste Water Treatment Plant (NWWTP): serves the northern catchment of Nelson City, comprising mainly domestic residences, and a small percentage of industrial discharges from the Port and Vanguard street industrial areas. Fish waste from the Port area is disposed of separately via the fisheries outfall pipeline from Vickerman Street to the far side of the Boulder Bank. Wastewater is collected by a reticulation system that is then pumped from the Neale Park Pump Station along the 8.5 kilometre, 750-900mm diameter concrete / fibreglass pipe Atawhai rising main to the waste water treatment plant at the northern end of the Nelson Haven. The Nelson Waste Water Treatment Plant treats approximately 9,500 m3 of effluent every day.

The Nelson Waste Water Treatment Plant was upgraded in 2006-08 and is designed to comply with the requirements of the 2004 resource consent. The design of the new plant has allowed for better management of variable inflows and allows adjustments in operation to be made to reduce the negative effects of winter conditions on the pond operation. The treatment concept for the waste water treatment plant is based on:

- Removing gross solids through the inlet works
- Pre-treating the effluent flow to remove Biochemical Oxygen Demand through the use of a trickling filter and clarifier
- Pond based treatment for the removal of Biochemical Oxygen Demand and Total Suspended Solids to the consent criteria
- Natural disinfection using the maturation pond and wetlands

The main components of the waste water treatment plant are the flow buffer, screening and grit removal, clarifier, sludge tanks, trickling filter, oxidation pond, wetlands and outfall. Note: The organic sludge is shipped to Bell Island, where it is treated and sprayed as fertiliser on Rabbit Island pine forests.

The Nelson Waste Water Treatment Plant treats wastewater in a modified oxidation pond with some primary screening and sludge control. This method of treating wastewater is relatively low cost and utilises natural processes (sun and wind) and naturally occurring algae and bacteria to break down the waste material. One of the challenges with this type of facility is maintaining an appropriate balance of waste and bacteria in the ponds to prevent pond failure and the production of un-acceptable odours.

Treatment Plant Effluent Quality: Monitoring results to date indicate the upgraded waste water treatment plant complies with conditions of the resource consent relating to effluent quality.

Odour Control: There have been a number of odour complaints since the plant upgrade was commissioned. Council and engineering consultants have investigated possible sources and solutions. Based on an evaluation of the likely sources of odour a number of works have been put in place. In 2012 pond aerators were installed and in 2014 the pond is being de-sludged and a cover installed to the trickling filter.

Nelson Outfall: Constructed in 1970 using 900mm diameter reinforced concrete pipes and a multi point diffuser. As part of the resource consent conditions, five yearly studies are carried out by the Cawthron Institute to report on the marine environment adjacent the outfall. The most recent study was in 2010 and concluded that the Nelson wastewater discharge is not causing discernible adverse impacts on water quality, the seabed, or human use and values.

Nelson Regional Sewerage Business Unit: The Nelson Regional Sewerage Business Unit operates the wastewater treatment plant on Bell Island in the Waimea Estuary. This facility serves the Stoke - Tahuna catchment of Nelson City together with the Waimea Basin and Mapua townships of the Tasman District Council.

The charges levied on Nelson City Council by the Nelson Regional Sewerage Business Unit for the treatment of wastewater make up the largest component of the Council's wastewater operational costs.

Reticulation

The main purpose of the reticulation system is to take effluent from the customer's point of discharge (Nelson City Council mains) and transport it to a treatment plant. The Nelson City Council has wastewater pipe assets ranging from new to 100plus years of age. The distribution of pipe length versus age can be seen in Figure 5.3. The pipe install date distribution increases at a steady rate for the pipes installed from the 1950's to the present date. This is in line with the population growth in Nelson over the last 60 years.

PVC has been the predominant pipe material used, asbestos cement (AC) and concrete are the next most common material and were a popular choice for distribution mains and some trunk mains in the 1950's to 1980's. The percentage of pipe material that is unknown is very low (<1%).

Pump Stations

The Nelson City Council is responsible for 25 wastewater pump stations (see Table 5.4), ranging in size from the smallest serving the Tahuna skating rink to the main pumping station for central Nelson at Neale Park. The majority of the pump stations have had upgrade works completed. Neale Park and Corder Park are the last stations to need significant works, with detailed design and construction set down in the capital expenditure table. It is proposed to construct a new pump station at Awatea Place rather than upgrade two pump stations on Parkers Road. All pump stations have telemetry and flow monitoring installed.

At present approximately five overflow events per year occur due to pump stations inability to cope with flows during peak wet weather periods. In the 2012-13 year 5 overflow events occurred, 4 of these were associated with the failure of the Atawhai rising main on the 20 June 2013.

There is a need to complete an updated pump station inventory of all 25 pump stations, to ensure the records held internally are complete and readily available. This work will then lead into the review of the storage capacity in the reticulation and pump stations to ensure the necessary capacity is available in the event of emergencies. Storage will be aided by the development of a strategy for the utilisation of emergency generators.

Supervisory Control and Data Acquisition System (SCADA)

All of the Nelson City Council's strategic utility components are monitored remotely, at Civic House or by duty staff using laptop computers at home, utilising a telecommunication system called SCADA.

SCADA has given Council the ability to ascertain faults and instigate repairs without affecting the service to the consumer and has significantly increased efficiency and reliability of the utility schemes. This function has become critical to the operation of the network and has been supported by Council's in-house Information Management team up to now. There is a need to upgrade this package and at the same time consider how the technical requirements can be accommodated with the essentially office based computer network used by the majority of Council staff.

FINANCIAL SUMMARY

The projected operating and maintenance costs, renewals and capital expenditure for the wastewater network over the next twelve years are shown in the following Table.

Table Years 1-12 of the 2015/25 Long Term Plan- Financial Summary

Note: The figures for Renewals and Capital Works are in 2015 dollars - the Long Term Plan figures are adjusted for inflation

Year		1	2	3	4	5	6	7	8	9	10	11	12
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**		
O&M Expense	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Administration/interest	291	291	291	291	291	291	291	291	291	291	291	291	291
Depreciation	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066
Electricity	188	223	223	223	223	223	223	223	223	223	223	223	223
Mtce: Physical Works - Programmed	246	256	256	256	256	256	256	256	256	256	256	256	256
Mtce: Physical Works - Reactive	536	553	553	553	553	553	553	553	553	553	553	553	553
Mtce: Engineering Services	180	180	180	180	180	180	180	180	180	180	180	180	180
Mtce: NN Treatment Plant	460	700	700	700	700	700	700	700	700	700	700	700	700
NRSBU - NCC Share	3,383	3,562	3,460	3,436	3,930	3,884	3,859	4,827	4,911	4,873	4,873	4,873	4,873
Mtce: Reduction in S/W Entry	90	150	150	150	150	150	150	150	150	150	150	150	150
Mtce: CCTV Inspections	42	44	44	44	44	44	44	44	44	44	44	44	44
Mtce: Flow Monitor	23	28	28	28	28	28	28	28	28	28	28	28	28
Mtce: Trade Waste Monitoring	3	15	15	15	20	20	20	20	20	20	20	20	20
Mtce: Ex-filtration (Maitai E.coli)	50	50	50	50									
Mtce: SCADA Remote site radio upgrade		60	60										
Mtce: SCADA upgrade		70	70										
NWWTP - Desludging	246	346	346	346	346								
Total [a] ($,000s)	**8,804**	**9,594**	**9,492**	**9,338**	**9,787**	**9,395**	**9,370**	**10,338**	**10,422**	**10,384**	**10,384**	**10,384**	**10,384**
Renewals Project Area	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
Pipe Renewals	525	525	525	525	650	650	650	700	700	700	750	750	750
Renewal Rising/Swallows	0	80	150	430	80	150	430	80	150	430	80	150	430

NWWTP Renewals	0	43	7	0	0	0	100	8780	2	0	40	0	0
Pump Stations Renewals	130	150	150	150	200	200	200	250	250	250	300	300	300
Flow Meters	45	45	45	45	45	45	45	45	45	45	45	45	45
Total ($,000s)	700	843	877	1150	975	1045	1425	1955	1147	1425	1215	1245	1525
Capital Works – Project	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Arapiki/Quarantine Trunk Main	1,554												

Awatea Place RM/PS/TM		300	50	650	3,000	600							
Corder Park	3,600	2,500											
Neale Park PS	215	250	3,000	3,000									
Ngawhatu Valley TM - Stage 1	500	335											
Ngawhatu Valley TM - Stage 2								180	20	1,000	1,000		
NWWTP - Upgrades				50		100			200	200	200		
NWWTP - Resource Consent							100	150	150	150	150		
Telemetry Upgrade													
Pump Station Storage		20	120	50	120	120							
Atawhai Rising Main - Stage 1											100	80	2,000
Maitai (Ralphine Way)						50		250					
Hira - investigate adding to network												100	150
Gracefield Beheading				50	150		500	500	500				
Atawhai Pump Stations (Brooklands & Marybank)		80	400	200	400	200							
Arapiki Rd #15 - Ridgeway		80	20	500									

Trafalgar Square - Betts Carpark			10	10	75								
Natural Hazards Risk Assessment		50	50		100	100	100						
Network Capacity Confirmation for Growth Areas		50	100						100	100	100	1,250	
Network Upgrades Nelson North													
Network Upgrades Nelson Central													
Network Upgrades Nelson South													
Total ($,000s)	**5,869**	**3,665**	**3,750**	**4,510**	**3,845**	**1,170**	**700**	**1,080**	**970**	**1,450**	**1,550**	**1,430**	**5,869**

MAINTENANCE

The provision of wastewater is a 24/7 operation, therefore the operation and maintenance of the wastewater activity requires backup facilities, equipment, machinery and staff to provide rapid response to loss of service. Corrective and preventive maintenance programs are in place to maintain the systems in a good state of repair to minimise the risk of loss of service. Nelmac, a 100% Council controlled organisation is contracted to provide this service.

RENEWALS

Renewal expenditure is major work that does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. Council's renewal strategy is in a stage of transition from renewal based on condition and age, to the strategy based on a combination of performance, asset criticality using the business and extended asset risk schedules, capacity and condition (age data is used to estimate condition when condition data is not known).

Performance and condition of the assets are assessed with respect to the following criteria:

- Inflow and infiltration potential;
- Leakage from pipes, manholes and fittings where the network is adjacent to waterways, marine environment or areas of high groundwater;
- Areas with elevated levels of blockages;
- Areas with elevated maintenance costs;
- Parts of the network prone to overflows;
- Parts of the network with objectionable odour emissions.

GROWTH AND DEMAND

Population Forecasts

The population of Nelson City in 2006 was 42,888 and 46,437 in the 2013 census. This is projected to increase to approximately 51,200 by 2031, using the projections from Statistics New Zealand completed in 2012.

The future demand drivers for the reticulated Wastewater activity in Nelson City are expected to be:

- The population increase projections;
- Expansion of urban development into rural areas;
- Increased number of tourists;
- Sustainability strategies that include infiltration reduction.

Capacity

Reticulation

Development of a computer model of the Nelson South and City Centre catchments has been underway since 2004 and will in the long term enable future upgrading works to be programmed over the 10-year life of the Asset Management Plan and Long Term Plan.

Maximum flows for the design were based on the current development potential of the various catchment zones in accordance with the Nelson Resource Management Plan. Modelling for the city area is currently underway providing a means to evaluate the implications of growth in the city and environs.

At this stage growth in the city is expected to be catered for by utilising a mix of reticulation upgrades and a reduction in the volumes of stormwater entering the network. Further consideration to using in-line detention tanks to spread discharge peaks and extend the "capacity life" of the current network will also feature.

Pump Station and Rising Main Capacities

Nelson City Council is nearing the completion of the pump stations upgrade programme. New pump stations in the network are designed for peak wet weather flow (PWWF) plus 10%, with a design life horizon to 2035.

Treatment Capacity

Nelson Wastewater Treatment Plant: The waste water treatment plant main structure was built to take into consideration future upgrades and designed to the following requirements:

- Hydraulic loadings – to year 2050
- Load (Biochemical oxygen demand, Suspended Solids, etc) – to year 2020

The treatment loading and capacity will be closely monitored to ascertain the uptake of the capacities.

Nelson Regional Sewerage Business Unit Waste Water Treatment Plant: The Council is a significant contributor to the Nelson Regional Sewerage Business Unit and as such has a quota based agreement with the Nelson Regional Sewerage Business Unit that details Council's existing and future requirements. Currently the Nelson Regional Sewerage Business Unit has just completed a project to upgrade the treatment plant and duplicate the rising main to Bell Island. At the same time a 250mm diameter return water line has also being installed for possible use to convey treated water from Bell Island to the mainland should demand lead to a treatment facility being constructed.

Demand Management

As with the stormwater activity a range of initiatives are likely to be required to manage the demand for wastewater services and additional infrastructure in the longer term.

- Develop changes to the Nelson Resource Management Plan requiring the installation of "dual flush" toilets, low flow shower heads, and banning in-line waste disposal units in kitchen sinks (these units encourage adding organic material to the wastewater stream that then has to be treated);
- Ongoing water supply proposals to reduce pressure in the lower parts of the city leading to reduced water usage and associated wastewater flows;
- Public education on the need to minimise the amount of water discharged to the wastewater network;
- Ongoing inflow and infiltration to address water ingress into the waste water reticulation;
- Active implementation of the Trade Waste Bylaw and Nelson Resource Management Plan to monitor discharges and ensure property owners do not dispose of hazardous material inappropriately;
- Intensification of residential development to reduce additional length of new reticulation added to the network.

IDENTIFYING AND MINIMISING RISKS

Council's Wastewater Risk Management Strategy is in its formative stage. Council is developing, implementing and maintaining risk plans for the principal utility asset systems to minimise the likelihood of non-achievement of critical business objectives. The areas that have been assessed to have an extreme or high level of risk are associated with the following:

- Waste water treatment plant processes;
- Rising mains failures (Atawhai and others);
- Overflows from trunk mains caused by infiltration and blockages;

- Trunk mains failure due to influence of hazardous trade wastes;
- Neale Park pump station failure due to system failures (power failure has been addressed with the installation of an emergency generator).

While response plans have been formulated to deal with emergency failures, these are essentially "after the event" reactive plans. More work is required to prepare mitigation strategies to reduce these risks to an acceptable level.

CAPITAL WORKS

Decisions on priorities for new works and renewal of assets for the wastewater network have historically been based on the following:

- Known problem areas with blockages and infiltration issues;
- New growth areas;
- Pump station overflows and odour issues;
- Rising main failures leading to overflows;
- Criticality of proposed works;
- Multiple network project (e.g. incorporating road work, sewer, water assets).

Appendix I outlines a means of documenting decisions and criteria relating to prioritisation of capital expenditure for areas shown in the Nelson Resource Management Plan with a services overlay.

The proposed criteria are:

- Cost to service versus anticipated Development Household Unit of Demand (HUD) yield;
- Degree of risk/hazards for utility development;
- Appropriateness of onsite mitigation for utilities;
- Indication of development timing and other Council projects in the same vicinity that can be brought together at the same time;
- Capital expenditure already identified in previous Annual Plan or Long Term Council Community Plan / Long Term Plan.

Conclusion

The Community and Council agree that the Council's wastewater system is of strategic importance and essential to the well-being of the community. To ensure the ongoing well-being of the community the activity must be sustainable for the environment and for future generations. This is demonstrated in the long-term planning that has been shown, the recognition of known risks and development of robust mitigation strategies, the management of discharges from the activity, and the quantification of the future demands.

1. INTRODUCTION

This section sets out the philosophy for the ongoing operation and development of the Nelson City Council wastewater activity and the scope and layout of this Asset Management Plan.

1.1 PURPOSE OF THE PLAN

Purpose of this Wastewater Asset Management Plan is to: ensure that assets are operated and maintained, so that they provide the required level of service for present and future customers in a sustainable and cost effective manner.

The Wastewater Asset Management Plan supports the purpose by:

- Demonstrating responsible, sustainable management and operation of wastewater assets which represent a significant, strategic and valuable asset belonging to Nelson City
- Identifying funding requirements; and
- Demonstrating compliance with Section 94(1) of the LGA 2002 which in summary requires the Long Term Plan to be supported by an audit report on:
  - the quality of the information and assumptions underlying the forecast information
  - framework for forecast information and performance measures and whether they are appropriate to assess meaningful levels of service
- Demonstrating clear linkage to community agreed outcomes with stated levels of service

The overall objective of asset management planning is to:

Deliver the required level of service to existing and future customers in a sustainable and cost effective manner.

The contribution of wastewater activity to the Community Outcomes and asset management objectives will be achieved by:

- Reflecting Long Term Plan stakeholder consultation to establish service standards
- Implementing a programme of inspections and monitoring of the activity to assess asset condition and performance
- Undertaking a risk based approach to identify operational, maintenance, renewal and capital development needs, and applying strategic prioritisation techniques to select the most cost effective and sustainable work programme
- Ensuring services are delivered at the right price and quality
- Achieving the appropriate level and quality of asset management practice

1.2 RELATIONSHIP WITH OTHER PLANS

Asset management plans are a key component of the Council planning process, linking with the following plans and documents:

Long Term Plan: A plan required by the Local Government Act 2002 to cover a period of at least 10 years. This plan contains key information about the Council's activities, assets, level of service and cost of providing service. It sets out the Council's funding and financial policies and also a financial forecast for the years covered by the plan. Levels of service and financial programmes as given in this document will be key information for this plan. The asset management plan provides the detail required to support the financial forecast.

Annual Plan: Detailed action plan on Council's projects and finances for each particular year. The works identified in the asset management plan form the basis on which annual plans are prepared. With the adoption of the Long Term Plan the Annual Plan mainly details the budget and sources of funding for the year.

Water & Sanitary Services Assessment: It is a long-term assessment, carried out under the Local Government Act 2002, of the sanitary services provided by a local authority. These services include wastewater treatment, stormwater, public toilet facilities, disposal from wastewater disposal systems, cemeteries and crematoria and landfills. The main focus of this assessment is to ensure that public health is maintained. Council prepared this assessment in 2005. No significant change to the delivery of services has occurred in the intervening period and there are no plans to review the document in the next three years.

Nelson Resource Management Plan: The Nelson Resource Management Plan complies with the requirements of the Resource Management Act. It has implications for the Asset Management Plan in terms of discharge and land use policies and the control of environmental effects for new developments.

Bylaws, Standards and Policies: These tools for asset creation and subsequent management are needed to support asset management tactics and delivery of service. Councils Trade Waste Bylaw became operative in 2007.

Ngā Taonga Tuku Iho Ki Whakatū Management Plan: It is a collective initiative involving five of the six local iwi (Ngati Rarua, Ngati Kuia, Ngati Toa Rangitira, Ngati Te Atiawa, Ngati Koata and Ngati Tama) gives a big picture approach to the management of nga taonga tuku iho (the treasured resources).

Trade Waste Management Plan: aims to ensure that contamination of the environment is minimised; assigned discharge volumes are in keeping with the capacity of the system; tariffs are set at equitable levels and the necessary charges levied; forward planning is current and realistic and that discharges to the wastewater system are regularly monitored. This plan has a specific emphasis on Trade Waste and sits as an operational plan under the Wastewater Asset Management Plan. It was last reviewed in 2004.

Sustainability Policy: To embed a culture of sustainability into all areas of Council by having an overarching policy to be given effect through Council decisions, strategies, plans and actions and against which, future Council actions will be evaluated.

Esplanade and Foreshore Reserves Mgmt Plan: Identifies the issues relating to the management of reserves adjacent to water bodies.

Biodiversity Strategy: The strategy provides principles for biodiversity management action. These underpin council wide actions and are recognised as inputs into the wastewater activity.

1.2.1 Key Stake Holders

The plan recognises the following external and internal key stake holders:

Table 1-2: Key Stake Holders

Key Stakeholders	Main Interests
External Stakeholders	
Residents and ratepayers	Public health and safety, service reliability, environment, cost
Industrial and commercial users	Public health and safety, service reliability, environment, cost
Nelson Marlborough District Health Board	Public health and safety, environment
Nelson City Council (unitary authority)	Environment
Government agencies (MoH, MfE, Audit NZ)	Public health and safety, service reliability, environment, cost
Tangata Whenua comprising of six iwi	Environment, cultural heritage
Consultants, Contractors and suppliers	Procurement, technical, projects/programmes

Key Stakeholders	Main Interests
Internal Stakeholders	
Councillors and Sub-committees	Public health and safety, service reliability, environment, cost
Staff	Public health and safety, service reliability, environment, cost

1.3 HOW THIS PLAN WILL BE USED

This plan will provide the substantiation for budget forecasts put forward in the Long Term Council Community Plan (2015-2025) for wastewater collection, treatment and disposal assets.

Nelson City Council will:

Implement a continuous improvement approach to asset management planning in the short term.

The wastewater Asset Management Plan will be reviewed three-yearly in advance of the Long Term Plan. Annual amendments or updates will be undertaken if significant asset management changes occur.

Report variations in the adopted annual plan budgets against the original asset management plan forecasts and explain the level of service implications of budget variations.

1.4 ASSET DESCRIPTION AND ASSETS INCLUDED IN THIS PLAN

The Nelson City Council provides wastewater services from Glenduan in the north to Stoke in the south with approximately 20,000 connected properties. Sewage from Stoke and Tahunanui is treated at the Nelson Regional Sewerage Business Unit Treatment Plant on Bells Island (details of Nelson Regional Sewerage Business Unit are shown in the Nelson Regional Sewerage Business Unit Wastewater Asset Management Plan 2007). Fish processing water from factories at Port Nelson is screened and discharged beyond the Boulder Bank into Tasman Bay through the industries fisheries outfall. Effluent from the remainder of the city is treated at the Nelson Wastewater Treatment Plant to the North of the city.

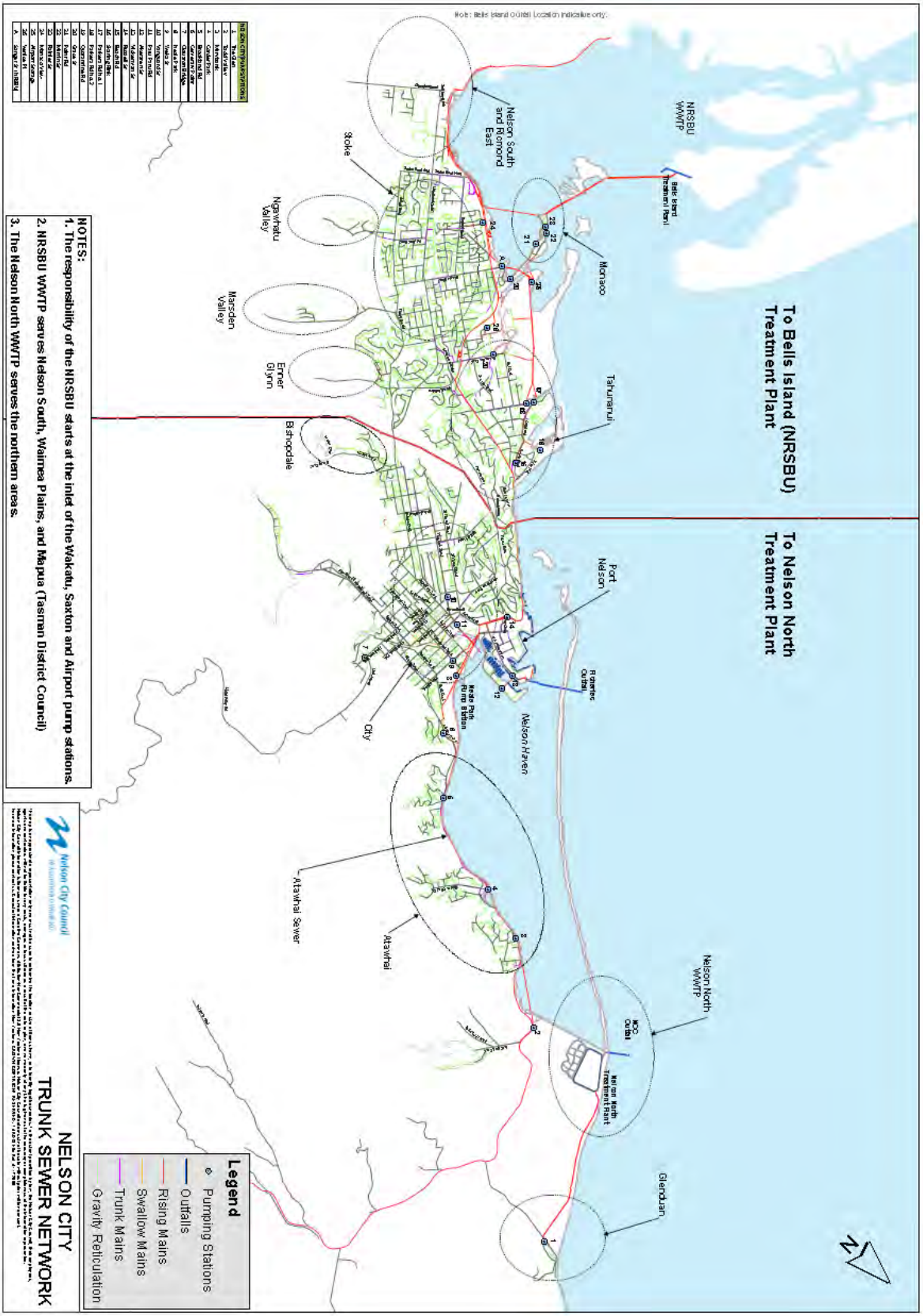
The Nelson Regional Sewerage Business Unit is a joint committee of the Tasman District Council and the Nelson City Council and was instigated to look after the owner's (the two Council's) interests in the Regional Sewerage Scheme. It became a business unit in October 2000 after previously operating as the Nelson Regional Sewerage Authority. A Memorandum of Understanding that was signed by the two Mayors and Chief Executive's in December 2000 governs the operation of the Nelson Regional Sewerage Business Unit. Nelson City Council is a contributor to the Nelson Regional Sewerage Business Unit for the Nelson South area and has a quota based agreement detailing Nelson City Council existing and future requirements. With the completion of the upgrade to the Nelson Waste Water Treatment Plant, sludge from the treatment plant is trucked to Bell Island for further processing.

The inventory of public wastewater assets, owned by Nelson City Council is shown in Table 1-2. This indicates the extent of the wastewater service and also that the replacement value is a significant investment within the community.

Table 1-3: Summary of Wastewater Activity Assets (June 2012)

Asset Category	Quantity	Unit	Replacement Value $
Reticulation Mains	310	km	110,274,347
Trunk Mains	34	km	14,224,987
Swallow Mains	6	km	3,384,507
Rising Mains	28	km	20,892,267
Access points	870	No	780,685
Manholes	6,547	No	26,868,888
Tanks	11	No	86,321
Valves	139	No	183,206
Neale Park Retention Tank	1	No	575,542
Pump Stations	25	No	6,785,020
Nelson North Waste Water Treatment Plant	1	No	18,397,500
Total			**202,453,270**

Figure 1-1: Nelson City Wastewater Scheme



1.5 WASTEWATER ACTIVITY ISSUES

Council's priorities between 2015 and 2025 for the wastewater activity will focus on the following areas:

- Accidental Discharges;
- Inflow and Infiltration;
- Te Tau Ihu Settlement Bill;
- Waste Water network odour issues;
- Neale Park and Corder Park Pumping Station Upgrades;
- Atawhai Rising Main Remediation;
- Natural Hazards - Security of the network in light of the recent Canterbury Earthquakes and Nelson storm events, including wider network hazards- Earthquake fault line, liquefaction and climate change;
- Awatea Place – Pumping Station, Rising Main and Trunk Main upgrades;
- Pump Station and Network Storage;
- Reticulation renewal strategy;
- Rising Mains and Swallows (gravity pressure main) renewals strategy;
- SCADA Review and upgrade of radio telemetry;
- Sustainable Development;
- Nelson Wastewater Treatment Plant resource consent renewal;
- 30 year Infrastructure Strategy signalled in the Local Government Act 2002 Amendment Bill (No 3).

2. LEVELS OF SERVICE

The levels of service provision for the wastewater activity and the performance measures by which these will be assessed are defined in this section. The levels of service are aimed at contributing towards the achievement of community outcomes and meeting the strategic goals of the Council.

This section also contains information on the customer research undertaken and the legislative requirements adhered to in arriving at the levels of service.

2.1 RATIONALE FOR COUNCIL'S INVOLVEMENT

The Council provides wastewater facilities for the following reasons:

Rationale for Council's involvement

Legislative requirements:

The Nelson City Council is a local authority established under the Local Government Act 2002 (the Act) with purpose and responsibilities set out in the Act. In particular the purpose as it relates to infrastructure is as follows:

10 Purpose of local government

(1) The purpose of local government is-

a) to enable democratic local decision-making and action by, and on behalf of, communities; and

b) to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.

*(2) In this Act, **good-quality**, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are—*

(a) efficient; and

(b) effective; and

(c) appropriate to present and anticipated future circumstances.

and the Act further defines core services to the community as:

11A Core services to be considered in performing role

In performing its role, a local authority must have particular regard to the contribution that the following core services make to its communities:

(a) network infrastructure:

(b) public transport services:

(c) solid waste collection and disposal:

(d) the avoidance or mitigation of natural hazards:

(e) libraries, museums, reserves, recreational facilities, and other community infrastructure.

Wastewater supply is a network infrastructure (sec 197(2)) and a water service (sec 124).

Council has specific obligations under section 130 of the Act to continue to provide existing water services. These also recognise the requirement to take a sustainable development approach, set out in section 14 of the Act, which takes into account:

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

Public Health and Safety: Adequate treatment of sewage is essential for community well being - The Health Act 1956 places an obligation on Council to improve, promote and protect public health within the District.

Reliable provision: Human health, tourism and industry, in particular, rely on the reliable provision of this service - The Local Government Act 1974 provides the authority for the Council to own and operate the Wastewater service.

Goal for Wastewater Activity

A goal for wastewater has been previously identified[1] to guide the future development of wastewater activity. The district and the community outcomes have been developed to provide a link between community issues and the current wastewater goal.

Wastewater Activity Goal

To provide a wastewater system to Nelson City that is capable of collecting and treating wastewater in an efficient, safe and sustainable way whilst ensuring that the cultural ecological and recreational values of waterways and the marine environment are recognised and enhanced

The 1996 Draft Strategic Plan set the Council's wastewater goal and identified a prioritisation of projects for the following 20 years. Council wanted to achieve, *"A significant reduction in stormwater infiltration into the wastewater system."*

This Asset Management Plan updates the goal, reports on the issues surrounding the goal and identifies work necessary to meet the goal. The Wastewater Asset Management Plan will be reviewed in conjunction with the Stormwater Asset Management Plan (the stormwater system can have a significant impact on the wastewater system and its ability to comply with the required levels of service).

2.2 COMMUNITY OUTCOMES

Councils are required by the Local Government Act 2002 to have Community Outcomes – a statement of the measures of success that Council is working to achieve for the community. Council's community outcomes were developed in 2005 with significant input from the community. The Long Term Plan 2012-22 also included seven Council priorities to provide a specific focus within the wider outcomes Council aimed to achieve.

Levels of service within this Plan have been developed with the objective of assisting Council in achieving the following community outcomes.

Table 2.1: Link between Community Outcomes and the Wastewater Activity

High Level Goals	Outcome	How the Activity Contributes
Healthy land, sea, air and water	We protect the natural environment	Reduces the impact on the environment.
People-friendly places	We build healthy accessible and attractive places and live in a sustainable region	Reduces harmful effects on people as well as the natural and built environment.
Kind, healthy people	We are part of a welcoming, safe, inclusive and healthy community	Minimises disease and health problems.
A strong economy	We all benefit from a	Allows businesses to operate safely in

[1] Nelson City Draft Strategic Plan 1996 - 2016

	sustainable, innovative and diversified economy	Nelson and protects the tourism sector from negative impacts.

2.3 LEGISLATIVE REQUIREMENTS

The legislative requirements form the minimum level of service Council and the community are required to comply with. It does not necessarily mean that all levels of service are covered within the legislation. The wastewater activity is influenced by the following legislative requirements.

The Local Government Act 2002: defines the purpose of local authorities. This Act specifically requires Councils to continue to provide wastewater and water services where they have already been established.

The Local Government Act 1974: provides the authority for Nelson City Council to construct, operate and maintain the wastewater, water supply and stormwater systems.

The Health Act 1956: places an obligation on Council to improve, promote and protect public health within the District. The provision of wastewater helps to promote and improve public health.

The Nelson City Council Trade Waste Bylaw 2007: This Bylaw is a legislative tool for fair and effective management of trade waste entering the Council's Sewerage Systems. The Bylaw was reviewed in 2014/15.

The Resource Management Act 1991: governs all wastewater discharges. Discharges to waterways and land occur as a by-product of wastewater treatment. Council has been granted resource consent for the accidental discharge of wastewater from the network, both pump stations and reticulation. The consent is for 20 years and was granted on 1st April 2012.

Health and Safety in Employment Act 1992: Council must ensure the safety of the public and all workers (including contractors) when carrying out works.

2.4 THE ROLE OF COUNCIL

Council is responsible for the provision of reticulation, treatment and disposal along with strategic planning and management functions. Council also has a role in regulation and enforcement of the existing legislative and regulatory framework (including bylaws) to ensure members of the community act appropriately.

2.5 CUSTOMER CONSULTATION, RESEARCH AND EXPECTATIONS

2.5.1 Background

While the Long Term Plan consultation process incorporates the Levels of Service associated with the wastewater activity, the Nelson City Council has also undertaken a range of consultation processes over the past four years specifically targeted at gathering information on preferred levels of service or the extent of infrastructure that Council has/will be required to install. The extent of the historical and additional proposed consultation is detailed in Table 2-2 below.

Table 2-2: Wastewater Consultation Processes (Historical and Proposed)

Consultation Processes	Date	Reasons for Consultation	Extent of Consultation	Applicable to Which Customer Value
Historical				
2012-2022 Long Term Council Community Plan process	2012	Legislative requirement criteria of LGA 2002	Public, business and Industry submissions requested. Advertising in local papers. Submissions heard and considered	Resident satisfaction Environmental quality Capacity Reliability Customer response
Sustainability Policy	2008	Instigation of the Council's sustainability policy	Special Consultative Process.	Sustainability
Water and Sanitary Services	2005	To meet sanitary services assessment	Consultation via the Long Term Council Community Plan	Reliability

Consultation Processes	Date	Reasons for Consultation	Extent of Consultation	Applicable to Which Customer Value
Assessments		criteria of LGA 2002	for acceptance of the assessment Consultation with Medical officer of Health and local iwi	Capacity
Trade Waste Bylaw 2007	2007	Review of Bylaw	Public, business and Industry submissions requested	Sustainability
Community Survey	Three yearly basis since 1998	Rate satisfaction with services provided by Council	400 residents surveyed by telephone	N/A
Treated Wastewater discharge consent*	2004	Upgrade of waste water treatment plant and associated discharges	Working party that included representatives from industry, iwi, Environmental and Council representatives Extensive consultation with residents/property owners, local business and trade waste operators on the options for upgrading waste water treatment plant	Sustainability
Nelson 2060 Framing our Future	2013	Guidance sought from the Community	Public, business and industry submissions requested.	Sustainability
Proposed				
Wastewater Bylaw	2014	Legislative requirement criteria of LGA 2002	Public, business and industry submissions requested. Advertising in local papers. Submissions heard and considered	Sustainability Capacity
2015-2025 Long Term Plan process	2014	Legislative requirement criteria of LGA 2002	Public, business and Industry submissions requested Advertising in local papers	Environmental quality Sustainability Reliability Capacity Responsiveness

*For the waste water activity Council is required to obtain consents under the Resource Management Act for the discharge of waste water to receiving waterways. These consents set the legal minimum level of service for values such as odour, quality and volume of water discharged. Where these applications are publicly notified the opportunity is given for any person to make a submission on the proposal.

2.5.2 Water and Sanitary Services Assessments

The aim of the Water and Sanitary Services Assessments was to enable Council to gain an overview of the water and sanitary services within its district to help plan and prioritise for any improved level of service and to consider its obligations as a Unitary Authority. Council completed this assessment in 2005. No significant change to the delivery of services has occurred in the intervening period and there are no plans to review the document in the next three years.

2.5.3 Customer Satisfaction Survey

Every year since 1998, a comprehensive survey is undertaken which, among other things, helps to establish relative priorities among the significant activity areas for Council and measures the level of satisfaction with Council performance in each of these areas.

Note: The margin of error on a sample size of 400 is ±4.9% (95% confidence level).

Importance Priority

The 2008 survey rated satisfaction with Council's provision of a wastewater service as 86% satisfied or very satisfied and 6% dissatisfaction.

In 2009 the survey questions changed from a 4 choice answer (Very Satisfied, Fairly Satisfied, Not Very Satisfied, Don't know) to a 5 choice answer (Very Satisfied, Satisfied, Neither, Dissatisfied, Very Dissatisfied, Don't know), therefore the results from the 2010 residents survey are not directly comparable to the previous years.

The survey in 2011 rated sewage disposal seventh out of the 14 Council groups for "Most Important". Water supply, Transport, Environmental Management, and sewage disposal are considered relatively more important than other significant activity Areas in contributing to quality of life of Nelson residents (pattern similar to the 2004 survey).

In 2012 Wastewater ranked eighth of 15 Council activities for residents scoring 4 or 5 out of 5 for satisfaction. Wastewater was identified as one of the top 5 activities in importance for residents.

The wastewater activity was not specifically addressed in the 2013 resident's survey.

The main issue in relation to areas identified as most important priorities within the wastewater activity was odour problems from the Nelson Wastewater treatment plant.

Dissatisfied Residents

The majority comment from the 2011 survey dissatisfied group was – "Overpowering smell from open ponds". In 2014 Council de-sludged the ponds to remove material identified as the source of the odours resulting from anaerobic decomposition of organic material.

Figure 2-1: Satisfaction Survey 1998 – 2007

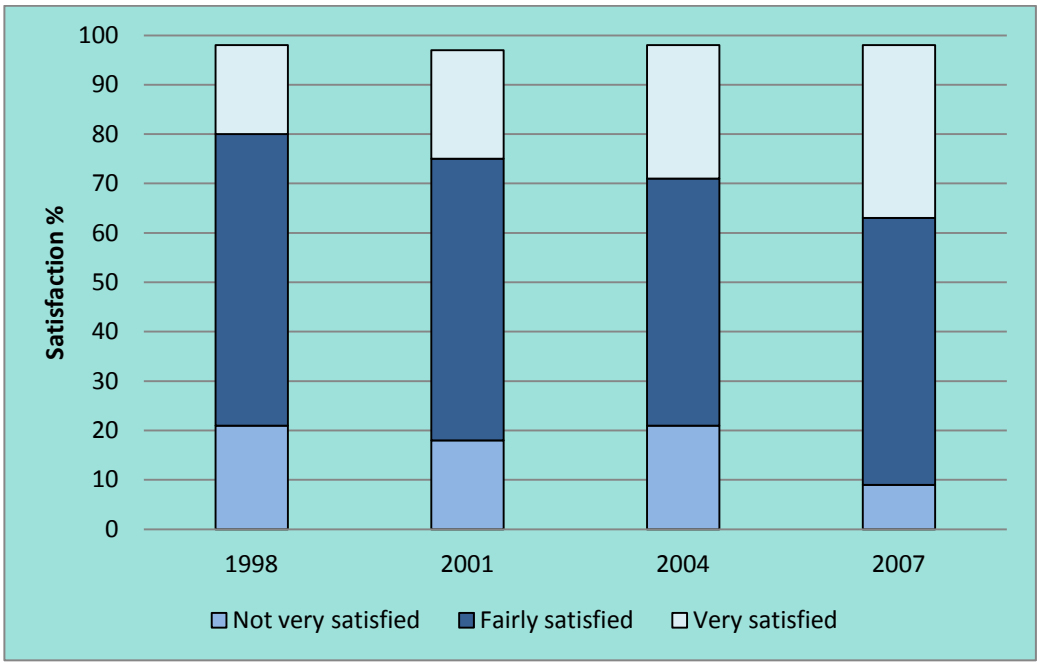
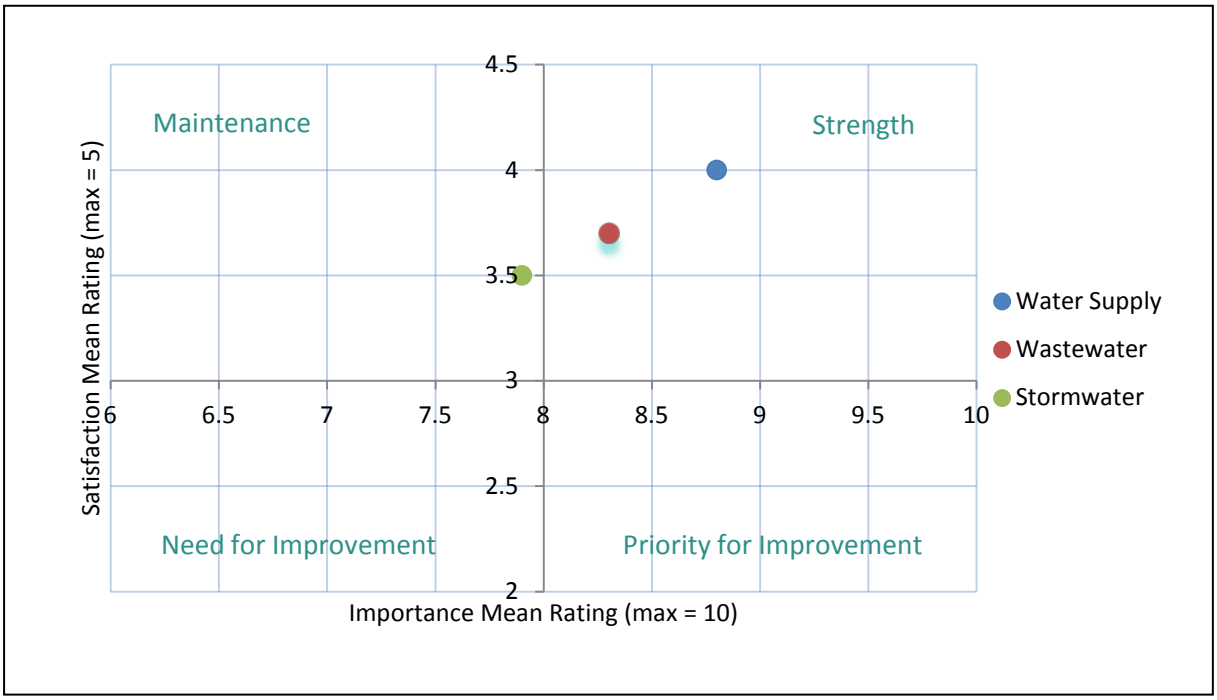


Figure 2-2: Relative Priorities in Council's Different Water Utility Areas from 2010 Residents Survey Results



2.6 LEVELS OF SERVICE

The levels of service are the reasonable quality measures of a particular service area stemming from specific customer values. When providing wastewater services to the community, Council must balance the standard of service desired with the cost of providing the service. The levels of service are designed by Council to represent the best level of service possible for a cost that the community can afford and is willing to pay.

The levels of service indicated in the 2012-2022 Long Term Plan, 2009 – 2019 Long Term Council Community Plan, 2006–2016 Long Term Council Community Plan and the 2005 Wastewater Asset Management Plan are detailed in Appendix F. Note: the 2005 Wastewater Asset Management Plan detailed 13 individual levels of service, seven of the most strategic levels of service were selected for the 2006-2016 Long Term Council Community Plan.

It should be noted that Service Levels are not intended as a formal customer contract, rather, Council's responsibility is initially to aim to achieve these levels and then to achieve them more cost effectively through a process of improvement where it can be met within current budgets.

The levels of service for Nelson City Council wastewater infrastructure are specified for the following features in the 2015-25 Long Term Plan:

- A fully operational wastewater treatment plant;
- Emergency response;
- Environmental protection.

The reasoning for the above customer values are detailed in Section 2.6.1 to Section 2.6.4.

2.6.1 Sustainability

Nelson Wastewater Treatment Plant

The waste water treatment plant was upgraded in the period 2006 to 2008 and designed to comply with the requirements of the 2004 resource consent. The design of the new plant has allowed for better management of variable inflow, loadings and volumes and allows adjustments in operation to be made to reduce the negative effects of winter conditions on the oxidation pond operation.

Construction of the wetland to assist with final polishing of the treated effluent prior to discharge was completed in 2010.

The waste water treatment plant became fully operational on the 9 March 2008 and the resource consent took effect from this date. Monitoring results to date indicate the upgraded waste water treatment plant can be expected to fully comply with all conditions relating to effluent quality. Full compliance with odour emission conditions has not been possible to date.

Performance Measure	Comply with all resource consent conditions

No Odour Events Originating from Wastewater Treatment Plant

The Nelson North Waste Water Treatment Plant has had a history of odour complaints. The majority of these complaints originated from the ponds during seasonal changes which tended to produce odours, predominantly during winter months. Prior to the waste water treatment plant upgrade, treatment relied solely on the oxidation ponds. This form of treatment uses naturally occurring bacteria to break down the products of the waste stream in an aerobic process. One of the most significant challenges with this type of operation is maintaining a balance between pond loading and available bacteria to process the waste. When the balance is not maintained, either through elevated waste loading or seasonal changes in bacteria action, the pond balance can be altered and another set of bacterial action using anaerobic processes can pre-dominate.

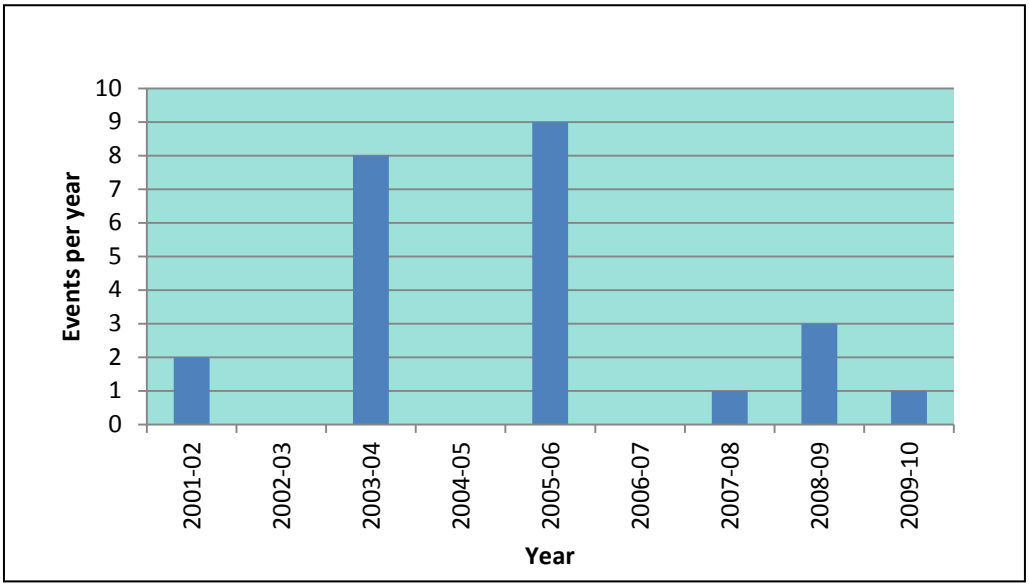
The recent upgrade to the waste water treatment plant has introduced a range of measures that better allow the pond contractor to manage the pond loading by removing solid waste as sludge before it enters the pond. As the contractor becomes familiar with the active management of the facility the odour levels are expected to meet all resource consent conditions.

The resource consent has the following condition for odours: "There shall be no discharges to air from the waste water treatment plant which are objectionable or offensive at any point on or south of SH6".

To date it has not been possible to fully comply with this condition. Detailed investigation between Council engineering consultants and the plant operator have centred on the accumulation of sludge in the oxidation pond as a likely source of odour production. In 2014 Council de-sludged the ponds to remove material identified as the source of the odours, resulting from anaerobic decomposition of organic material.

Performance Measure	No objectionable odour complaints associated with the treatment plant operation shown to occur outside the treatment plant designated area (From resource consent)

Figure 2-3: Odour Events Originating from Waste Water Treatment Plant

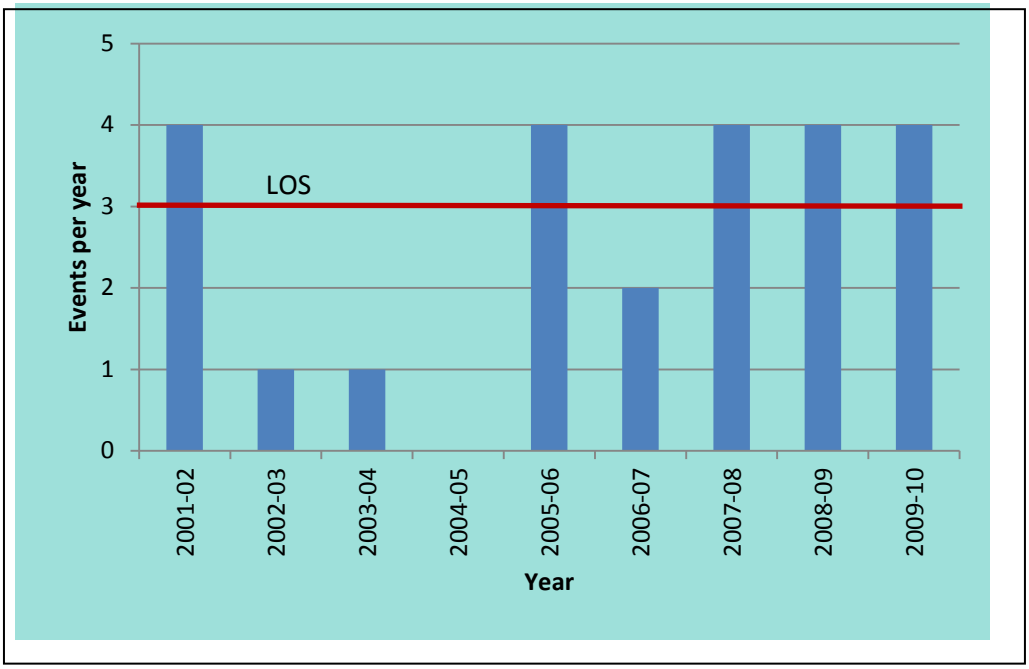


Minimise odour events associated with pump stations

Odours can originate from the wastewater reticulation network via pump stations and manholes. Historically pump stations have been the major cause of reticulation based odours. Biofilters comprising bark or activated carbon have been fitted to some pump stations to minimise odour events, and if complaints occur at the remaining individual pump stations odour measures will be programmed. The programmed upgrade of Corder Park and Neale Park Pump Stations will include review of odour event data and consider options as appropriate.

Performance Measure	No more than three confirmed odour complaints per annum associated with any individual pump station

Figure 2-4: Odour Events Originating from Pump Stations



Trade Waste Bylaw Compliance

The Trade Waste Bylaw 2007 has superseded the previous agreements that Council had with its trade waste contributors. The bylaw requires that consent be obtained before trade waste may be discharged to the sewer system. Trade Waste agreements are being entered into with all trade waste users with the larger users being considered first.

For monitoring purposes Trade Waste discharges are split into three categories:

- Category 'A' – High flow/high load discharges. All trade waste 'A' customers are monitored and are generally compliant
- Category 'B' – low flow/low load, but with potentially high risk (e.g. needs silt or oil trap, potentially hazardous waste)
- Category 'C' – low flow/low load/low risk

Currently Category 'B' and 'C' customers are not monitored. These categories are charged on the basis that the amount of wastewater discharged from the premises is assumed to be 80% of the amount of water supplied (all water supply connections are metered).

The high level risk assessment (Section 4) noted that the current trade waste bylaw prohibits certain toxic discharges to the plant and that the trade waste sampling and monitoring programme requires enhancement. Additional trade waste monitoring staff have been employed to ensure that the trade waste sampling and monitoring programme complies with the bylaw requirements.

The Trade Waste Management Plan was instigated in 2004 with a purpose of assisting with achieving the levels of service set out in the Wastewater Asset Management Plan in relation to trade waste. The Trade Waste Management Plan aims to ensure that:

- Contamination of the environment is minimised
- Assigned discharge volumes are in keeping with the capacity of the system
- Tariffs are set at equitable levels and the necessary charges levied
- Forward planning is current and realistic
- Discharges to the wastewater system are regularly monitored
- Minimise the impact of contaminants on the wastewater network

The future of the Trade Waste Management Plan requires review in 2015-18.

Minimise Overflow Events from Pump Stations

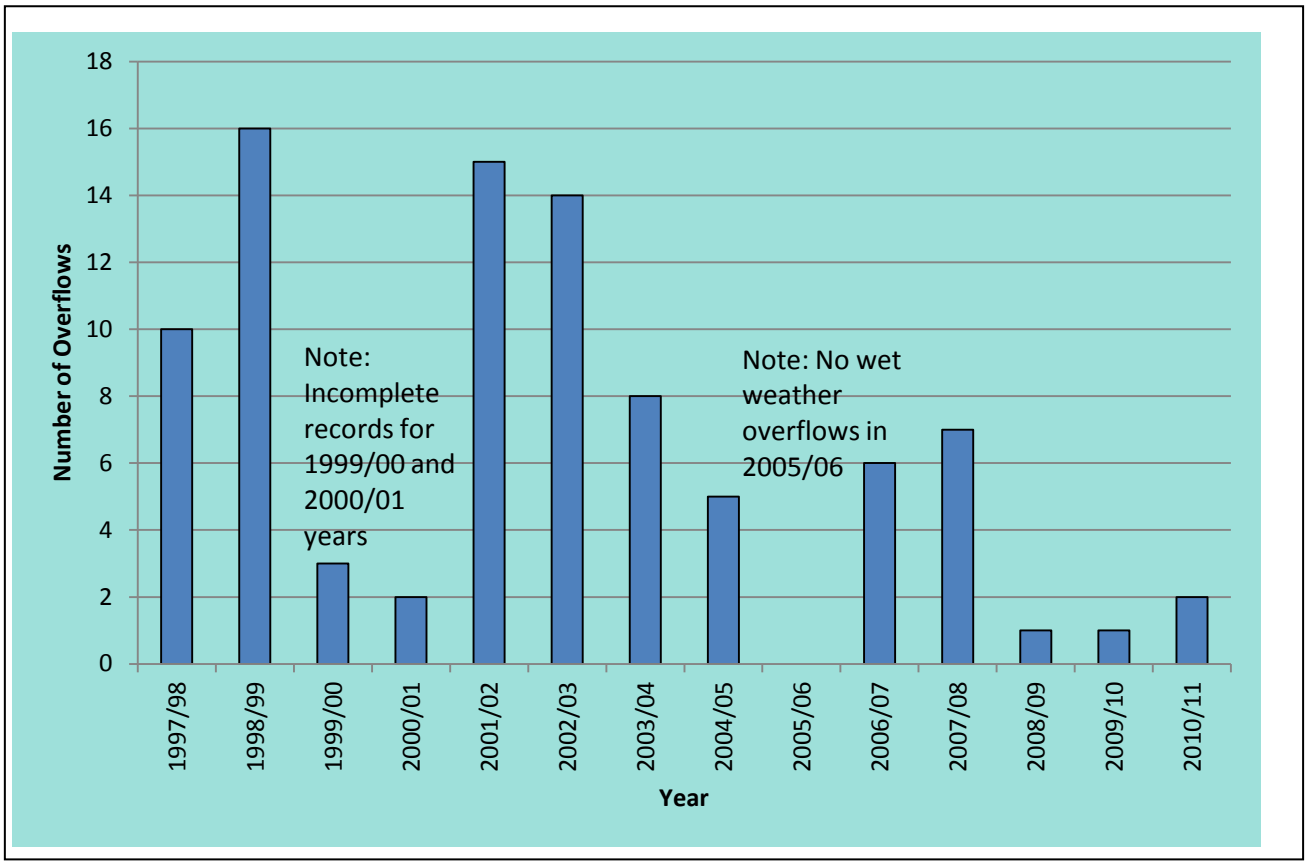
Nelson City Council is nearing the completion of a programme to upgrade the majority of Nelson City Council Pump Stations. The upgraded pumps and controls in the network are designed for PWWF plus 10% with a design life of 25-50 years depending on the pump station. The wastewater computer model is currently being developed to allow investigation of the network performance including different pumping scenarios (especially in linked pump stations) and maximum flow rates from pump stations. Nelson City Council have also completed a four year programme of installing flow meters at all pump stations.

The upgrading of the Corder Park and Neale Park Pump Stations is programmed for 2014-18. This is expected to significantly reduce overflows at the Neale Park Pump Station by lowering the pressure in the rising main between Neale Park and Corder Park, thereby allowing for the pumping of increased volumes of peak wet weather flows

Generally overflows from pump stations discharge to stormwater systems for which resource consents are required. The potential for significant overflow volumes at the Neale Park Pump Station has been recognised in the past and addressed by the installation of an underground storage tank giving 4 hours of average dry weather flow storage, which is the nationally accepted standard.

Performance Measure	Compliance with resource consent conditions

Figure 2-5: Pump Station Wet Weather Overflows



2.6.2 Reliability

Reduction in Pump Station Facility Failures that Result in Overflows

Historically approximately 15 overflow events per year occur due to pump stations inability to cope with flows (during peak wet weather periods). Comparatively, only 4 or 5 overflow events per annum can be attributed to "system failures".

All pump stations are monitored by a Supervisory control and data acquisition/telemetry system. In the event of a system or power failure the system notifies on-call operators to take the necessary action.

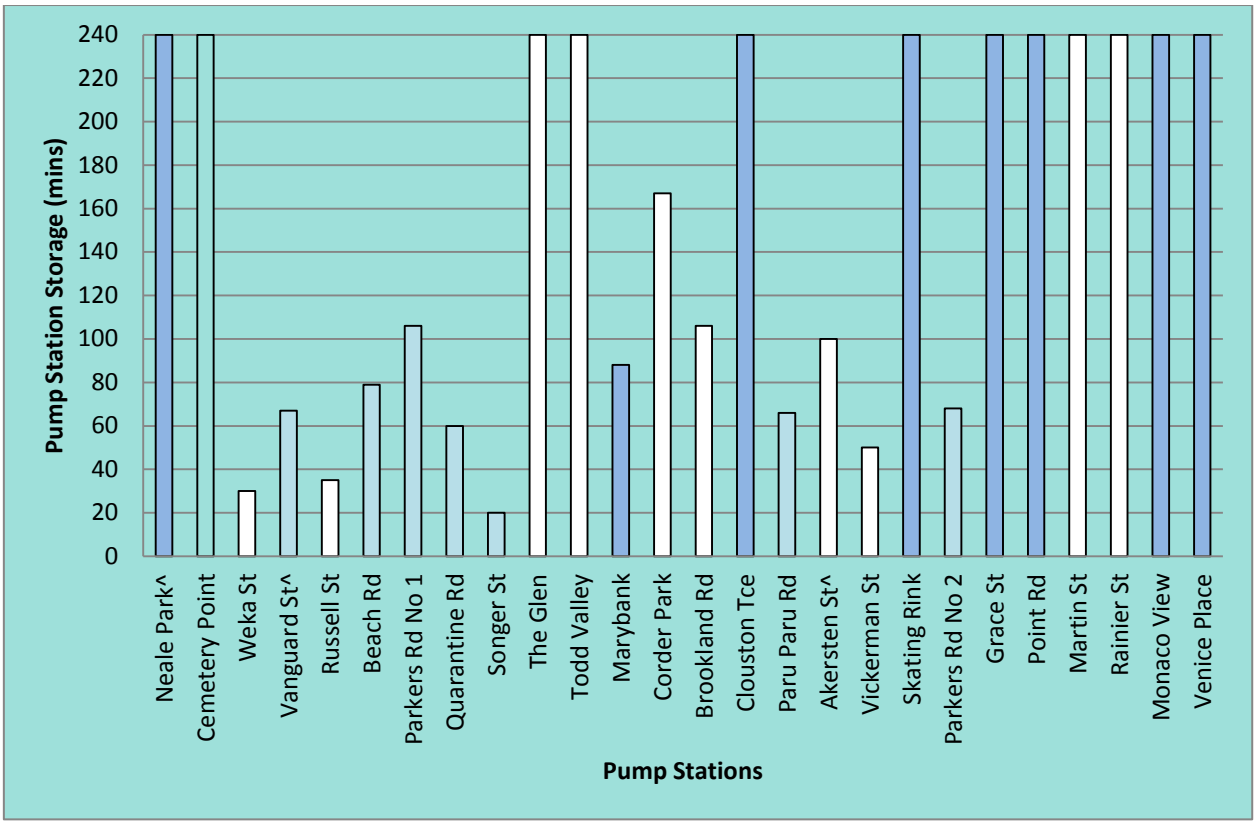
Performance Measure	Compliance with resource consent conditions

There is a need to complete an updated pump station inventory of all pump stations, so that records held internally are readily available.

A review of pump station capacity, the development of a strategy for emergency power generators and construction of network storage where practicable are proposed as a means of meeting this performance measure. Figure 2-5 below details the extent of storage capacity of the individual pump stations during dry weather flows.

As 4 hours (240mins) storage is the nationally accepted standard, Figure 2.5 is capped at that amount and some pump stations have storage that exceeds this amount – see table 5-4 for actual amounts.

Figure 2-6: Pump Station Storage Capacity



Estimated Storage Time	
	Limited desktop evaluation (excluding laterals) calculating estimated time between high level alarm to actual overflow, based on average dry weather flow
	Site measured time between high level and overflow alarms on 12th May 2011
	Value from previous Asset Management Plan
^ Indicates pump station has standby generation	

Minimise Sewer Blockages

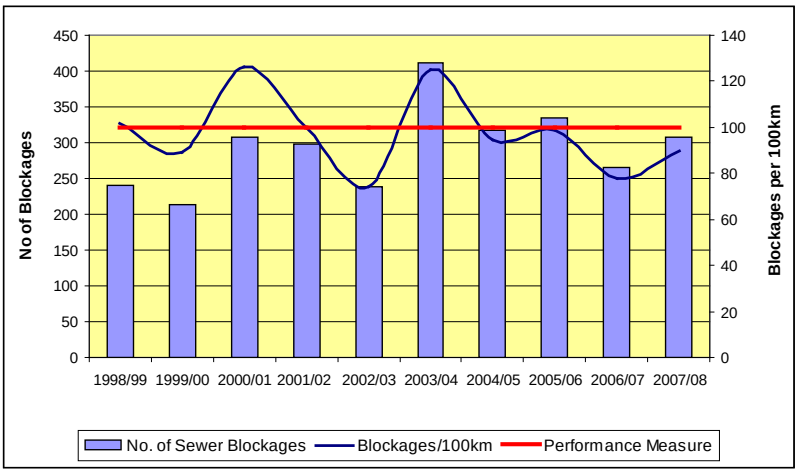
Blockages in the sewer reticulation can lead to overflows and odour complaints with associated health issues.

To address this a 24-hour callout system provides a prompt response to any sewer blockage. If the blockage is within the private section of the system and the landowner still wants the repair carried out then the Council's Maintenance Contractor will carry out the work and invoice the landowner directly.

Pipes with continual blockages are inspected via closed circuit television and either cleaned or replaced. Regular flushing occurs at 17 points around the city. Closed circuit television survey work is also carried out at regular intervals to identify areas prone to root intrusion.

Figure 2-7 indicates the historical trend of sewer blockages over a ten year period. The 10 year trend indicates that the performance measure has been achieved for the majority of time.

Figure 2-7: Sewer Blockages 1998/99 – 2007/08



needs to be updated 17mar2014

2.6.3 Inflow and Infiltration

Inflow and infiltration into piped services can originate from a variety of sources. Above ground, inflows during rain events can happen when storm water flows through manhole lids, low gully traps, emergency overflow points in pump stations, crossed connections between private stormwater pipes and sewer pipes and deliberate redirection of stormwater into sewer mains.

Below ground, infiltration occurs when ground water enters sewer pipes through cracks in the pipes, failed joints, broken pipes, poor lateral connections and a similar range of issues associated with manholes and pump stations.

High ground water levels arise from existing natural seepages, rain saturation, tidal and river effects and on site stormwater soakage. As sea levels rise and an increasing interest in low impact urban design develops it is anticipated that inflow and infiltration will need an expanded effort to minimise adverse effects arising from it. Addressing the issues of inflow and infiltration requires the efforts of both council and the community.

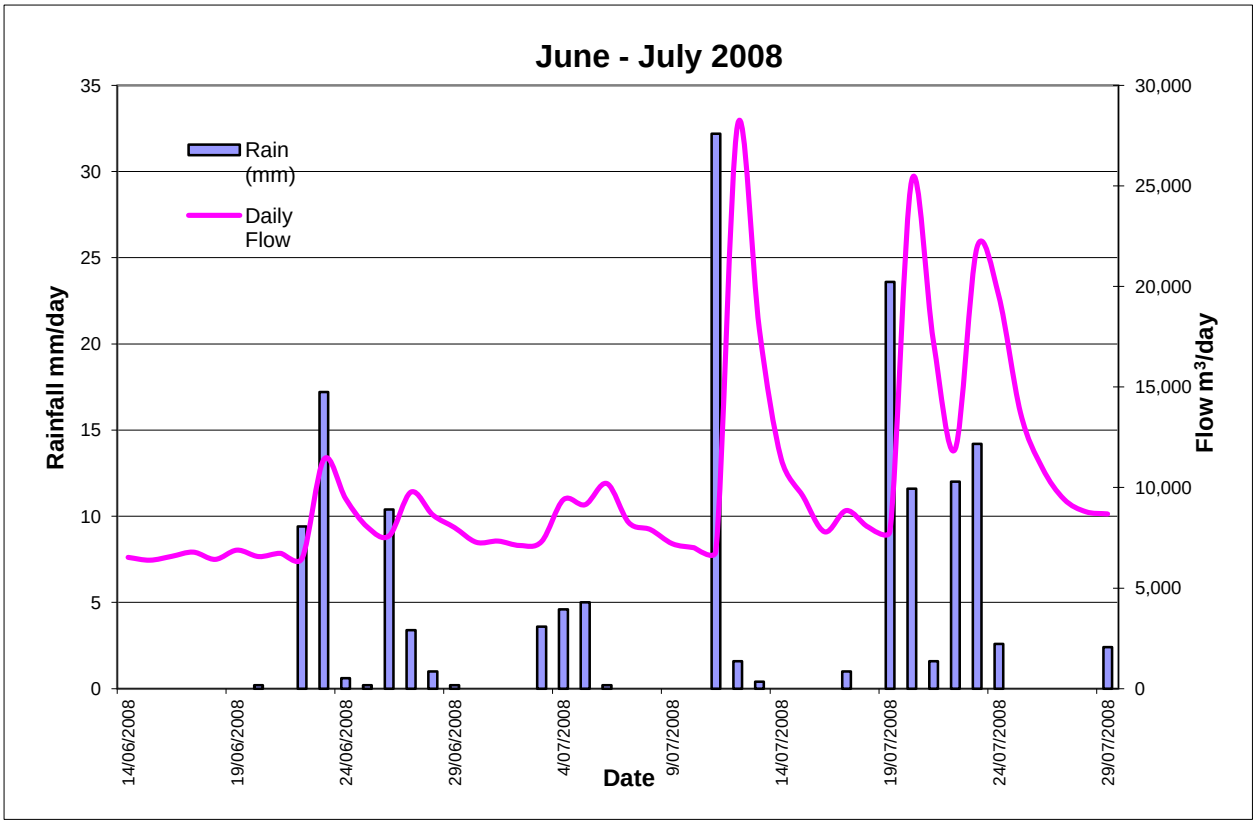
Monitoring of flows during rain events has shown that infiltration of ground water can lead to peak flows in excess of 6 times average dry weather flow. As a result overflows due to wet weather occur within the system. Also additional volumes during wet weather lead to an increase in pumping and treatment costs.

A target peaking factor of 7 times average dry weather flow has been determined for the reticulation design in Nelson south region[2] but may be decreased for future development as infiltration is further brought under control.

Figure 2-8 details the impact of rainfall on wastewater flows recorded at the waste water treatment plant during the period June/July 2008 (flows increased from 7,500m3/day to 27,000m3/day following a significant rainfall event).

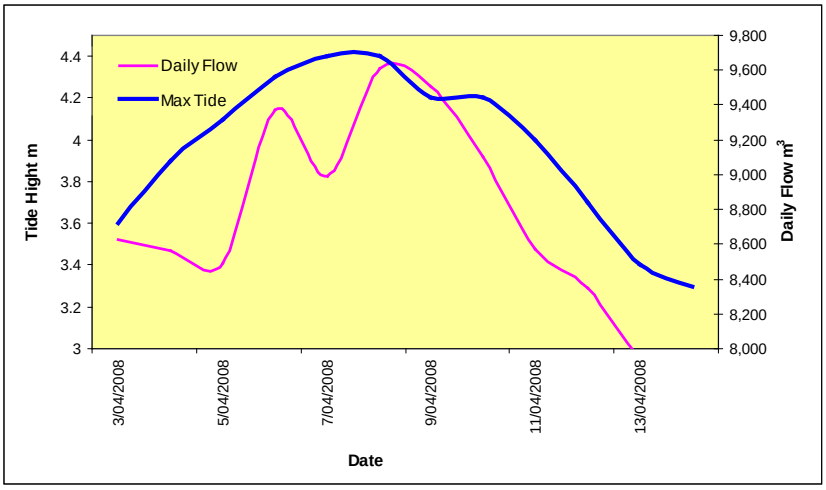
[2] Nelson Regional Sewerage Business Unit – Regional Pipeline Strategic Issues and Options Study

Figure 2-8: Rainfall Effects on Sewer Flows



Tidal influences on wastewater flows to the Nelson North Waste Water Treatment Plant have also been recorded and may account for the recorded increase in flows. Figure 2-9 below details the high tide levels and the changing flows to the treatment plant during April 2008 (the 5.8mm of rainfall that occurred on the 5 April does have an small influence on the daily flows). This indicates that the height of the tide must be influencing the ground water levels and associated infiltration. Daily flows increase by 1000m3/day from a 3.4m tide to a 4.4m tide.

Figure 2-9: Effect of High Tides on Sewer Flows



The ingress of stormwater into the sewer system through direct inflow and infiltration requires proactive intervention to control. It is a serious issue for network utility operators and it is extremely hard to control. There are significant sustainability and operational impacts, consent compliance issues and major negative effects on Nelson City Council customers.

Reducing the Amount of Inflow and Infiltration

Controlling inflow and infiltration is a long term commitment and reductions in wet weather flows are likely to be gradual. There is a need to control inflow and infiltration as ingress of stormwater can quickly exceed system capacity and the "do nothing" option is not appropriate given the resulting system overflows and costs of treating this volume of wastewater.

Inflow and infiltration reduction receives financial commitment in:

- Installation of new stormwater reticulation;
- Stormwater upgrades within existing reticulation;
- Sewer renewal programmes (dependant on age profile);
- Specific inflow and infiltration reduction programs;
- Reduction in overflow events from pump stations by renewal programme, level monitoring/alarms, additional storage capacity and emergency generators.

For its part council seeks to lessen the impact of inflow and infiltration primarily by the following:

- Upgrading the older section of the network in those areas most at risk of infiltration in particular and requiring private land owners to replace older failed laterals when council mains are replaced or testing identifies a specific problem;
- Smoke testing sections of the city sewer network in an effort to identify crossed connections and deliberate stormwater discharge into the sewer. This is an initiative that is carried out annually, targeting areas of high inflow and infiltration. Previously the full city has been smoke tested twice;
- Ensuring the sewer network is maintained.

The status of Nelson City Council inflow and infiltration strategies are as detailed in Table 2-3 below.

A developing area of stormwater control that impacts on the wastewater network is the application of low impact urban design (LIUD) techniques for stormwater disposal. Increasingly LIUD focuses on the disposal of stormwater to on-site soakage rather than by reticulated stormwater network to streams and rivers.

While disposal to soakage is not a new concept the effect of increased volumes of water to areas where the wastewater reticulation is installed can be to increase the levels of inflow and infiltration in older pipes. Additionally where soakage is poor property owners often resort to disposal of stormwater to gully traps in an attempt to reduce the effect on their property of too much water.

Requirements included in Council's Land Development Manual focus on options for low impact urban design in new subdivisions and for the control and processing of stormwater run-off from roads. A functioning reticulated stormwater network is seen as critical to ensuring inflow and infiltration is controlled on private property as well as public streets.

Table 2-3: Inflow and infiltration Reduction Strategies Status

Reduction Strategies	Strategy Status
Inflow/Infiltration Programme	Staged Investigations, implementing staged work plan with supporting budget
Inflow and infiltration Monitoring Programme	Investigations started with supporting budget
Water Reduction Programme	Domestic water metering complete leading to better leak identification

Stormwater Upgrades	Staged Investigations, implementing staged work plan with supporting budget
Management of LIUD	A focus on low impact urban design in new subdivisions and for the control and processing of stormwater run-off from roads.
Sewer Renewals (on Target)	Staged Investigations, implementing staged work plan with supporting budget

To enable improvements in the reduction of inflow and infiltration to be achieved ongoing review of the inflow and infiltration reduction strategy is necessary. It is proposed to continue the more strategic approach with a focus on identifying areas with high levels of water ingress and network overflows and establishing a future programme to address them. Ongoing education of the public to stop the discharge of stormwater to the sewer reticulation from downpipes and sumps is also required. These will be further developed over the next three years.

2.6.4 Responsiveness

Reliable and Timely Response to Service Requests and System Failures

Generally system failures within the reticulation system are reported by the public. Whatever the means of reporting, it is important that response to failures is prompt to maintain public health and to avoid potential damage to the environment. Table 2-4 sets out the response times for system failures that are detailed in the maintenance contract with Maintenance Contractor as well as the level of compliance since July 2005.

Table 2-4: System Failure Response Times

Description	Investigation & Appraisal	Complete Repair	Target Compliance	Investigation Compliance July 2012 to June 2013	Repair Compliance July2012 to June 2013
Investigations, inspections and reticulation monitoring	By arrangement	N/A			
Minor leaks from fittings and connections	2 hours	1 working day	90%	100%	99.5%
Flow meters	1 working day	5 working days			
Other non-urgent works	N/A	10 working days	90%		96.7%
Burst pipes/major leakage	30 minutes	8 hours	90%	88.9%	88.9%
Pump station failure	30 minutes	24 hours	90%	No recorded events in time period	
Major sewage overflow that could endanger life or property or have an adverse effect on the environment	30 minutes	8 hours	90%	100%	99%
Other emergency works	30 minutes	8 hours 90% of times Nil beyond 48 hours			
Gravity sewer blockage	2 hours	8 hours	90%	100%	95.1%

Performance Measure	Response and investigation to comply with the Maintenance contract requirements

Table 2-5: Levels of Service

What Council will provide	Performance Measures	Targets			Targets in Years 4 - 10
		Year 1	Year 2	Year 3	
A fully operational wastewater treatment plant	Level of compliance of treatment plant with resource consent conditions	100% compliance	Maintain 100% compliance	Maintain	Maintain
Emergency response	Time taken to respond and investigate emergencies	Respond and investigate emergency works within 30 min and resolve emergency situations within eight hours	Maintain	Maintain	Maintain
Environmental protection	Level of compliance with resource consent conditions for accidental discharges from the network	100% compliance	Maintain	Maintain	Maintain
	Number of confirmed odour complaints per annum associated with a pump station	No more than three confirmed odour complaints a year associated with any individual pump station	Maintain	Maintain	Maintain

2.7 FUTURE LEVELS OF SERVICE TARGETS

Future levels of service targets will be set to match community and regulatory requirements. Targets for the long term will be considered and consulted in conjunction with the future Long Term Plan process.

Sustainability and Climate change policies may have an impact on levels of service, particularly as they relate to reduction in greenhouse gas emissions, accidental discharges from the network and discharge of treated effluent to sea. There may be significant funding implications in the future.

3. FUTURE DEMAND

This section outlines the existing demand, demand forecasts, growth and expectations and the demand management strategies that Council utilise.

3.1 EXISTING SITUATION

3.1.1 Background

The population of Nelson City in 2006 was 44,300 and projected to increase to approximately 49,900 by 2031. The future demand drivers for the reticulated wastewater activity in Nelson City will be:

- The significant population increase projections
- Residential expansion into greenfield areas
- Reduction in house occupancy rate
- Sustainability strategies that include infiltration reduction

The effects and consequences of the above four areas are discussed in more detail in the following sections.

3.2 DEMAND FORECAST

Future Growth

Council is concentrating on providing services to areas that are currently being developed (Residential, Rural Zone High Density Small Holdings, Suburban Commercial, Industrial). Servicing of other areas covered by the Services Overlay, because one or more servicing constraints have been identified as needing to be addressed prior to the complete development of that property/area, will be considered as Council develops a policy on prioritising these areas. The specific projects to facilitate future growth identified in this Asset Management Plan therefore only consist of works required to eliminate servicing constraints on the former.

A Map of the areas zoned for growth but constrained by lack of services is attached in Appendix I. Construction of services to these areas should be carried out in line with Council's prioritisation policy. Appendix I sets out a draft "INFRASTRUCTURE PLANNING TOOL FOR GROWTH PROJECTS" that reflects infrastructure prioritisation factors. In 2014 Council is expected to consider a proposal to review the Nelson Resource Management Plan and look at wider prioritisation criteria for future development areas. Infrastructure planning will align with any new policy that is developed.

As early provision of infrastructure has a cost to the community of servicing loans for the works, it is more economical to programme works to coincide with a demand or as a means of incentivising development for strategic reasons.

3.2.1 Population Trends

Historic population figures and projections to 2045 are shown in Table 3.1 and Figure 3-1. The information is sourced from Statistics New Zealand local population trends, published in 2012.

Table 3-1: Nelson City Population Projections 2011 – 2045. From Statistics New Zealand 2012 (A1114741)

	2011	2015	2025	2045
Population	46,200	47,240	49,400	51,360
Number of households	19,300	20,020	21,640	23,380
Average number of people per household	2.4	2.4	2.3	2.2
Median age (years)	41	42	44	47
Population aged 65 and over	7,450 (16%)	8,480 (18%)	11,610 (23%)	15,130 (30%)
Working age population (aged 15-64)	30,290 (66%)	30,180 (64%)	29,360 (59%)	28,140 (55%)
Population aged under 15 years	8,460 (18%)	8,580 (18%)	8,430 (17%)	8,090 (16%)

Figure 3-1: Population Projections

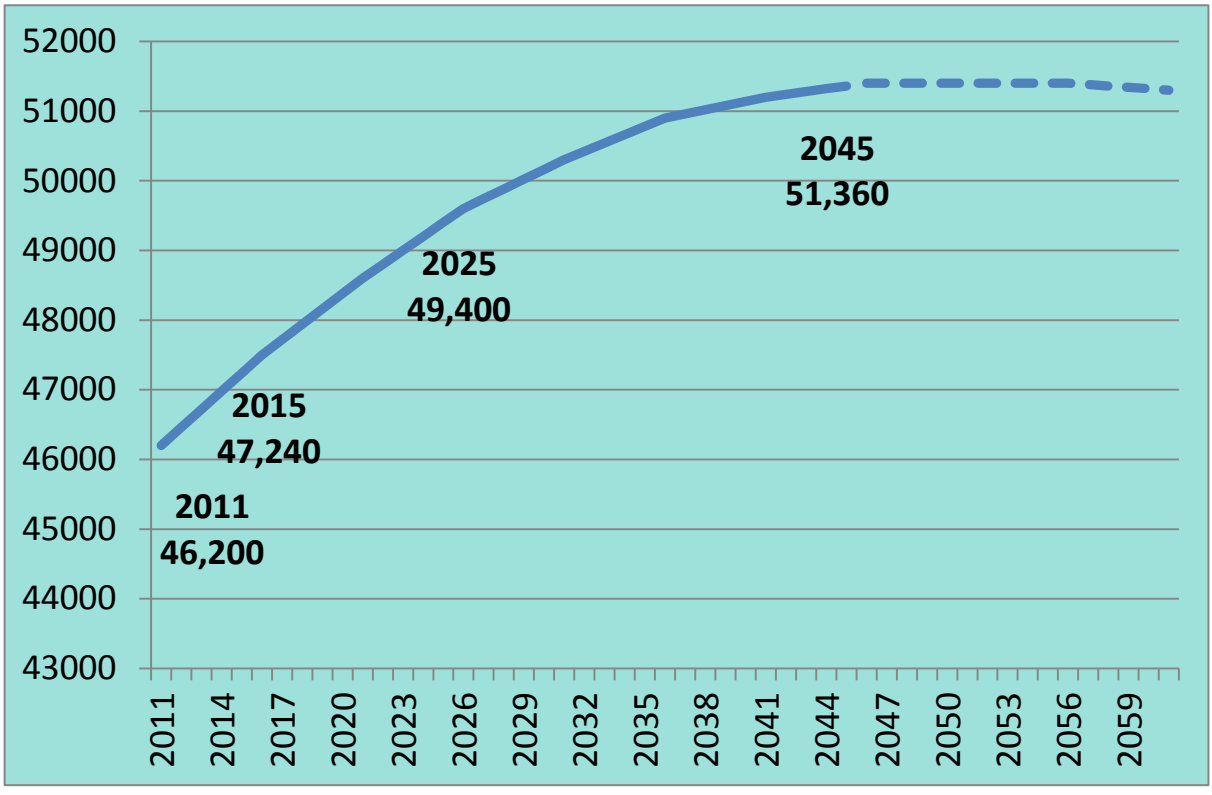


Table 3-2: Nelson City Population Projections 2011 – 2045. From Statistics New Zealand 2012 (A1114741)

Locality	Projected population by locality						
	2015	2020	2025	2030	2035	2040	2045
Stoke							
Ngawhatu	2,340	2,510	2,620	2,730	2,850	2,960	3,110
Saxton	1,960	2,060	2,100	2,110	2,090	2,060	2,030
Nayland	880	900	920	930	930	940	940
Enner Glynn	3,420	3,590	3,790	3,990	4,170	4,340	4,470
Maitlands	2,440	2,480	2,530	2,570	2,610	2,640	2,670
Isel Park	3,100	3,240	3,410	3,590	3,720	3,860	3,960
Langbein	3,310	3,310	3,330	3,340	3,340	3,330	3,330
Sub Total	17,450	18,090	19,140	19,260	19,710	20,130	20,510
Tahunanui							
Tahunanui	2,070	2,070	2,070	2,060	2,040	1,990	1,930
Tahuna Hills	2,440	2,550	2,660	2,750	2,830	2,880	2,920
Nelson Airport	910	900	890	880	870	850	830
Sub Total	5,420	5,520	5,620	5,690	5,740	5,720	5,680
Nelson Central							
Port Nelson	110	110	110	110	110	110	110
The Wood	2,810	2,780	2,730	2,680	2,630	2,560	2,500
Britannia	1,380	1,380	1,380	1,370	1,340	1,300	1,230
Washington	3,140	3,230	3,300	3,340	3,370	3,400	3,410
Trafalgar	390	370	360	350	330	310	290
Maitai	580	570	550	530	510	480	450
Kirks	840	850	840	840	820	800	780
Bronte	1,700	1,700	1,690	1,670	1,650	1,620	1,580
Atmore	1,250	1,250	1,250	1,250	1,240	1,220	1,190
Toi Toi	1,640	1,630	1,650	1,640	1,700	1,760	1,780
Broads	1,660	1,680	1,690	1,670	1,650	1,630	1,610
Grampians	2,270	2,340	2,390	2,430	2,480	2,530	2,580
The Brook	1,330	1,350	1,370	1,380	1,400	1,410	1,430
Sub Total	19,100	19,240	19,310	19,260	19,230	19,130	18,940
Nelson North							
Clifton	1,220	1,240	1,240	1,230	1,210	1,190	1,160
Atawhai	2,590	2,720	2,850	2,980	3,050	3,100	3,140
Glenduan	510	540	560	570	580	590	590
Whangamoa	1,010	1,070	1,130	1,180	1,230	1,260	1,290
Sub Total	5,330	5,570	5,780	5,960	6,070	6,140	6,180
City Total	47,300	48,420	49,850	50,170	50,750	51,120	51,310

3.3 WASTEWATER DISCHARGE TRENDS

Trending of wastewater flows for the Nelson North Waste Water Treatment Plant and the Stoke/Tahuna (Nelson Regional Sewerage Business Unit) area for the last Asset Management Plan period are detailed in Figures 3-2 and 3-3. The trend for both plants is increased flows as the general population increases. Some year to year variability is expected as industrial use fluctuates. The rate of increase in flows to either plant is also influenced by the areas that are being developed at the time.

There is a certain level of inaccuracy in the flow records prior to 2004 from the Nelson North Waste Water Treatment Plant as the ultrasonic meters were not always accurate.

Magnetic flow meters were installed as part of the plant upgrade in 2008/09 and are considered to provide more accurate information.

Figure 3-2: Nelson North Waste Water Treatment Plant Average Daily Inflows

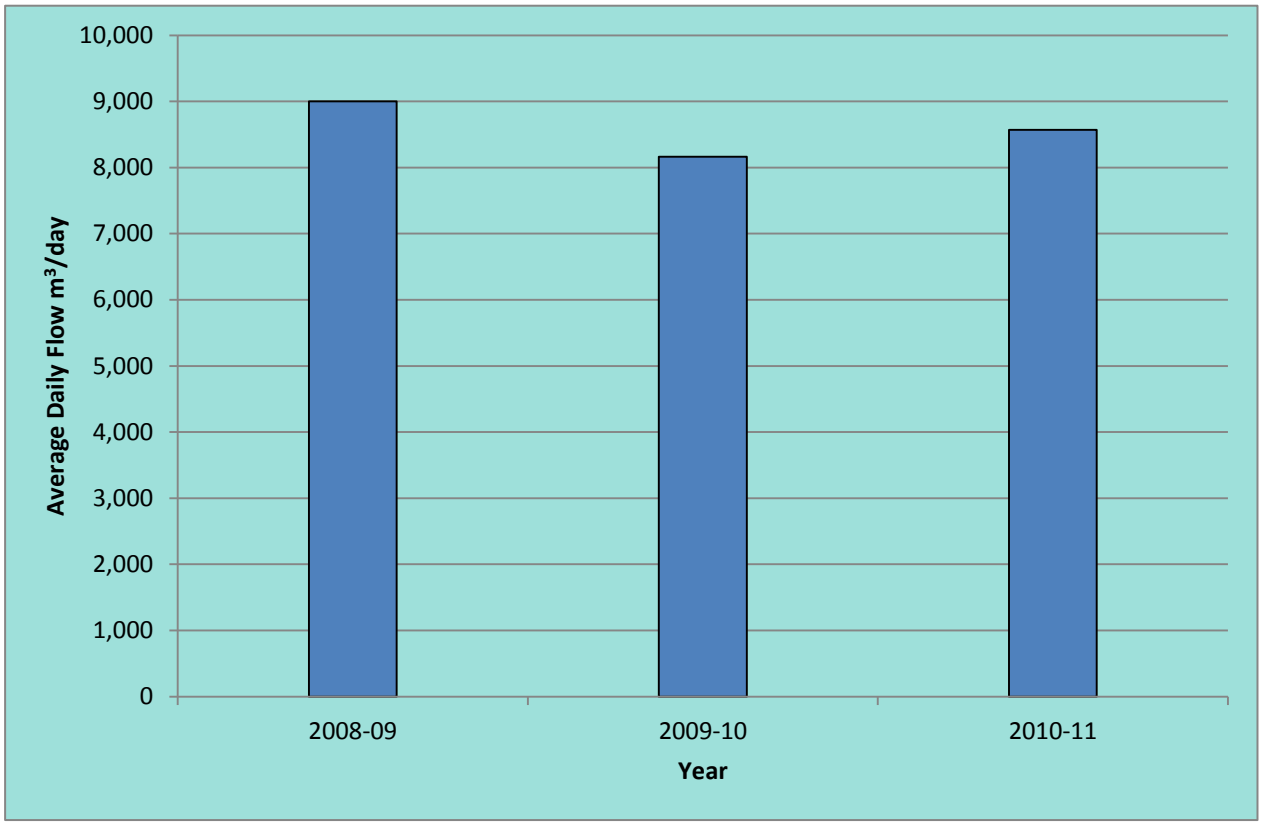
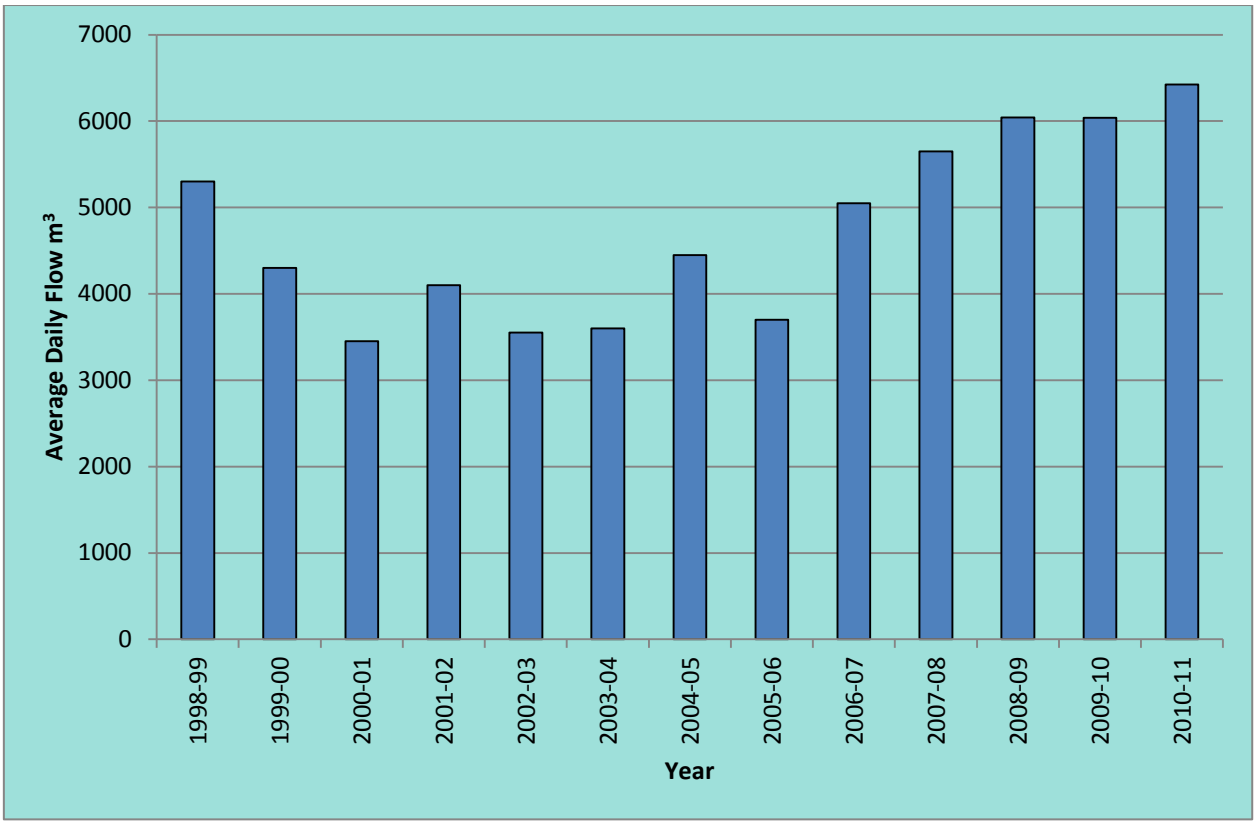


Figure 3-3: Stoke /Tahuna Average Daily Inflows



3.4 FUTURE DEMAND

3.4.1 Reticulation Capacity

Modelling of the Nelson City and Nelson South catchments has been occurring since 2004 using Info Works CS (Collection Systems) software. The programme outputs were a series of capacity and upgrade options reports from MWH Ltd for the two catchments.

Part of the system performance analysis was to investigate how the system performs with the current population, and with future population projections. Future population growth has been allowed for in greenfield development areas currently zoned for residential use both within the city area and on the periphery of the system. Some intensification within the central city and Stoke area is expected to be considered as part of the review of the Nelson Resource Management Plan.

Future development will ultimately be driven by a demand from the community or as a result of wider strategic objectives of Council and network upgrades will follow on.

Maximum flows for design are based on the current development potential of the various catchment zones in accordance with the Nelson Resource Management Plan and urban growth studies carried out on behalf of Council.

3.4.2 Pump Station and Rising Main Capacities

Nelson City Council is nearing the completion of an upgrade programme of pump stations. The upgraded pumps and controls in the network are designed for PWWF plus 10% with a design life horizon of 25 – 50 years depending on the pump station. The EPANET model is used in the majority of cases to calculate different pumping scenarios (especially in linked pump stations) and maximum flow rates from pump stations.

Future upgrades will be linked to the expected flows identified in the wastewater network model and development of areas in line with Council policy.

Nelson City Council have now completed a programme of installing flow meters at all pump stations.

3.4.3 Treatment Capacity

Nelson Waste Water Treatment Plant: The waste water treatment plant main structure was built to take into consideration future upgrades and designed to the following requirements:

- Hydraulic loadings – to year 2050
- Load (Biochemical oxygen demand, suspended solids etc) – to year 2020

The treatment loading and capacity will be closely monitored to ascertain the take up of the capacities.

Nelson Regional Sewerage Business Unit: Nelson City Council as a contributor to the Nelson Regional Sewerage Business Unit for the Nelson South area has a quota based agreement detailing Nelson City Council existing and future requirements. The following sets out the projected Nelson Regional Sewerage Business Unit expenses for Nelson City Council.

Table 3-2: Projected Nelson Regional Sewerage Business Unit Expenses for Nelson City Council

Year	Fixed ($,000s)	Operations and Maintenance ($,000s)
12/13	$2,154	$1,333
13/14	$2,118	$1,335
14/15	$2,074	$1,274
15/16	$2,276	$1,286
16/17	$2,194	$1,266
17/18	$2,155	$1,281
18/19	$2,266	$1,664
19/20	$2,218	$1,666
20/21	$2,185	$1,674
21/22	$3,169	$1,658
22/23	$3,259	$1,652
23/24	$3,191	$1,683

Note: Fixed and Operations and Maintenance costs are based on current contracted loads and Operations and Maintenance loads but are adjusted for projected capital spending (and associated Operations and Maintenance costs) by Nelson Regional Sewerage Business Unit.

All figures are in 2014 dollars.

3.5 DEMAND MANAGEMENT

Demand Management strategies are used as alternatives to the reduction in the rate of creation of new assets. They are aimed at modifying system demands to achieve:

- Environmental and legislative objectives for Nelson City Council
- The delivery of cost-effective services
- Defer the need for new assets and optimise the performance/utilisation of the existing assets
- Sustainability in the wastewater activity

Nelson City Council is working on a range of strategies to manage the demand for wastewater services and therefore the requirement for additional infrastructure. Table 3-3 below details the demand management strategies that can or have been instigated:

Table 3-3: Demand Management Strategies

Strategy	Objective/ Description
Operations	- Reduce direct stormwater entry into the wastewater reticulation system by detection and control - Ongoing property inspections programmes will continue to assist in the reduction of direct stormwater entry into the wastewater system thereby reducing overflows in peak wet weather periods and reducing the loadings (and ongoing operations costs) at the treatment plants - Installation of inspection ports at private property boundaries to identify inflow and infiltration into the sewer network. From international and national studies it is known that a large component of inflow and infiltration does occur on private property - Metering of water supplies to individual properties, implemented in 1998, and has increased the awareness about the need to conserve water with subsequent flow on effect for the wastewater activity - Investigations into the condition of lateral pipes at the time of mains replacement are to be instigated (laterals that are found to be faulty are to be replaced, with the cost of lateral replacement covered by the land owner as Nelson City Council is not responsible for the lateral) - The provision of adequate public stormwater systems will reduce the likelihood of flooding and therefore inflows of floodwaters into the sewer system through gully traps and manholes - Targeted pipe renewal programmes, based on criticality, pipe condition deterioration modelling, closed circuit television inspections and peak flow monitoring (targets the areas most affected by stormwater flooding and infiltration), to replace pipes before failure and reduce groundwater infiltration - Use of modelling to ascertain effects and constraints within the systems - Increasing storage capacity at priority pump stations
Regulation	- The use of the District Plan to control the areas in which development can occur and the associated density that is permitted
Trade Waste Bylaw	- The promotion of on-site pre-treatment for the major industrial contributors - Protection of Council's wastewater reticulation and treatment processes, the environment at the point of discharge and ensuring the system capacity is not compromised by high volume or high strength point discharges - Requirement of approved management plans for individual industrial contributors that enable Council to achieve the levels of service requirements - The provision of economic signals which will influence at what pace industrial users will modify their procedures on a cost-benefit basis to reduce or avoid charges
Education	- Continuation of the wastewater conservation programmes aimed at increasing community awareness of the benefits of reducing

Strategy	Objective/ Description
	direct stormwater disposal into the wastewater system. These programmes will include information on the effects of directing stormwater flows to the wastewater system and will be implemented through public signage in key locations and using the print media - Encourage use of low flow devices where applicable (i.e. showers, toilets, etc.) - Promotion of the Trade Waste Bylaw

4. RISK AND EMERGENCY MANAGEMENT

This section looks at the risk management processes set up by Nelson City Council for assessing and managing risk. Risk is used as a strategic decision-making tool assisting with developing and prioritising strategies and work programmes detailed in Section 6.

4.1 RISK MANAGEMENT

4.1.1 Background

Risk analysis involves consideration of the sources of risk, their consequences and the likelihood that those consequences may occur. The objective of risk analysis is to separate the low impact risks from the major risks, and to provide data to assist in the evaluation and treatment of the risks.

In the absence of component level assessments, a Risk Summary Analysis has been developed which identifies strategies to minimise risks associated with the provision of the wastewater activity. In the future the risk profile will be extended to encompass assets down to a component level for critical assets (Risk Management Plan). In the absence of component level assessments the Risk Summary Analysis will be used to provide guidance for mitigation steps.

The Wastewater Risk Management Plan will be designed to ensure that:

- All significant operational and organisational risks are understood and identified
- The highest risks that should be addressed within a 10 year planning horizon are identified
- Risk reduction treatments which best meet business needs are applied
- Responsibilities for managing risks are allocated to specific staff and reporting regimes specified

The Lifecycle Section of the Plan covers the further actions suggested for mitigation of these risks but needs to align with the Lifeline mitigation measures that are yet to be defined, with component level risk to be assessed following the completion of the criticality assessment. It is important to note that risk management is not simply about the downside of events such as financial loss or legal proceedings, it also refers to the upside and opportunities that exist for the Nelson City Council to do things more innovatively, sustainably and effectively.

4.1.2 Potential Risks

Risks can be seen to arise from many areas of the Nelson City Council, both in the physical aspect for assets and business risks. Table 4-1 identifies all risks associated with the ongoing management, funding, planning, development and operation of the Nelson City Council waste water activity and identifies all risks associated with natural causes and operational aspects of all assets owned by Nelson City Council.

The mitigation strategies are detailed and the residual risk is then ascertained. The Asset Risk Control Schedules will be updated on a regular basis, to ensure that all risks are relevant and understood. Where required, the mitigation strategies have been noted in the improvement programme.

The Christchurch Earthquakes of 2010 /2011 lead to significant damage to that city's infrastructure including pump stations, treatment plants and pipe network from direct shaking and liquefaction. Recognising this, and the results of other natural hazard investigation post the Nelson storm events of December 2011 and April 2013, Nelson City Council is reassessing the risk to the network from earthquakes (including liquefaction, tsunami and direct shaking), flooding, storms and sea level rise.

In particular a series of reports have been compiled, as part of the city's wider hazard planning, as follows:

- *TSUNAMI MODELLING AND EVACUATION ZONE MODELLING FOR TASMAN AND GOLDEN BAY- GNS FEBRUARY 2012*

- *REVIEW OF TSUNAMI HAZARD IN NEW ZEALAND (2013 UPDATE)- GNS AUGUST 2013*
- *ASSESSMENT OF THE LOCATION AND PALEOEARTHQUAKE HISTORY OF THE WAIMEA-FLAXMORE FAULT SYSTEM IN THE NELSON-RICHMOND AREA WITH RECOMMENDATIONS TO MITIGATE THE HAZARD ARISING FROM FAULT RUPTURE OF THE GROUND SURFACE- M. R. JOHNSTON A. NICOL GEOLOGICAL CONSULTANT GNS SCIENCE 395 TRAFALGAR STREET PO BOX 30368 NELSON LOWER HUTT GNS SCIENCE CONSULTANCY REPORT 2013/186 AUGUST 2013*
- *TAHUNANUI AREA LIQUEFACTION ASSESSMENT- TONKIN AND TAYLOR LTD NOVEMBER 2013*
- *MAITAI RIVER FLOOD HAZARD MAPPING MODELLING REPORT TONKIN AND TAYLOR LTD AUGUST 2013*

A further report is expected in 2015, to update the 2009 report by the National Institute of Water and Atmospheric studies (NIWA), looking at the latest state of knowledge of the impact of climate change on sea level rise.

The wastewater network activity is likely to be impacted by sea level rise more than other utilities because the reticulation is essentially gravity based, with pipes of varying depth, age and integrity. Inflow and infiltration rates would be expected to rise, with base ground water levels likely to become elevated and high tides enhancing this effect. Pump stations and treatment plants are mostly positioned on lower level ground with potential for direct tidal impact, particularly in the Port Nelson and Tahunanui areas.

Liquefaction was seen in Christchurch to be an extreme risk to the network through floating manholes and sand and silt infiltration into pipelines and manholes.

Climate change is expected to bring with it more extreme weather in the form of higher intensity and longer duration rain events (with associated flood damage and inflow and infiltration issues) and drought periods. The issue will be monitored and future asset management plans will be adjusted to address impacts as they become better understood.

4.1.3 Analysis of Risks

The risk management framework is consistent with the joint Australian New Zealand Standard AS/NZIS4360:2004 Risk Management and the associated Risk Management Guidelines (SAA/SNZ HB 436:2004), to ensure risks are managed on a consistent basis.

Table 4-1: Asset Risk Schedule

Item	Asset Group	sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk	Mitigation Strategy		Residual Risk	Action Plan	
						Risk Assessment	Description	Operational	Risk Assessment	(AP) Ref	Action Plan Description
5	Treatment		Treatment Plant	Toxic Discharge to Plant	Failure of biological process resulting in the treatment plants discharges failing to meet consent conditions.	High	Current trade waste by-laws prohibit certain toxic discharges to the plant. Trade waste sampling and monitoring programme requires enhancement.	Yes	Mod	2-5	Appoint additional Trade Waste monitoring staff
8	Treatment		Treatment Plant	Equipment/ component Failure	Failure to meet consent conditions.	High	Processes within treatment plant have contingencies for failure (duplication of pumps) and alarm systems (Supervisory control and data acquisition).	Yes	Low		
9	Treatment		Ponds	Failure to achieve consent conditions: Odour	Failure to comply with resource consents. Customer complaints.	High	Recent upgrading work has introduced pre-treatment processes to minimise loading fluctuations. Currently the pond is required to be operated and maintained in a manner that employs best practicable options that includes: - Pond loadings are adjusted for different seasons and conditions - Loading profile of the ponds are known and operated to these limits - A regular pond monitoring and sampling programme is in place -Sporadic odour problems continue feature in the operation of the Nelson North Waste Water Treatment Plant. Current investigations have centred on the build up of sludge in the pond. Budgets have been identified for further investigation	Yes	Low	2-2	Ensure clear delineation between waste water treatment plant, pump station, reticulation in systems and reports

Item	Asset Group	sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk	Mitigation Strategy		Residual Risk	Action Plan	
						Risk Assessment	Description	Operational	Risk Assessment	(AP) Ref	Action Plan Description
							and some remedial de-sludging.				
10	Treatment		Ponds	Overloading of Components Treatment Capacity	Failure to comply with resource consents. Customer complaints.	High	Currently the pond is required to be operated and maintained in a manner that employs best practicable options that includes: - Pond loadings are adjusted for different seasons and conditions - A regular pond monitoring and sampling programme is in place	Yes	Low		
2	Rising Mains	Atawhai	Rising Mains - Concrete	Deterioration and acid attack	Deterioration and failure of asset resulting in loss of service, health and safety issues and wastewater discharges to the environment having an impact on environmental and cultural issues. No waste water from Nelson City can be pumped to waste water treatment plant.	Ext	The construction of the Corder Park pump station will reduce the pressure profile in the bulk of the rising main and is expected to reduce the risk of failure. The installation of air valves at high points in the main will remove the accumulated hydrogen sulphide gas and lessen the risk of ongoing acid attack. Contingency Plan in EPM	No	Mod	5-1 & 3-2	A re-evaluation of the strategy for condition profiling (including Closed circuit television) is required Initiate investigation and regulatory processes for construction of duplicate main

Item	Asset Group	sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk	Mitigation Strategy		Residual Risk	Action Plan	
						Risk Assessment	Description	Operational	Risk Assessment	(AP) Ref	Action Plan Description
57	Rising Mains	Other	Rising Mains	Deterioration	Mains failure - discharges to the environment having an negative impact on environmental and cultural issues	High	Prevention through inspection and remedial strategy.	Yes	High	5-1	A re-evaluation of the strategy for condition profiling (including Closed circuit television) is required
50	Reticulation		Gravity - Trunk Mains	Sewerage Blockages	Overflow- discharges to the environment having an negative impact on environmental and cultural issues	Ext	Renewal of old pipelines. Clear blockage.	Yes	Mod		Ongoing renewal programme.
51	Reticulation		Gravity - Trunk Mains	Non-compliant Trade waste / Hazardous Waste discharge to network	Mains failure- discharges to the environment having an negative impact on environmental and cultural issues	High	Prevention through future enhanced monitoring.	Yes	Low	2-5	Appoint additional Trade Waste monitoring staff
49	Reticulation		Gravity - Trunk Mains	Stormwater Infiltration	Overflows - discharges to the environment having an negative impact on environmental and cultural issues	High	Renewal of old pipelines and investigation of private sewers.	Yes	Mod	5-1	A re-evaluation of the strategy for condition profiling (including Closed circuit television) is required
72	Reticulation		Sewer Mains	Discharge of deleterious substances to the sewer	Silt and gravel in the sewer system can obstruct and block sewer pipelines as well as cause excessive wear to pump stations. Fat and grease can deposit on the inside of the pipeline causing obstruction and blockages.	High	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	Low	2-5	Appoint additional Trade Waste monitoring staff

Item	Asset Group	sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk	Mitigation Strategy		Residual Risk	Action Plan	
						Risk Assessment	Description	Operational	Risk Assessment	(AP) Ref	Action Plan Description
59	Pump Stations	Neale Park	Pump Stations	Power failure/System failure	Overflows - discharges to the environment having an negative impact on environmental and cultural issues	Ext	Stand-by generators and additional storage capacity [reduces probability of failure] Redevelopment of the pump station is programmed.	Yes	Mod	5-4	Formalise strategy for failure of pump stations that include contingency planning, lifelines and emergency management
7	Pump Stations	Neale Park	Pump Stations	Equipment/component Failure	Wastewater discharges to the environment having an negative impact on environmental, cultural and health issues. Customer complaints. No wastewater from Nelson City can be pumped to waste water treatment plant.	High	Processes within pump station that has contingencies for failure (duplication of pumps) or alarm systems (Supervisory control and data acquisition) installed. Redevelopment of the pump station is programmed.	Yes	Mod	5-4	
72	Pump Stations	Neale Park	Sewer Mains	Discharge of deleterious substances to the sewer	Silt and gravel in the sewer system can obstruct and block sewer pipelines as well as cause excessive wear to pump stations. Fat and grease can deposit on the inside of the pipeline causing obstruction and blockages.	High	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	Low	2-5	Appoint additional Trade Waste monitoring staff
59	Pump Stations	Other	Pump Stations	Power failure/System failure	Overflows - discharges to the environment having an negative impact on environmental and cultural issues	Ext	Stand-by generators and additional storage capacity.	Yes	Mod	5-4	Formalise strategy for failure of pump stations that include contingency planning, lifelines and emergency management

Item	Asset Group	sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk	Mitigation Strategy		Residual Risk	Action Plan	
						Risk Assessment	Description	Operational	Risk Assessment	(AP) Ref	Action Plan Description
72	Pump Stations	Other	Sewer Mains	Discharge of deleterious substances to the sewer	Silt and gravel in the sewer system can obstruct and block sewer pipelines as well as cause excessive wear to pump stations. Fat and grease can deposit on the inside of the pipeline causing obstruction and blockages.	High	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	Low	2-5	Appoint additional Trade Waste monitoring staff

4.2 RISK SUMMARY

The extreme and high risks are associated with the following:

- Waste water treatment plant processes
- Rising mains failures (Atawhai and others)
- Overflows from trunk mains caused by infiltration and blockages
- Trunk mains failure due to influence of hazardous trade wastes
- Neale Park pump station failure due to system failures

It is considered that the Asset Risk Schedule should be further developed to a component level i.e. pumps, electrical, controls etc. This is seen as necessary as different assets lend themselves to different treatment options. These treatment options may include:

- Duplication
- Increased maintenance
- Early replacement
- High level of procedures, decision making process, contingency plans and operation and maintenance manuals
- Quicker response times and/or increased storage
- Accepting risk i.e. do nothing, monitor

These treatment options may increase operating and depreciation costs but offsets the high level of risks associated with failure of the Nelson City Council assets.

It is considered that if the improvements or actions indicated in the improvement and action plans are implemented then the level of risk is considered to be at an acceptable level for the ongoing operation of the Nelson City Council wastewater asset.

4.3 INSURANCE

4.3.1 Background

Nelson City Council has insurance cover for the wastewater, water supply & stormwater activities, staff and property as detailed in Table 4-2 below. The insurance cover is updated on a regular basis following valuations to ensure the insurance cover is appropriate for its purpose.

Table 4-2: Wastewater Insurance Provisions

Components / Items	QBE		LAPP	Vero	
	Public Liability	Professional Indemnity		Buildings & Contents	General Insurance
Reticulation			✓		
Treatment Plants and Pump Stations			✓		
- Electrical			✓		✓
- Mechanical			✓		✓
- Structural			✓		✓
- Outfall (excludes fisheries outfall)			✓		
Staff	✓	✓			
Council Vehicles					✓
Private property damage related to wastewater damage	✓				

✓ Indicates coverage by that particular insurance type

4.3.2 Local Authority Protection Programme Disaster Fund

Nelson City Council is a member of the Local Authority Protection Programme Disaster Fund established by the NZ Local Government Association Incorporated. Background and the historic details of Local Authority Protection Programme Disaster Fund are shown in Appendix E. The total replacement value[3] of wastewater assets declared for cover by the Local Authority Protection Programme Disaster Fund is $181m as detailed in Table 4-3 below.

In the event of a natural disaster, Local Authority Protection Programme Disaster Fund will generally cover 40% of the reinstatement cost of infrastructure assets that have been damaged and declared for cover by the Local Authority Protection Programme Disaster Fund.

The damage resulting from the Canterbury Earthquakes of 2010 and 2011 has severely depleted the reserves of the Local Authority Protection Programme Disaster Fund and as a consequence the fund directors have signalled the intention to increase annual levies until the fund recovers. This will increase administration costs in this activity.

Table 4-3: Infrastructure Assets Covered by Local Authority Protection Programme Disaster Fund

Asset Type	Asset Description	Estimated Replacement Cost
Main carriers – Rising mains	Brittle	$15,808,362
	Ductile	$5,188,367
Pump stations	Storage Chamber	$148,944
Reticulation Mains	Brittle	$60,113,197
	Ductile	$50,987,880
Trunk & Swallow	Brittle	$15,243,512
	Ductile	$2,454,029
Reticulation	Manholes, valves, access points	$28,087,561
Treatment plant		$15,188,967
	Outfall	$3,300,521
Neale Park Retention Tank		$578,420
Total		**$197,099,759**

4.4 EMERGENCY MANAGEMENT

4.4.1 Civil Defence and Emergency Response Plans

The following documents are available for guidance in the Civil Defence and Emergency Management:

- Civil Defence Emergency Management Plan
- Nelson City Council emergency procedures manual - exercises are carried out on a six monthly basis to ensure all engineering staff are familiar with the procedures

[3] Member Authority Risk Profile for Infrastructure Assets Covered by the Local Authority Protection Programme Disaster Fund: Risk Management Partners April 2008

4.4.2 Local CDEM Arrangements

Nelson-Tasman Civil Defence Emergency Management Group (CDEM) is a joint committee of both Nelson City Council and Tasman District Council.

The Nelson Tasman Civil Defence Emergency Management Group Plan provides for an 'all hazards' approach to emergency management planning and activity within the CDEM Group area for Nelson City and Tasman District. The CDEM Group Plan states the civil defence emergency management structure and systems necessary to manage those hazards, including the arrangements for declaring a state of emergency in the Group's area. The Group Plan is the primary instrument whereby the community identifies and assesses its hazards and risks, and decides on the acceptable level of risk to be managed and how it is to be managed.

4.4.3 Lifelines Responsibility

Sections 60 and 64 of the Civil Defence Emergency Management (CDEM) Act 2002 requires Local Authorities to:

"60 Duties of lifeline utilities

Every lifeline utility must—

(a) ensure that it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency

64 Duties of local authorities

(1) A local authority must plan and provide for civil defence emergency management within its district.

(2) A local authority must ensure that it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency"

Nelson City Council participated in the Nelson-Tasman Engineering Lifelines project in 2004 as a life line utility. The Lifelines report should now be reviewed and risk schedules updated to reflect network improvements over the past ten years.

The following indicates the status of the wastewater schemes in the areas of Risk Reduction, Readiness, Response and Recovery.

Table 4-4: Risk Reduction, Readiness, Response and Recovery Status

Activities required	Description	Wastewater Status
Risk Reduction	Identifying hazards, describing risks, and taking actions to reduce the probability or consequences of potential events	Asset Management Plan Risk Treatment Schedule and Plan
Readiness	Planning and preparation required to equip agencies and communities to respond and recover	Wastewater Mutual Aid Plan Emergency procedures manual and exercises
Response	Addressing immediate problems after an emergency	Wastewater Mutual Aid Plan
Recovery	Addressing the long-term rehabilitation of the community	Nelson-Tasman Civil Defence Emergency Management Group

4.4.4 Nelson City Council Mutual Aid Plan

The Nelson City Council is a signatory to the Wastewater Mutual Aid Plan administered by the Water Services Group of the New Zealand Water and Waste Association.

4.4.5 Electricity Supply

The electricity lines suppliers are Network Tasman Limited and Nelson Electricity Limited.

Energy supply is via contracts with Trustpower.

4.4.6 Interconnectivity Effects

Interconnectivity or interdependence between different utilities during and after a disaster is of utmost importance. In the event of failure, access is necessary to visit a site and provide power for recovery or removal of debris. To enable effective and efficient recovery of lifelines from an event which disrupts their service, dependencies on other lifelines must be understood and where necessary, mitigated against.

Table 4-5 details the interdependence[4] between Nelson City Council and other utility providers following a disaster.

Table 4-5: Interdependency – Nelson City Council and other Utility Providers following a Disaster

The degree these utilities are dependent on these → / ↓	Roading	Sea Transport	Air Transport	Water Supply	Wastewater	Stormwater	Electricity	Fuel Supply	Broadcasting	Telecommunications
Roading		1	2	2	2	3	1	3	3	3
Sea Transport	2		0	1	1	0	2	2	1	2
Air Transport	3	1		1	1	0	2	2	0	1
Water Supply	3	2	2		0	0	3	3	3	1
Wastewater	3	2	2	1		0	2	2	2	1
Stormwater	3	2	2	0	0		3	3	2	1
Electricity	3	2	2	0	1	2		3	2	3
Fuel supply										
Broadcasting	2	0	2	0	0	0	3	2		3
Telecommunications	3	1	2	0	0	0	3	3	2	
Total Dependency	**22**	**11**	**14**	**5**	**5**	**5**	**19**	**23**	**15**	**15**

3 = Essential to Operations 2 = Important to Operations
1 = Low/Minimal Reliance or Requirement 0 = No Reliance or Requirement

The above table shows a high dependence for the wastewater activity on roading, electricity and fuel supplies following a disaster. It is proposed to investigate the storage capacity of pump stations and reticulation and develop a strategy to respond to emergencies requiring back up electricity generation.

[4] Assessment of Interdependency Workshop: February 2008

4.4.7 Succession Planning

Succession planning within any business is considered necessary to reduce the risk associated with staff leaving the organisation. Succession planning allows institutional knowledge to be passed on, and assists in ensuring continuity of organisational culture.

Currently succession planning is largely by way of multiple staff members involved in administering the activity and detailing strategies for the future in asset management plans. In order to ensure greater effectiveness there is a need to improve planning and recording of strategies over the next three years.

4.4.8 Climate Change Effects

There has been considerable work undertaken at a national level on the possible effects of climate change and sea level rise. The New Zealand Government has published projections of climate change to 2080. The general trend for Nelson is of winters being wetter and the other seasons being drier. More frequent heavy rainfall events have been predicted. By the 2090s the typical temperature rise is expected to be +2 degrees Celsius and extreme rain events should increase by about 16%

The key climate influences on the wastewater activity is more intense rainfall, higher sea level and tides. More water inflow and infiltration into the wastewater system increases the risk of wet weather overflow events.

Sea Level Rise: Nelson City Council has factored predicted sea level rise into its minimum ground and floor level requirements for low lying sites in the Nelson Resource Management Plan and Engineering Standards. The predictions for sea level rise, flooding, and storm surges will be monitored on an ongoing basis to ensure that the Council's planning documents and building requirements reflect the most up to date predictions.

The High Intensity Rail Fall Analysis for Nelson Urban Area carried out by NIWA in 2008 indicated the following; *The present Nelson City design storm intensity chart is somewhat conservative: the 50 year return period totals on this chart are close to 100 year return period HIRDS estimates. However, a degree of conservatism in the estimates is probably desirable, especially since intensities increase moving to higher elevations inland from the coast*.

The Nelson City Council Land Development Manual incorporates changes noted in the NIWA report.

4.5 HEALTH AND SAFETY

Council has a Health and Safety Co-ordinator who in conjunction with the Nelson City Council Health and Safety Committee ensures the responsibilities under the Health and Safety in Employment Act 1992 are met. Regular safety training is provided to staff and induction processes have been established for contractors and consultants working on Council sites where required. Council contracts and tenders require stringent HSE compliance.

5. LIFECYCLE MANAGEMENT

This section applies the risk policies described in Section 4 to develop the broad strategies and specific work programmes required to achieve the goals and standards outlined in Sections 2 and 3. It presents the Lifecycle Management Plan for the wastewater assets.

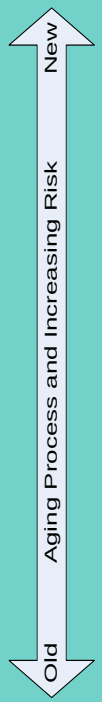
This section of the plan also provides reasons and justification for asset ownership, describes the assets, identifies critical assets and provides an overview of the asset capacity, performance, condition and sustainability commentary.

5.1 OVERVIEW

Lifecycle Management has a direct impact on the provision of the wastewater services to Nelson City. Section 2 identifies the levels of service that Nelson City Council is committed to delivering for the Nelson City Council residents and businesses. This section identifies the measures that need to be implemented to achieve these levels of service. Lifecycle Management will allow Nelson City Council to clearly identify both the short and long term requirements of the wastewater system ensuring that a cost effective service is delivered to the contributors.

5.1.1 Asset Lifecycle

Assets have a lifecycle as they move through from the initial concept to the final disposal. Depending on the type of asset, its lifecycle may vary from 10 years to over 100 years. Key stages in the asset lifecycle are:



Asset planning	When the new asset is designed - decisions made at this time influence the cost of operating the asset and the lifespan of the asset. Alternative, non-asset solutions, must also be considered
Asset creation or acquisition	When the asset is purchased - constructed or vested in the Nelson City Council. Sustainability, capital cost, design and construction standards, commissioning the asset, and guarantees by suppliers influence the cost of operating the asset and the lifespan of the asset
Asset operations and maintenance	When the asset is operated and maintained - operation relates to a number of elements including efficiency, power costs and throughput. Maintenance relates to preventative maintenance where minor work is carried out to prevent more expensive work in the future and reactive maintenance where a failure is fixed
Asset condition and performance monitoring	When the asset is examined and checked to ascertain the remaining life of the asset - what corrective action is required including maintenance, rehabilitation or renewal and within what timescale
Asset rehabilitation and renewal	When the asset is restored or replaced to ensure that the required level of service can continue to be delivered
Asset disposal and rationalisation	Where a failed or redundant asset is sold off, put to another use, or abandoned

5.2 DESCRIPTION OF WASTEWATER ACTIVITY

This section describes the assets, identifies critical assets and provides an overview of the asset capacity, performance and condition.

5.2.1 History of Nelson City Council Wastewater Systems

Nelson City Council has been responsible for wastewater disposal in the city since the first piped disposal system was put in place. The city has since expanded by the amalgamation of adjoining areas. Tahunanui Town Board joined the City in 1950, Stoke was transferred from Waimea County Council in 1958, Atawhai in 1968, Wakapuaka and Stoke rural in 1989. The following details the time line of the wastewater treatment and disposal for the Nelson north area.

- 1872 First drain (sewer and stormwater) draining into Maitai River from Rutherford, Nile, Hardy and Bridge Streets
- 1894 Stormwater and sewer separated
- 1904 Untreated effluent discharged to Boat Harbour
- 1960 Construction of pumping stations in preparation for pumping to Nelson North
- 1969 Water right secured allowing discharge to take place into Tasman Bay followed by construction of Tasman Bay outfall, work completed in 1970
- 1979 Establishment of the current 26-hectare oxidation pond at Nelson North to treat sewage discharge
- 1984 Fisheries discharge channelled through separate outfall, diverting this flow away from the oxidation ponds
- 2007 Existing treatment plant facility extensively upgraded

5.2.2 Summary of Assets

General

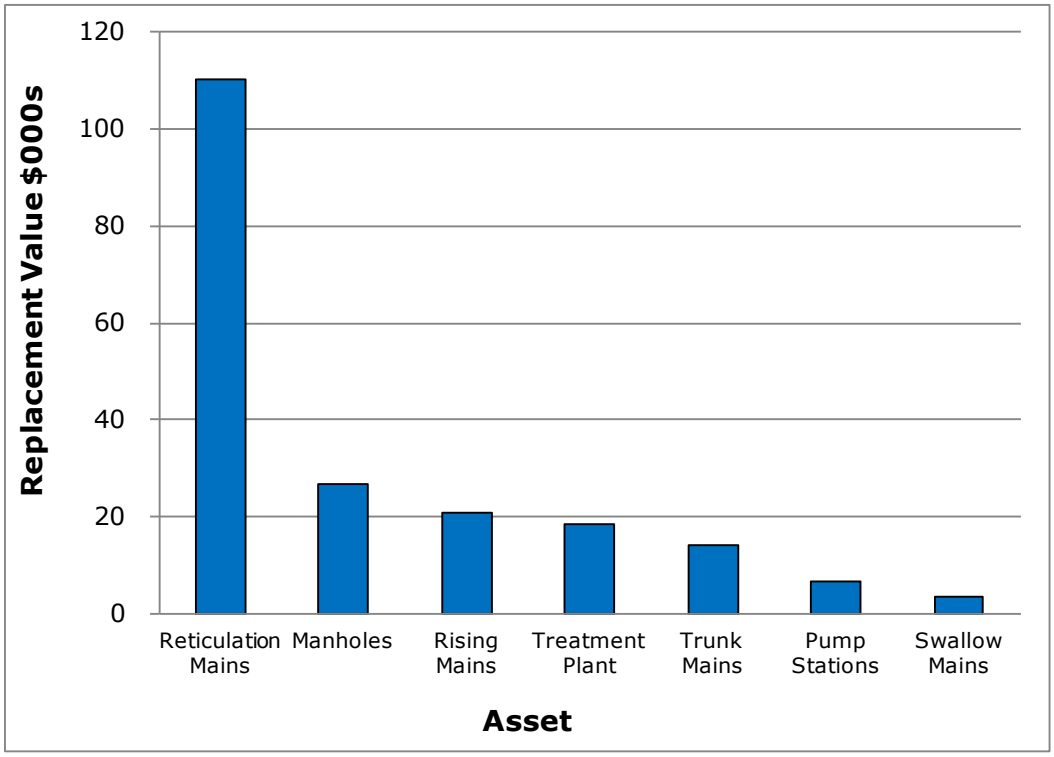
Nelson City Council is responsible for 310 km of mains, 25 reticulation Pump Stations, Wastewater Treatment Plant and one outfall. The replacement costs of the wastewater assets are $202M (as shown in the 2012 valuations) as detailed in Table 5-1 below.

Table 5-1: Summary of Wastewater Assets June 2012

Asset Category	Quantity	Unit	Replacement Value $,000s	Depreciated Replacement Value $,000s
Reticulation Mains	310	km	110,274	66,129
Trunk Mains	34	km	14,225	6,715
Swallow Mains	6	km	3,385	392
Rising Mains	28	km	20,892	9,094
Access points	870	No	781	610
Manholes	6,547	No	26,869	16,233
Tanks	11	No	86	42
Valves	139	No	183	68
Neale Park Retention Tank	1	No	576	464
Pump Stations	25	No	6,785	2,509
Nelson North Treatment Plant	1	No	18,398	14,692
Total			**202,453**	**116,949**

The majority of the replacement costs associated with the wastewater system is the reticulation mains (51%), as indicated in Figure 5-1 below (figures are rounded up).

Figure 5-1: Wastewater Asset Renewal Costs 2012



5.2.3 Wastewater Treatment and Disposal

Background

The Nelson Wastewater Treatment Plant serves the northern catchment of Nelson City, comprising mainly the city commercial area, domestic residences, and a small percentage of industrial discharges. The wastewater is collected by a reticulation system then pumped from the Neale Park Pump Station along the 9.8 kilometre, 750-900 diameter rising main (Atawhai rising main) to the waste water treatment plant at the northern end of the Nelson Haven. The Nelson Waste Water Treatment Plant currently treats approximately 9,450 m3 per day of effluent that comprises trade wastes and domestic sewage.

Wastewater Treatment History

Wastewater has been discharged from the outfall at Wakapuaka into Tasman Bay since 1970. Initially it was untreated, but in 1979 Nelson City Council constructed the present oxidation pond to treat the wastewater prior to discharge.

In 1996 the waste water treatment plant was upgraded by constructing a bund to divide the single oxidation pond into a primary facultative compartment and a secondary maturation compartment. This largely achieved the intended improvement in effluent quality, particularly in regard to faecal coliform reduction. One of the most significant challenges with this type of operation is maintaining a balance between pond loading and available bacteria to process the waste. When the balance is not maintained, either through elevated waste loading or seasonal changes in bacteria action, the pond balance can be altered and another set of bacterial action using anaerobic processes can pre-dominate.

The Nelson Waste Water Treatment Plant has had a history of odour complaints. The majority of these complaints originated from the ponds during seasonal changes which tended to produce the conditions allowing anaerobic processes to occur, particular in winter months. The ponds "crashed" for a three month period in 1999 and it was concluded that the facultative compartment was overloaded during the winter period and the dividing bund was removed in February 2000. This improved the operational capacity of the pond but returned the quality of the effluent to pre-1996 levels.

The waste water treatment plant has been monitored comprehensively since 1999, in terms of flow, load, pond algal condition, and other parameters.

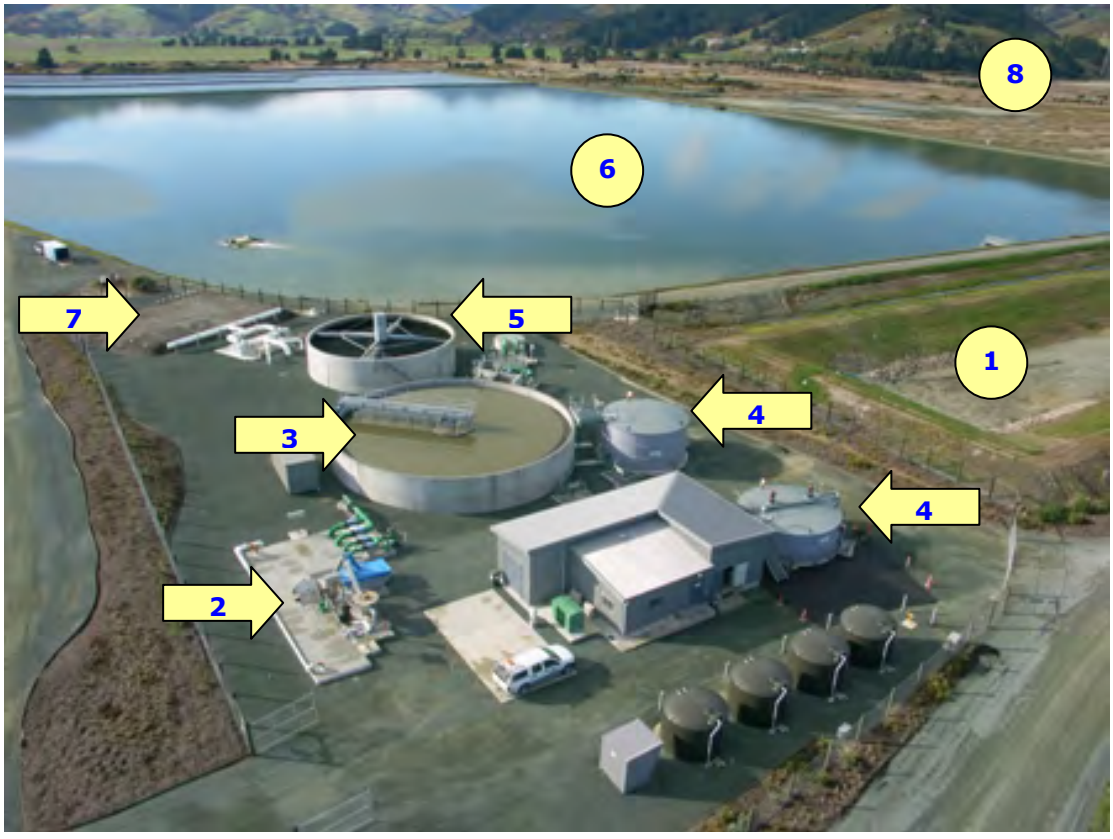
Treatment Plant

The waste water treatment plant upgrade, substantially completed in 2008, was designed to comply with the requirements of the 2004 resource consent. The design of the new plant has allowed for better management of variable inflows (Biochemical oxygen demand has been shown to vary between 1,250kg Biochemical oxygen demand/day to 2,700kg Biochemical oxygen demand/day) and allows adjustments in operation to be made to reduce the negative effects of winter conditions on the pond operation. The treatment concept for the waste water treatment plant is based on:

- Removing gross solids through the inlet works;
- Pre-treating the influent flow to remove Biochemical oxygen demand;
- Pond based treatment for the removal of Biochemical oxygen demand and total suspended solids to the consent criteria;
- Disinfection using the maturation ponds;
- Final "polishing" of effluent via passage through a constructed wetland.

While improvements in odour generation have been made there are still recurring odour issues that have to be addressed.

Detailed investigations by Councils Network Services Department, the plant operator and consultants have focussed on the levels and distribution of sludge in the oxidation pond compartments. Maintenance dredging was completed in 2014 to remove excess sludge.

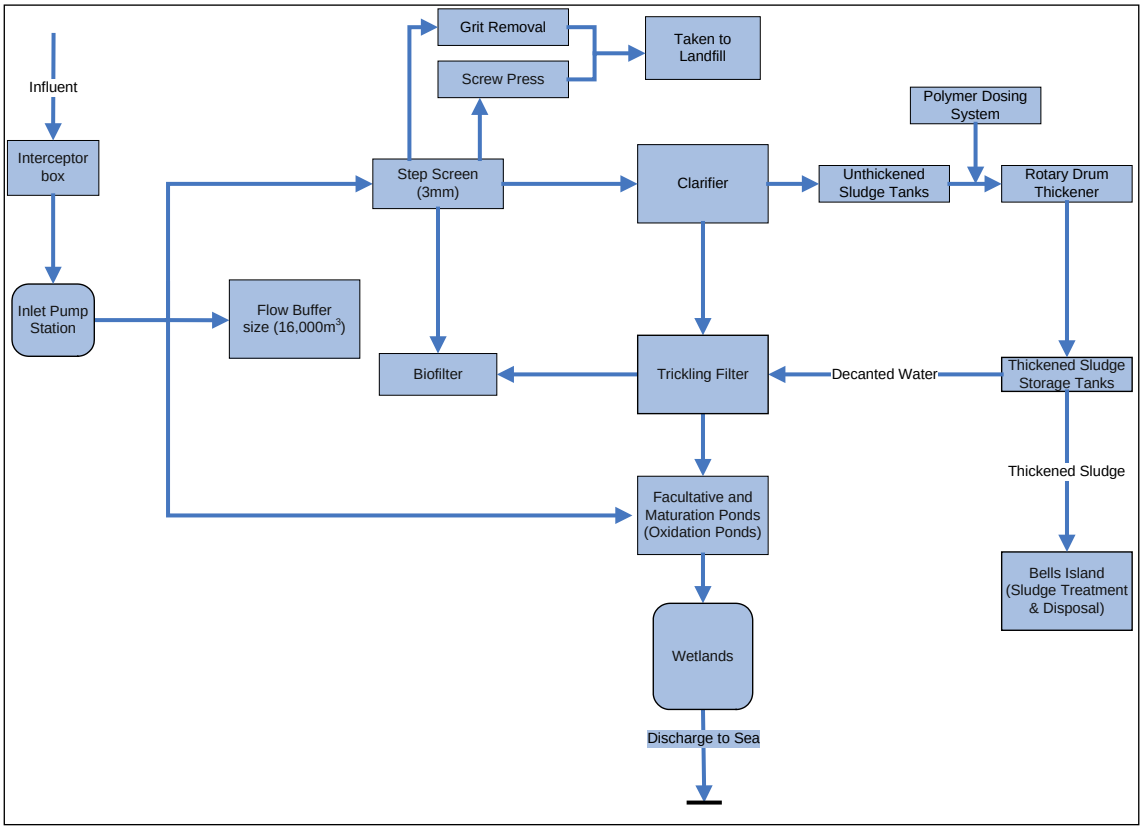


The main components of the waste water treatment plant (as detailed in photo above) are:

- Flow Buffer (1) – during periods of high rainfall, the flow buffer at the front of the treatment plant keeps the system from being overwhelmed
- Screening and Grit Removal (2) - the screening system removes non-organic material from the waste stream. This is compressed and taken to the York Landfill and buried
- Clarifier (3)- Removes readily settleable solids, the organic solids (sludge) settling out of the wastewater are forced to the centre of the tank by scrapers on a revolving mechanical arm inside the tank
- Sludge Tanks (4) - The organic sludge from the clarifier is thickened by mechanical removal of liquid wastewater and then stored for shipment to Bells Island, where it is treated and sprayed as fertiliser on Rabbit Island pine forests
- Trickling Filter (5) – A circular concrete tank which contains plastic media over which the wastewater is distributed from rotating arms. The trickling filter is a fixed growth process designed to reduce the Biochemical oxygen demand load of the wastewater
- Oxidation Pond (6) - The waste water treatment plant has two ponds, a facultative pond and a maturation pond to meet the Biochemical oxygen demand, suspended solids and faecal coliform resource consent criteria
- Bio-Filter (7) – A large 'biofilter', using air, water and bark to neutralise odours,
- Wetlands (8) - Provide a degree of further effluent treatment (or polishing) whilst meeting the cultural aspirations of local iwi (installed in 2008/09)
- Outfall – Outfall pipe that goes 350 m into Tasman Bay

The waste water treatment plant was commissioned in March 2008 with the initial operation becoming the responsibility of the United Group in March 2008. In 2012 Nelmac was contracted to operate and maintain the plant. The Schematic of the treatment process is shown in Figure 5-2.

Figure 5-2: Nelson Wastewater Treatment Plant



Treatment Plant Capacity

Estimated design flow parameters[5] for various time-related flow periods for the upgraded waste water treatment plant are set out in Table 5-2 below.

Table 5-2: Design Flow Parameters

Design Flow Parameter (2 year rainfall return period)	2003	Future 2049
Instantaneous in-flow rate (maximum)	600 (approx) l/sec	700 (approx) l/sec
Peak one-day pond inflow	38,000m³/d	38,000m³/d
Peak 5-day average pond inflow	28,000m³/d	28,000m³/d
Peak 28-day average pond inflow	18,000m³/d	21,000m³/d
Dry season 28-day average pond inflow	7-8,000m³/d	10-11,000m³/d

Assumptions made for the above design flow parameters are:

- Limited further industrial growth (500m³/day allowance)
- Wet weather and seasonal infiltration effects are likely to remain the same in terms of volume, and could even reduce through future reticulation upgrades
- A population increase from 2003 of approximately 10,000 persons (2,500m³/d allowance) to year 2049.

[5] Nelson City Council Waste Water Treatment Plant Tender Document Date November 2004

Treatment Plant Effluent Quality - Performance

The waste water treatment plant became fully operational on the 9 March 2008 and the resource consent took effect from this date. Monitoring results to date indicates the upgraded waste water treatment plant can achieve full compliance with all effluent quality conditions of the consent.

Nelson Wastewater Treatment Plant Resource Consent

The resource consent for the operation of the plant, the marine outfall and the discharge of treated effluent expires 1 December 2024. As this is a critical operating authority, renewal planning will begin in 2020/21.

5.2.4 Outfalls

Nelson has two outfall structures within its territorial boundaries - the Fisheries Outfall and the Nelson Wastewater Treatment Plant Outfall.

Nelson Wastewater Treatment Plant Outfall: Constructed in 1970 using 900mm diameter reinforced concrete pipes and a multi point diffuser.

A study by the Cawthron Institute in April 2013 concluded

"In summary the conclusion drawn as far back as the original 1998 assessment (Barter & Forrest 1998) of effects has not changed. That is: "*There was no sign of excessive sedimentation on rocky habitat in the vicinity of the diffuser, and there were no obvious patterns in the distribution of species which suggested an adverse impact from the sewage discharge*"."

Nelson City Council is responsible for the maintenance and repair of this structure.

Fisheries Outfall: The fish processing companies are responsible for the operating and maintenance costs of the Fisheries Outfall, including the pump station, and therefore it does not have any impact on Council's asset management capital expenditure.

5.2.5 Reticulation

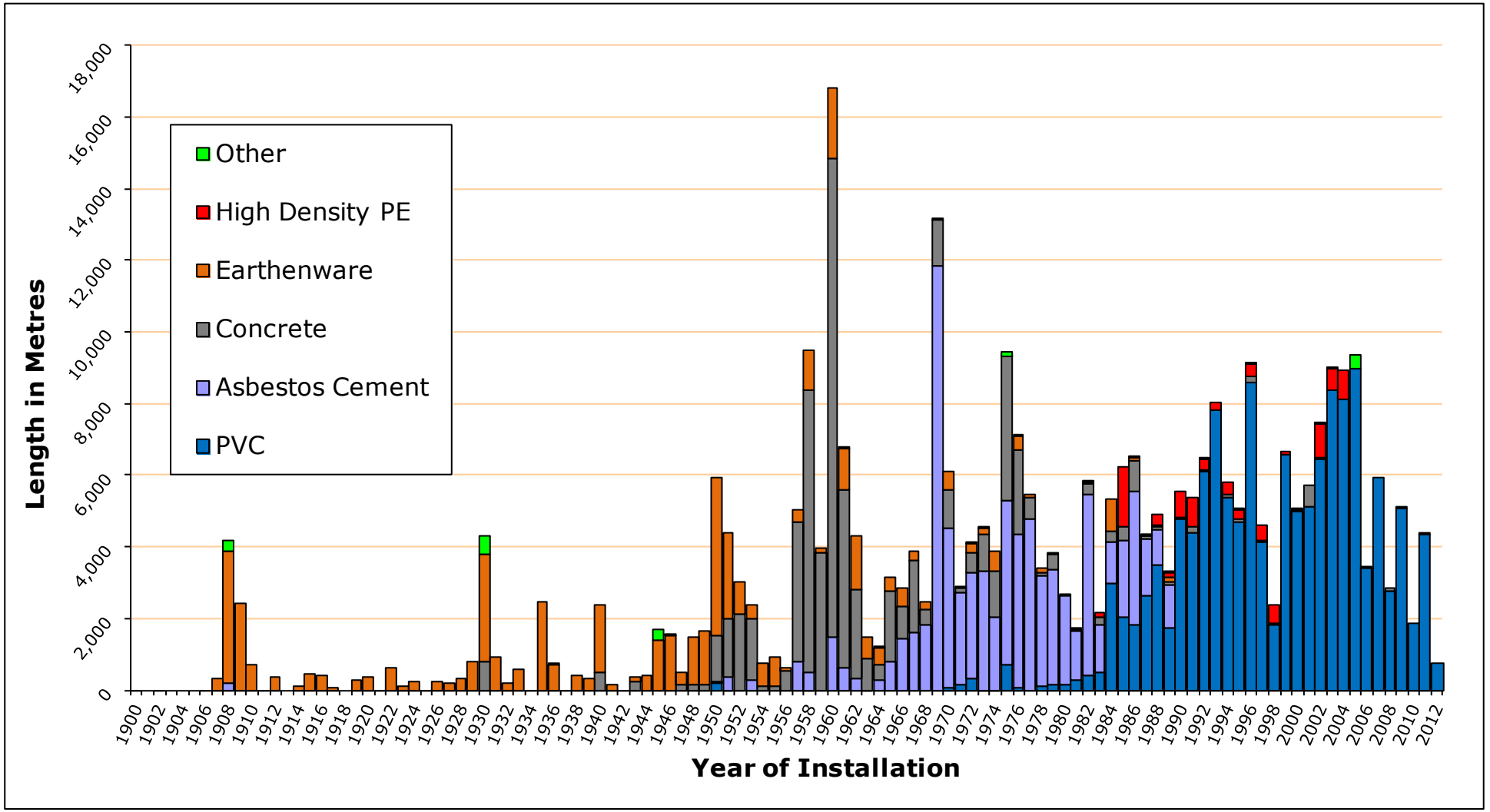
Asset Description update reqd

The main purpose of the reticulation system is to take effluent from the customer's point of discharge (Nelson City Council mains) and transport it to the treatment plant. The reticulation system consists of the following key components:

- 100mm diameter lines, typically serving 2-5 households
- 150mm diameter reticulation mains - approx 292km
- Trunk mains - approx 34km
- Manholes/LHCE - approx 7000
- Swallow mains (gravity pressure lines) – approx 6km
- Rising mains (approx 28km)

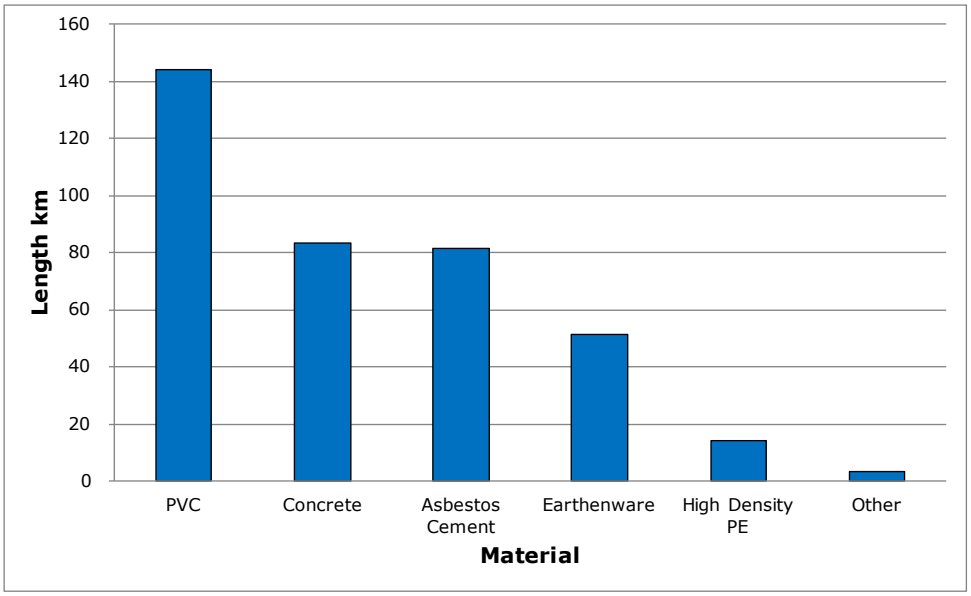
The Nelson City Council has wastewater pipe assets ranging from new to about 110 years of age. The distribution of pipe length verses age can be seen in Figure 5-3.

Figure 5-3: Pipe Length by Install Date



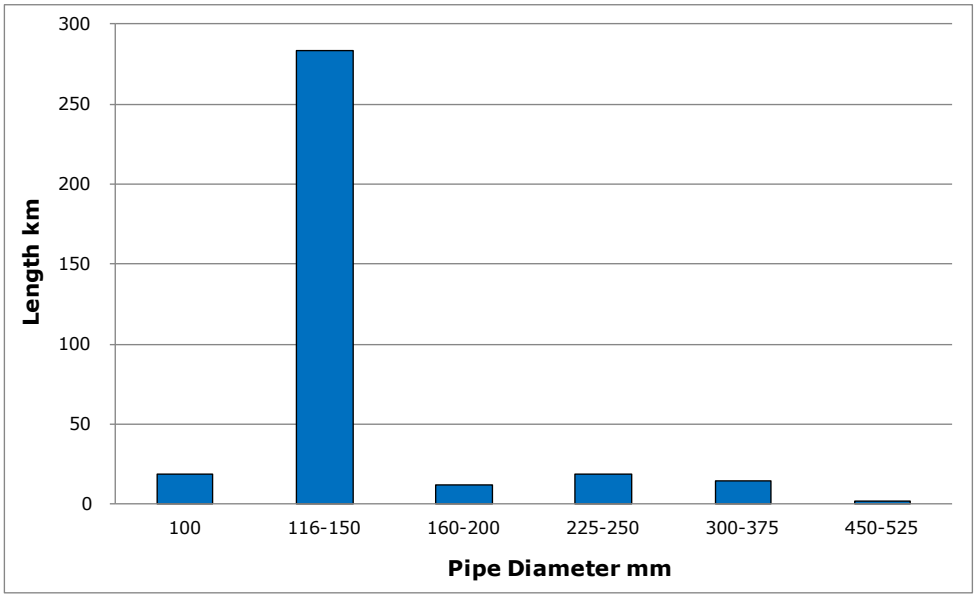
The pipe install date distribution increases at a steady rate for the pipes installed from the 1950's to the present date. This is in line with the population growth in Nelson over the last 60 years. Appendix A details the abbreviations for the pipe materials.

Figure 5-4: Summary of Pipe Materials 2012



PVC has been the predominant pipe material used and this can be seen in Figure 5-4 where it makes up 36% of the Nelson City Council reticulation. Asbestos Cement and concrete are the next most common material and were a popular choice for distribution mains and some trunk mains in the 1950's to 1980's. The percentage of pipe material that is unknown is very low (0.8%).

Figure 5-5: Gravity Mains Length versus Diameter 2012



The major proportion of pipe used within Nelson City Council is 150mm diameter (278 km) which has been the standard sewer main used in New Zealand.

Rising Mains

Rising mains are the pressurised lines that transfer wastewater from a low point (i.e. pump station) to a higher point; in the case of Neale Park, to the treatment plant. There are a total of 28.4km of rising mains.

Atawhai Rising Main

The Atawhai Rising Main was constructed in the mid 1960's from reinforced concrete pipes with approximately 50mm thick walls. Failure of this pipe in the early 1990's from sulphuric acid attack on the underside of the top of the pipes (soffit) lead to a comprehensive inspection and remediation project to extend the rising main's service life. Remediation works consisted of replacing the worst affected pipes with fibreglass pipes, relining others with acid resistant fibre reinforced resin sleeves and grouting pipe joints. The remediated pipeline was expected to have a service life out to 2046.

In 2012/13 there have been three failures in the main. Two from pipe failures in the section immediately downstream of Corder Park and one from a displaced rubber ring joint in a pipe close to Founders Park on Atawhai Drive.

To address the risk to the city of ongoing pipe failures the following broad strategy has been developed:

The renewal of the rising main is currently being looked at in five stages:

Stage 1 – construction of the new pump station and section of rising main upgrade at Corder Park, earmarked to be constructed in 2014/15 and 2015/16. This reduces the pressure in the line between Neale Park and Corder Park.

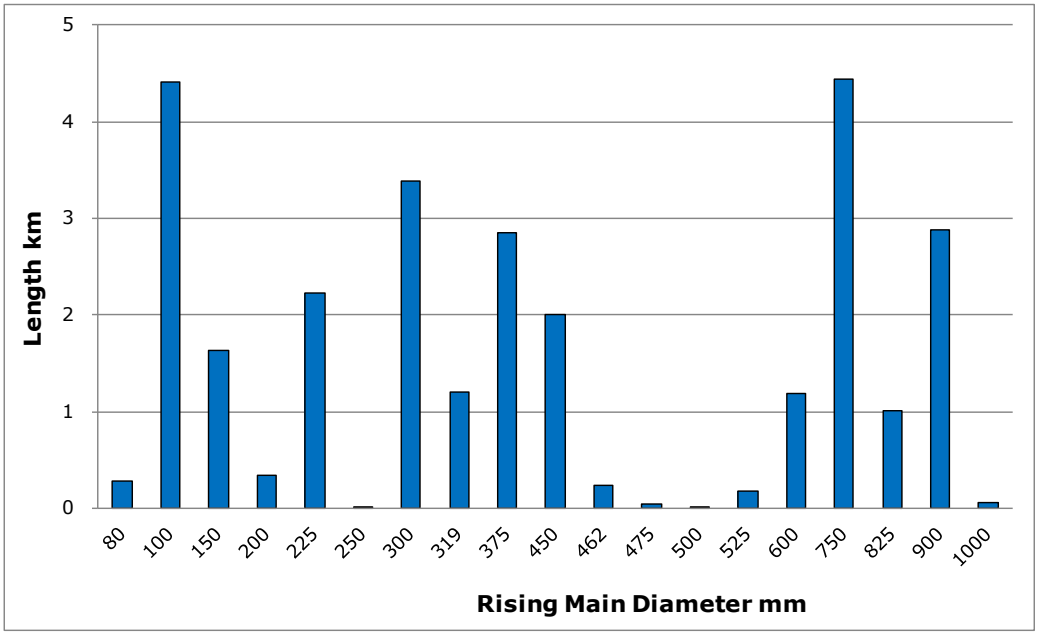
Stage 2 – construction of the new pump station at Neale Park in 2017/18 and 2018/19. This allows installation of additional pumps which will ensure a smoother pressure profile that better matches flows.

Stage 3 -duplication or re-lining of the rising main from Neale Park to Brooklands Road 2030/31 and 2031/32. This work secures the rising main either through Founders Park or relocates it around the Founders Park- Miyazu Park area.

Stage 4 -duplication or relining of the rising main from Brooklands Road to Corder Park 2032/33 and 2033/34.

Stage 5 -duplication or re-lining of the rising main from Corder Park to Boulderbank Drive 2034/35 and 2035/36.

Figure 5-6: Rising Main Length versus Diameter 2012



Swallows

To minimise pumping costs, a system of gravity pressure sewers (swallows) are used to convey effluent from the higher Central City areas, under the Maitai River to the Neale Park Pump Station. There are a total of 5.6km of these types of mains.

Rising Mains and Swallows (gravity pressure main) renewals strategy

The main feature of these pipes is that they are constantly full of wastewater under pressure. Swallows are gravity pressure mains where the pipes are generally full, but at a lower pressure. It is difficult to inspect these mains and assess the condition as they are in constant use, which makes renewal programming challenging. Historically this has meant that monitoring has not been possible on a regular basis and failures are likely to be the first indication of problems. This is common throughout New Zealand and has been demonstrated by the recent failures of the Atawhai rising main.

Some investigations of the swallows have been undertaken with closed circuit television, and a condition assessment and renewal strategy is currently being developed. The first will be the Collingwood Street swallow under the Maitai River to investigate possible links with e-coli readings in the Maitai River downstream of the Collingwood Street Bridge.

The rising mains will be more difficult to inspect and investigation for renewals will focus on pipeline materials, such as concrete, that are likely to be at greater risk of chemical attack. Each assessment will require careful planning as it is likely a section of the pipeline will have to be taken out of operation for short periods of time. This brings with it a risk of overflows that can be addressed in part with suction trucks.

Condition of Reticulation

100mm Diameter Lines

These lines are the smallest diameter sewer lines used and account for 14% of the reticulation network. They are common on hillsides where lines traverse private properties that do not have direct frontage to a sewer main in the road. Council no longer permits the installation of new 100mm public sewers, but will allow infill subdivisions to connect to existing 100mm lines provided they are proven to be in sound condition, and only if the total number of households served does not exceed 5.

The older lines are often poorly installed, without proper bedding, without sufficient access points and are typically failing at joints. This makes them prone to allowing infiltration and root ingress causing blockages and overflows.

Connections

Where a sewer pipe passes through private property and serves more than one house, Council maintains the pipe to within 15 metres of the boundary of the last property served. The landowner is responsible for maintaining the sewer lateral which is the pipe from the Council main to the dwelling.

150mm Diameter Reticulation Mains

The original network was constructed using glazed earthenware pipes in the early 1900s. These pipes are either butt or rubber ring jointed and are known to be failing at joints. They are also susceptible to cracks due to the increased loads imposed by modern vehicles.

Most pipes installed since the 1970s are of plastic (PVC or HDPE) construction. These pipes have a nominal life between 75 and 90 years.

Trunk Mains

Trunk mains are defined as all sewers greater than 150mm in diameter. They generally carry high flows and are the lines that discharge into the pump stations. There is approximately 34km of trunk mains in Nelson. The trunk mains are being assessed for capacity as part of the network model project.

Manholes/LHCE

Manholes in Nelson are typically 1050mm in diameter with 450mm lids/openings to provide access for inspection and maintenance staff. Older manholes are constructed of bricks. Most manholes installed since the 1950s are constructed of pre-cast concrete. LHCE are used where access points are required at less than usual spacing such as on hillsides and where multiple changes in direction are needed over a short distance. LHCE are typically constructed from small diameter pipes and do not allow person access to the reticulation.

Where lines are constructed on hillsides such that changes in direction/grade occur closer than usual, the use of buried bends and smaller precast plastic manholes will be encouraged to reduce costs and the risk of blockage and infiltration.

5.2.6 Performance of Reticulation

In 2004, Council formulated a long term strategy for the development of hydraulic network models for the entire Nelson wastewater network. This project is intended to establish the interaction and capacity of those systems and to allow investigation of potential changes to the network with the aim of improving efficiency of the system and to reduce the risk of overflows. The Nelson South and central city catchments have been modelled using Infoworks CS software. The remainder of the city can be added to the model in future years as development shows this to be desirable or demand for better information develops.

5.2.7 Condition of Reticulation

Historically asset monitoring to determine condition has been subjective, based on local knowledge and experience. Nelson City Council now has procedures to assess and report on asset condition via Closed circuit television and material failure analysis.

The cost of undertaking condition assessment can be relatively high and is unlikely to provide a degradation curve that can be statistically supported. The need for inspection of assets with long economic lives will in the future be based on consequence of failure (criticality), remaining life and asset performance (failure modes).

A re-evaluation of the strategy for condition profiling is required to ensure that it is conducted using a risk based methodology that is an appropriate industry standard and will comply with Audit requirements.

The majority of Nelson City Council sewer mains are between the range of 0 – 70% of their standard lives and 8% is considered to be in the intervention zone.

Table 5-3 details the experienced Nelson City Council Operations and Maintenance investigator estimate of the condition of the reticulation using staff knowledge of the network along with blockages and failure rates.

To support longer term benchmarking it would be appropriate to review asset condition against a nationally recognised grading system, such as the International Infrastructure Management Manual Grading system, utilising a 1-5 grading hierarchy.

This is proposed to be undertaken over the next three years.

Table 5-3: Condition of Mains Estimates

%	Very Good	Good	Moderate	Poor	Very Poor	Total
100mm diameter lines	10%	20%	20%	30%	20%	18.7km
Reticulation	10%	20%	20%	20%	30%	284.3km
Trunk Mains	10%	20%	20%	20%	30%	34km
Rising Mains	10%	80%	10%	0%	0%	28.4km
Swallow Mains	10%	80%	10%	0%	0%	5.3km
Manholes	15%	35%	30%	10%	10%	6441#
Condition rating as per the NZ infrastructure Asset Grading Guidelines 1999 1 = Very Good 2 = Good 3 = Moderate 4 = Poor 5 = Very Poor						

Reticulation renewal strategy

Council renews components of the wastewater network as they reach the end of their service 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 City's wastewater infrastructure is maintained.

The gravity pipe network is made up of a variety of materials with different service lives. Where pipes remain in good condition it is anticipated that lives of 80-100 years can be achieved. Current renewal strategies focus on renewing pipelines that show high infiltration rates and/or a history of multiple repairs. A constant renewal programme is undertaken to even out the rate of renewal and avoid the need for very high expenditure in the years when the pipes reach the end of their service lives.

5.2.8 Pump Stations

Background

The Nelson City Council is responsible for 25 wastewater pump stations, ranging in size from the smallest serving the Tahuna skating rink to the main pumping station for central Nelson at Neale Park. The majority of the pump stations have had upgrade works completed. Neale Park and Corder Park are the last stations to need significant works, with detailed design and construction set down in the capital expenditure table. It is proposed to construct a new pump station at Awatea Place rather than upgrade two pump stations on Parkers Road. All pump stations have telemetry and flow monitoring installed.

At present approximately five overflow events per year occur due to pump stations inability to cope with flows during peak wet weather periods. In the 2012-13 year 5 overflow events occurred, 4 of these were associated with the failure of the Atawhai rising main on the 20 June 2013.

There is a need to complete an updated pump station inventory of all 25 pump stations, to ensure the records held internally are complete and readily available. This work will then lead into the review of the storage capacity in the reticulation and pump stations to ensure the necessary capacity is available in the event of emergencies. Storage will be aided by the development of a strategy for the utilisation of emergency generators.

All pump stations have Supervisory control and data acquisition and flow monitoring installed. The general layout of the pumping system is detailed in Figure 5-7.

Figure 5-7: Schematic of Nelson City Council Wastewater System

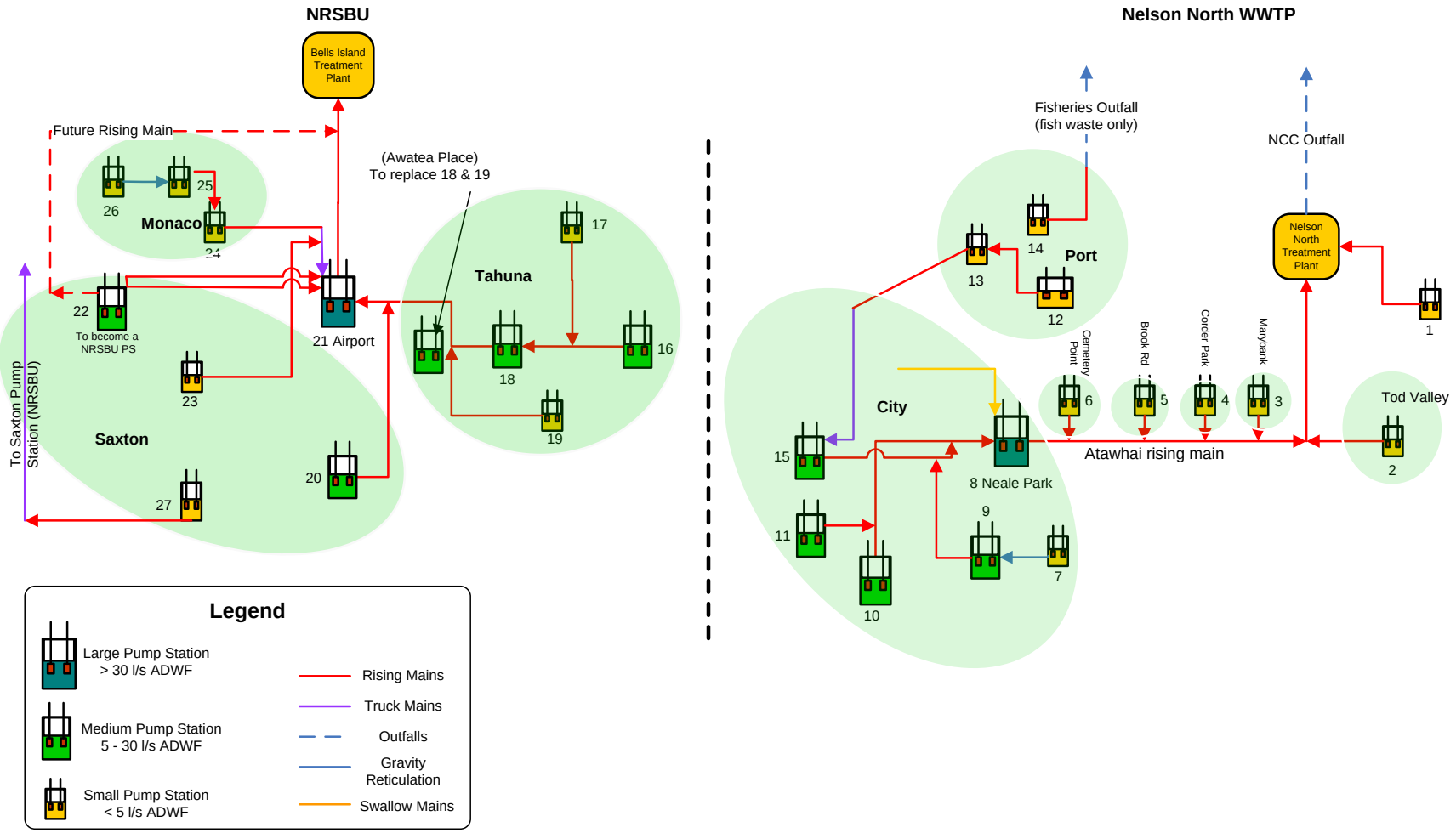


Table 5-4: Pump Station Details needs to be updated 17mar2014

	Name	Size	average dry weather flow	Pump Capacity	Number of Pumps	Estimated Storage Hrs:Min
			L/sec			
8	Neale Park^	Large	90	197-450	3	4:19
6	Cemetery Point	Medium	u/k	1-33	2	4:00
9	Weka St	Medium	23	28-81 (Future 99 – 104)	2	0:30
10	Vanguard St^	Medium	16	55-175	2	1:07
15	Russell St	Medium	10	16-131	2	0:35
16	Beach Road	Medium	9	11-64	2	1:19
18	Parkers Road No 1**	Medium	23	40-102	2	1:46
20	Quarantine Road	Medium	15	18-149	3	1:00
1	The Glen	Small	0.4	1-6	2	9:02
2	Todd Valley	Small	0.4	2-6	2	12:50
3	Marybank	Small	4.4	7-56	2	1:28
4	Corder Park	Small	3	1-50	2	2:47
5	Brookland Road	Small	2.2	1-46	2	1:46
7	Clouston Terrace	Small	0.5	1-34	2	6:41
11	Paru Paru Road	Small	5	11-79	2	1:06
12	Akersten Street	Small	u/k	u/k	2	1:40
13	Vickerman Street	Small	2	u/k	2	0:50
17	Skating Rink	Small	u/k	u/k	1	13:49
19	Parkers Road No 2**	Small	u/k	u/k	3	1:08
23	Grace Street	Small	0.15	u/k	2	15:13
24	Point Road	Small	0.3	u/k	2	9:04
25	Martin Street	Small	u/k	u/k	2	4:00
26	Rainier Street	Small	u/k	u/k	2	4:00
27	Monaco View	Small	0.4	0-20	2	95:40
31	Venice Place	Small	u/k	u/k	2	4:00

u/k = unknown *Station being taken over by Nelson Regional Sewerage Business Unit
**Station being replaced by Awatea Place

Estimated Storage Time	
	Limited desktop evaluation (excluding laterals) calculating estimated time between high level alarm to actual overflow, based on average dry weather flow
	Site measured time between high level and overflow alarms on 12th May 2011
	Value from previous Asset Management Plan

Notes:

- Desired Nelson City Council storage is 4 hours at average dry weather flow
- ^ Indicates pump station has standby generation

- Large Pump Station >30Lts/sec, Medium 5 – 30 Small < 5
- All pump stations (except Pt Road and Rainier) are fitted with variable speed drive pumps
- Songer Street is to be taken over by Nelson Regional Sewerage Business Unit. New pump station currently under construction

Pump Station Condition

The condition of the pump stations are as detailed in Table 5-5 below. The good condition of the stations is due to the extensive pump station programme that started in 2003.

Table 5-5: Pump Station Condition

	Name	Electrical		Pumping		Structural	
		Year Upgraded	Condition	Year Upgraded	Condition	Year Upgraded	Condition
1	The Glen	2004	1	2004	1	2004	1
2	Todd Valley	2003	1	2006	1	1985	2
3	Marybank	2003	1	1969	3	1969	2
4	Corder Park	2003	1	1969	3	1969	2
5	Brookland Road	2003	1	1969/2007	2/1	1969	2
6	Cemetery Point	2003	1	2006	1	1979	2
7	Clouston Terrace	2005	1	2006	1	1985	2
8	Neale Park	2001	3	1969	4	1989	2
9	Weka St	2002	1	2004	1	1984	2
10	Vanguard St	2007	1	2006	1	1986	2
11	Paru Paru Road	2004	1	2006	1	1995	2
12	Akersten St	2004	1	2006	1	1986	2
13	Vickerman St	2004	1	2006/1970	1/3	1970	2
15	Russell St	2008	1	2000	1	1980	2
16	Beach Road	2004	1	1950	3	1950	2
17	Skating Rink	2004	1	1960	3	1960	2
18	Parkers Road No 1**	2004	1	1951/2008	3/1	1951	2
19	Parkers Road No 2**	2004	1	1982	4	1982	2
20	Quarantine Road	2005	1	1981/2006	3/1	1981	2
23	Grace St	2004	1	2004	1/2	1976	2
24	Point Road	2004	1	2004	1	1976	2
25	Martin St	1976	3	1976	3	1976	2
26	Rainier St	1976	3	1976/2002	3/1	1976	2
27	Monaco View	2001	1	2001/2004	1	2001	2
31	Venice Place	2009	1	2009	1	2009	1

Condition rating as per the NZ infrastructure Asset Grading Guidelines 1999

1 = Very Good 2 = Good 3 = Moderate 4 = Poor 5 = Very Poor

- **Station being replaced by Awatea Place

Pump Station Performance

At present approximately 5 overflow events per year occur due to pump stations inability to cope with flows (during peak wet weather periods). Furthermore, only 8 overflow events have been attributed to "system failures" with none occurring over the last two years. The upgrading of the pump stations will significantly reduce the occurrence of system failure related overflows.

There is a need to review the storage capacity of all reticulation and pump stations to allow the necessary capacity in event of emergencies and the development of a strategy for the utilisation of emergency generators.

Table 5-6: Pump Station Performance

	Name	Storage (m3)	Electrical	Pumping
8	Neale Park	1399	1	4
6	Cemetery Point	10	1	1
9	Weka St	25	1	1
10	Vanguard St	29	1	1
15	Russell St	21	1	1
16	Beach Road	15	1	3
18	Parkers Road No 1**	8	1	3
20	Quarantine Road	23	1	3
1	The Glen	21	1	1
2	Todd Valley	13	1	1
3	Marybank	23	1	2
4	Corder Park	30	1	2
5	Brookland Road	30	1	2
7	Clouston Terrace	10	1	1
11	Paru Paru Road	17	1	1
12	Akersten St	13	1	1
13	Vickerman St		1	2
17	Skating Rink	14	1	3
19	Parkers Road No 2**	26	1	4
23	Grace St	8	1	1
24	Point Road	9	1	1
25	Martin St	12	1	1
26	Rainier St	12	1	1
27	Monaco View	137	1	1
31	Venice Place		1	2

Performance rating as per the NZ infrastructure Asset Grading Guidelines 1999

1 = Very Good 2 = Good 3 = Moderate 4 = Poor 5 = Very Poor

**station being replaced by Awatea Place

	Limited desktop evaluation (excluding laterals) calculating estimated time between high level alarm to actual overflow, based on average dry weather flow

Neale Park and Corder Park Pumping Station Upgrades

Wastewater from the central city is reticulated to Neale Park pump station and then pumped 8.5km to Nelson Waste Water Treatment Plant. The route of the rising main (pressurised pipe) follows Atawhai Drive and then the state highway. Along the route to the treatment plant smaller catchments connect to the rising main with injector pump stations.

Due to the distance of Neale Park Pump Station from the treatment plant the pumps pump at elevated pressures to get the flows to the treatment plant. This means that as the city grows and flows increase, the rising main will be put under greater stress from high pressure flows. In order to reduce the pressure profile of the flow in the rising main, upgrading the existing pump station at Corder Park has been identified as the most desirable option. This would mean Neale Park pump station would pump to Corder Park and then Corder Park pump station would pump to the treatment plant. Upgrading Corder Park means that while the flows in the rising main can increase, which will manage the increasing flows as the city grows, the pressure in the rising main can stay at a lower level to maximise the working life of the rising main.

Detailed design and costing for the upgrade of Corder Park pump station has been completed as a first priority. Some additional remediation of the rising main will be carried out in conjunction with the pump station construction to address areas where failures have occurred since the original remedial works were carried out in 1997. Table 6.6 outlines the Capital Expenditure for this project.

Council has undertaken a comprehensive upgrade of most of the injector pump stations in recent years, to standardize electronic controls and install variable speed drive units. These units electronically control the speed of the pumps to match the pumping rate with the flow of wastewater into the pumpstation. This extends the life of the pumps and reduces electricity costs. Additionally the majority of pump stations have had at least one of the pumps replaced with a modern unit. Some further works will be required when the Corder Park and Neale Park pump station upgrade works are completed.

As a result of damage to the pumps at Neale park during the December 2011 extreme rain event, where very high volumes of wastewater lead to one of the pumps burning out, a new large storm pump has been installed. The two pumps now at Neale Park are able to cope with current flows but lack the necessary pumping security of backup pumps. Additionally the building housing the pumps and electronic drive equipment is considered to be earthquake prone and must be strengthened or demolished at some point in the future. The importance of the pump station to the city suggests that either a new pump station is constructed or the necessary upgrading and expansion of the existing facility should happen in the next 5 plus years.

The proposed redevelopment of the Neale Park Pump Station will allow for the construction of new larger wastewater collection wells (wet wells), with some ability to pre-screen wastewater and upgrade odour control. Odours from the wet wells and open grit channels are a feature of the existing station, particularly in the summer months. In addition, the existing pump station building has been identified as an earthquake risk and must be upgraded of demolished in the medium term. Currently, seismic upgrading efforts have been directed to the drinking water assets. A review of the remaining wastewater assets will follow that work.

Awatea Place – Pumping Station, Rising Main and Trunk Main upgrades

In the Stoke/Tahuna area the twin pump stations in Parkers Road are programmed to be replaced with a single new pump station in Awatea Place. The current pump stations are close to the end of their service life and being situated very close to residential buildings have their own odour control issues. The new pump station will connect to the Nelson Regional Sewerage Business Unit pump station at Nelson Airport via a new rising main. Upgrades to the trunk mains will be required to link the existing pipework with the new pump station. Installing a single larger pump station in Awatea Place will significantly reduce operating and maintenance costs, allow for the installation of modern odour control equipment and provide a level of storage in event of emergency -

Parkers No. 1 and No. 2 pump stations will stay within the reticulation network as extra emergency storage.

Pump Station Systems and Power Failures

All pump stations are monitored by a Supervisory control and data acquisition/telemetry system. In the event of a system or power failure, the system notifies On-Call operators to take the necessary action.

The options available to cope with the consequences of a power failure event are standby power and emergency storage. Council owns four mobile generators, one with 30kVA, one with 35kVA and two with 50kVA capacity. 300kVA generators are kept at Neale Park pump station and Nelson North Wastewater Treatment Plan, and at the water treatment plant at the Tantragee Saddle.

To increase power failure back up an additional generator is to be acquired in 2012/13. A review of the strategy for the requirement for standby generators is now required to ensure levels of service requirements are achievable.

Pump Station and Network Storage

The issues of significance for pump stations is the need to provide 4 hours average dry weather flow storage where possible, under the conditions of the resource consent for accidental discharges, and to formalise the use of generators to provide coverage in an emergency situation. All new pump stations are designed with this level of storage, and additional storage will be considered for existing pump stations where this is practical. Significant storage is also available within the reticulation network as well (from pipes and manholes only flowing part full most of the time) and work is ongoing to quantify this. Main pump stations at Neale Park and Vanguard Street have an emergency generator installed onsite as part of the design. A fleet of trailer mounted emergency generators is maintained to enable other pump stations to be operated in the event of either localised or wide area power failure.

5.2.9 Supervisory control and data acquisition System

Background

Council has a "Kingfisher" Supervisory Control and Data Acquisition and "Intouch" system at the base station (rationalisation of system occurred in 2005). The system is used to monitor and control critical aspects of treatment plants & pump stations. A total of 67 utility sites are presently monitored that include:

- Wastewater Treatment Plant
- Stormwater pump stations
- Wastewater pump stations
- Water treatment plant
- Water pump stations and reservoirs

Appendix G details the over view of the Supervisory control and data acquisition system. The system is used for:

- Monitoring the operation of sites
- Data collection
- Alarm monitoring (operators are informed of alarms via text messages to mobile phones)
- Some control functions

Monitoring of water, wastewater and stormwater systems by the Council's Supervisory control and data acquisition system has grown to the point that without the current Supervisory control and data acquisition system, maintaining the existing levels of service would be difficult. Supervisory control and data acquisition has given Council the ability to ascertain faults and instigate repairs without affecting the service to the consumer and has significantly increased efficiency and reliability of the utility networks. The Supervisory control and data acquisition system is a critical feature of Council's operation and maintenance regimes.

Future Strategy for Council's Supervisory Control and Data Acquisition

There is a need to upgrade this package and at the same time consider how the technical requirements can be accommodated with the essentially "office" based computer network used by the majority of Council staff.

5.3 CRITICAL ASSETS

Critical assets are considered to be those assets for which the consequence of failure is unacceptable and would result in a major disruption to the removal of wastewater or failure in meeting levels of service.

For wastewater infrastructural assets Closed circuit television inspection and pipe sampling are the most common forms of condition assessment. The current prioritization of inspection of assets is based on criticality, expected remaining life and asset performance (faults).

Assets that are presently considered critical within the Nelson City Council wastewater system are:

- All pump stations
- All rising mains
- All trunk mains
- The waste water treatment plant

The effect of criticality on an asset is highlighted in the following areas:

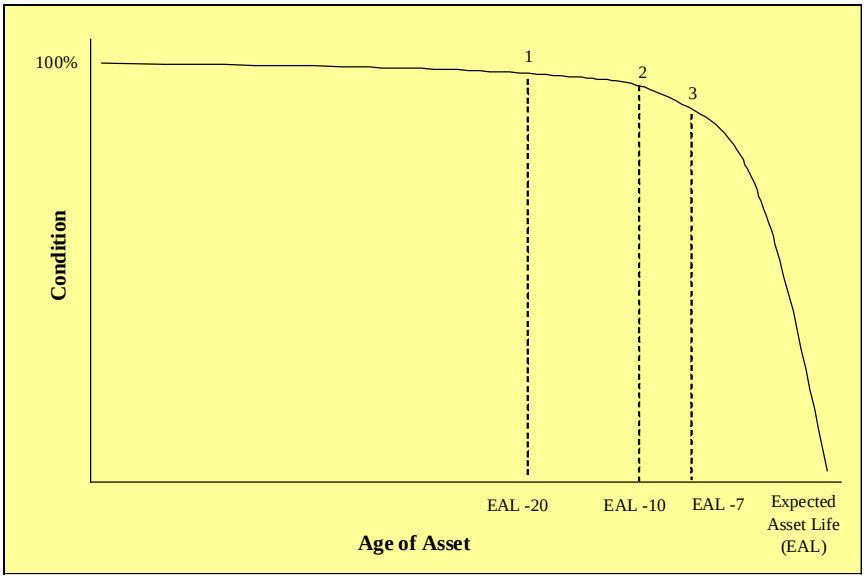
- Operation and maintenance planning
- Proactive or scheduled maintenance
- Priorities for collecting and determining the required level of reliability of data for asset management systems
- Priorities for undertaking condition assessments
- Adjusting economic lives with respect to renewal profiles
- Prioritising/Deferring renewals
- Prioritising expenditure
- Prioritising levels of service reviews

The role of critical assets in the wastewater network is such that failure is not an acceptable event given the difficulty of repair and the strategic role they play. By contrast non-critical assets are relatively quickly and easily repaired or replaced and expected service lives can be maximized.

Monitoring and intervention strategies are therefore quite different for both categories of asset. Critical assets attract a greater level of monitoring and ongoing condition assessment, with physical investigations taking place at a much earlier stage. Conversely non-critical assets can be expected to undergo a higher level of repair before complete replacement is considered.

The following shows the nature and timing of interventions for both critical and non-critical assets.

Figure 5-8: Interventions for Critical Assets



Intervention: 1 Desktop review of asset and performance supported by Closed circuit television inspection, 2 Physical inspection of asset and performance review. 3 Replacement initiated.

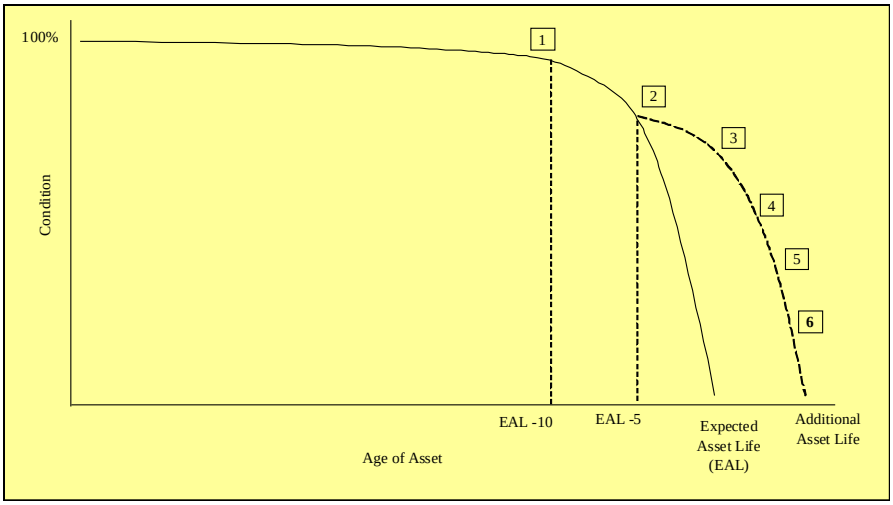


Figure 5-9: Interventions for Non-Critical Assets

Intervention: 1 Desktop review of asset and performance, 2 Physical inspection of asset with Closed circuit television review and decision made on extending expected asset life, 3 Repair, 4 Repair, 5 Repair, 6 Replace asset.

A methodology for determining asset criticality to a component level will be instigated along with options to integrate criticality into the ongoing operation, maintenance, renewals and the capital programme for the wastewater activity.

5.4 ENVIRONMENTAL EFFECTS

5.4.1 Resource Consents Held for Wastewater

The resource consents associated with the wastewater activity for Nelson City Council are detailed in Table 5-7 below.

Table 5-7: Resource Consents – Wastewater

Consent Number	Consent Type	Consent Expiry Date	Consent Allowance
RM 025169	Consent for costal permit to discharge treated wastewater to Tasman Bay	December 2024	The maximum volume shall not exceed 38,000m3/day in a 2 year rainfall return period and a peak 28 day average flow of 21,000m3 per day
	Consent to use, maintain and renew a pipeline and outfall structure, and to occupy the seabed	December 2024	
	Consent to deposit in or on the seabed substances from the outfall pipe	December 2024	
	Consent to discharge wastewater onto or into land, namely the existing oxidation pond and proposed wetlands and flow buffer storage ponds	December 2024	
	Consent to discharge contaminants, namely wastewater treatment plant gases, to air from a wastewater treatment plant	December 2024	There shall be no discharges to air from the waste water treatment plant which are objectionable or offensive at any point on or south of SH6
RM 105388 (Discharge Permit) RM 105388A (Coastal Permit)	Accidental discharges from the network. Consent being processed as at October 2011.	1st April 2032	During a wet weather event there shall be no more that 10 overflow events per 12 month period, reducing to 8 overflow events per 12 month period by 31/03/22 and 5 overflow events per 12 month period by 31/03/32. During dry weather there shall be no more than 2 overflow events per 12 month period until 31/03/23. From 01/04/23 there shall be no dry weather discharges from any pump stations.

The resource consent for the operation of the plant, the marine outfall and the discharge of treated effluent expires 1 December 2024. As this is a critical operating authority, renewal planning will begin in 2020/21.

5.5 LIFECYCLE MANAGEMENT- AN OVERVIEW

The Lifecycle Management programmes cover the four key categories of work necessary to achieve the required outcomes for the wastewater activity. These programmes are:

Management Programme:

Management functions required to support the other Programmes - Developed and Implemented by Nelson City Council

Operations and Maintenance Programme:

To ensure efficient operation and serviceability of the assets so that they achieve their service potential over their useful lives - Developed, Managed and Implemented by Nelson City Council

Renewal Programme:

To provide for the progressive replacement of individual assets that have reached the end of their useful lives - Developed, Managed and Implemented by Nelson City Council

Maintaining the service potential of the assets and ensuring that the assets achieve that potential

Development Programme:

To improve parts of the system currently performing below target service standards and to allow development to meet future demand requirements - Developed, Managed and Implemented by Nelson City Council

Closing service gaps.

Meeting future demand

The Operations & Maintenance and Renewal Programmes are focused on maintaining the current service potential of assets, and are primarily driven by the condition of assets although asset performance is often an indicator of asset condition.

The Development Programme is focused on closing service gaps by increasing the service potential of the wastewater system and is primarily driven by the performance of assets and the need to accommodate growth in the City.

5.6 MANAGEMENT STRATEGIES

Table 5-8 below sets out Nelson City Council Wastewater Management Strategy for the following categories: Strategic Planning, Data Management and Utilisation, Business Processes, Monitoring and Financial Management.

Table 5-8: Management Strategies

Strategy	Objective/ Description
Strategic Planning	
Human Resources	Develop the professional skills of the staff through adequate training and experience Personal Development Plans will be agreed with staff each year and a register maintained to record training history. Staff are encouraged to belong to appropriate professional bodies and to attend appropriate conferences, seminars and training courses
Strategic Alignment	This Asset Management Plan will support the achievement of relevant Community Outcomes for Nelson City Council Community Outcomes for Nelson City Council are set out in the Long Term Council Community Plan or Long Term Plan. The intended contribution of the Nelson City Council wastewater service to the

Strategy	Objective/ Description
	achievement of Community Outcomes is shown in this Asset Management Plan
Service Levels	A clear statement of the wastewater services provided and standards to be achieved that directly link to, and support the stated community outcomes, are shown within this Asset Management Plan Service standards are incorporated into contracts as part of an internal performance management framework for the wastewater activity and will be used for performance and monitoring purposes
Sustainable Management	Ensures all planning for the management, operation, maintenance, renewal and development of the wastewater activity is compatible with sustainable management principles Nelson City Council will pursue ways of limiting the use of natural resources including energy, valued landscapes (and other natural heritage) and adverse effects on waterways. This will involve auditing the systems and materials used, and developing ways to incorporate sustainable operation and development principles into Nelson City Council activities
Data Management and Utilisation	
Network Modelling	Complete the development of computer-based hydraulic models of the reticulation network. Computer models of the wastewater reticulation enable Nelson City Council to: - Determine accurately the existing capacity of the system - Identify inadequate sections of the system - Operate the system in the most efficient and sustainable manner - Determine the impact of further development on the system - Identify system upgrading requirements - Compare options for upgrading the wastewater network
Data Collection	Data collection programmes (condition, performance, asset registers) closely aligned with business needs are operated in accordance with documented quality processes Data collection, maintenance and analysis are expensive and it is important that programmes and techniques are cost effective and consistent with business needs. Systematic processes will be introduced for the collection and upgrading of essential data based on asset criticality including: - Asset attribute information - Asset performance data - Asset condition data
Geographical Information System Data	Geographical Information System data will be the subject of defined quality assurance processes Nelson City Council will review quality processes to ensure that all data entered to the Geographical Information System system meets defined quality standards and supports asset management through connectivity with the asset register and asset management data storage
Business Processes	
Asset Management Plan Updates	This Asset Management Plan remains a strategic 'living' document and will be updated through Annual Plans and reviewed at three yearly intervals The scope of the review will be influenced by changes in Community Outcomes for Nelson City Council, service standards, improved knowledge of assets and corporate strategy/ policy and process

Strategy	Objective/ Description
Risk Management	Risk Management is an essential part of Asset Management. Wastewater activity risks will be managed by implementing a Risk Management Plan for the wastewater activity and the implementation of risk mitigation measures to maintain risk exposure at agreed levels Risk mitigation measures will include maintaining appropriate insurance cover, emergency response planning, condition monitoring of critical assets, preventative maintenance, use of Supervisory control and data acquisition, and operations manuals, review of standards and physical works programmes
Infrastructure Asset Valuation	Perform valuations in a manner that is consistent with national guidelines and Nelson City Council corporate policy for valuation cycles which currently are 3 yearly aligned with Long Term Council Community Plan/Long Term Plan requirements Asset valuations are the basis for several key asset management processes including asset renewal modelling and financial risk assessments. Valuations of the wastewater system will be carried out based on data from the Asset Management System system to ensure audit compliance and alignment with other processes
Monitoring	
Level of Service Standards	Continue with the monitoring procedures to ensure wastewater activity is contributing to the community outcomes as stated and that internal controls are also monitored and managed
Asset Performance	The performance of the wastewater assets is monitored as an input to asset renewal and asset development programmes. The Monitoring includes: Customer service requests Asset failure records Asset Maintenance records Compliance with Resource Consents Wastewater Treatment Plant effluent quality Critical asset audits Supervisory control and data acquisition Legislative compliance
Financial Management	
Budgeting	Expenditure programmes for the wastewater activity indicates required Council funding and prepares budgets based on a 12 year projection Use the asset management plans to provide sufficient detail to demonstrate the decision-making process for those projections (3 year detail and the following 9 years as a guide)
Financial Management	Manage the wastewater activity budget in accordance with statutes and corporate policy. This involves: Economic appraisal of all capital expenditure Annual review of Asset Management Plan financial programmes Recording of significant deferred maintenance and asset renewals Continuous monitoring of expenditure against budget
Sustainable Funding	Ensure the wastewater activity is managed in a financially sustainable manner over the long term The financial requirements for the provision of the wastewater activity, sustainable and to acceptable standards over the long term will be identified and provided for in the budgets. These financial

Strategy	Objective/ Description
	requirements include: Management of the wastewater activity Operation and maintenance of the wastewater systems Asset replacement Asset development to ensure that the ability of the wastewater activity to deliver an acceptable level of service is not degraded by growth in Nelson City Council

5.7 OPERATIONS AND MAINTENANCE

5.7.1 Introduction

Operations and Maintenance activities ensure the wastewater network will be operated and maintained on a day-to-day basis to consistently achieve the optimum use of assets. Operations and Maintenance activities fall into the following categories, each having distinct objectives and triggering mechanisms:

Operations - Activities designed to ensure efficient utilisation of the assets, and therefore that the assets achieve their service potential. Operational strategies cover activities such as energy usage, control of mechanical and electrical plant, inspections and service management.

Maintenance - Maintenance strategies are designed to enable existing assets to operate to their service potential over their useful life. This is necessary to meet service standards, achieve target standards and prevent premature asset failure or deterioration. There are three types of maintenance:

- Preventative Maintenance - A base level of maintenance carried out to a predetermined schedule. Its objective is to maintain the service potential of the asset system. This approach is not necessarily the most cost effective.
- Predictive Maintenance - Maintenance undertaken as a result of condition or performance evaluations of components of the wastewater system. Its objective is to avoid primary system failure while maximising the effective life of components. Maintenance is carried out in optimal time frames.
- Reactive Maintenance - Maintenance carried out in response to reported problems or system defects. Its objective is to maintain day-to-day levels of service. Council currently operates at a reactive and preventative level.

5.7.2 Method of Delivery

The operation and maintenance of the Nelson City Council wastewater activity is carried out using a combination of Nelson City Council staff and external contractors consisting of:

- Network Services (internal business unit) for design and Supervision (Nelson City Council)
- NELMAC Limited (Nelson City Council CCTO) for all reticulation operations and maintenance
- External contractors for specialist activities such as Closed circuit television and major overhauls of mechanical equipment

5.7.3 Operations and Maintenance Strategies

The following table sets out the operations and maintenance strategies:

Table 5-9: Operations and Maintenance Strategies

Strategy	Objective/ Description
Maintenance	
Preventative Maintenance	Routine Maintenance will be carried out in terms of defined routine maintenance programmes with predetermined triggers for these activities to be carried out
Reactive Maintenance	Remedial maintenance will be undertaken as quickly as practically possible to restore an asset to a satisfactory condition after a failure or other another unsatisfactory condition has been detected
Repairs	The detection and repair of faults causing failure will be undertaken as quickly as practically possible. The fault will be isolated and components repaired or replaced as appropriate and then if warranted the item will be tested to ensure that it meets the relevant standard
Redesign and Modification	Redesign may be necessary if an asset or system does not meet its operational objective. Similarly, modifications may be necessary to improve the operating characteristics. Redesign and modifications will be undertaken in a methodical manner to ensure alternative options are considered and optimum decisions made
Operations	
Operations	Operational activities will be undertaken via NELMAC unless specialised advice is required. Staff will be responsible for the determination and optimisation of planned and unplanned works, work methods and maintenance scheduling to achieve the target service standards
Physical Works Monitoring	Audits of work will be carried out to verify compliance with standards
Operation of Utilities	Utilities such as treatment plants and pumping stations will be operated in terms of defined parameters and standards
Incident management	Council will effectively respond to and manage incidents to ensure system availability and service continuity, and mitigate adverse effects Maintenance staff and contractors are expected to effectively manage minor incidents. Nelson City Council Infrastructural Asset management staff will become involved in serious incidents
System control and monitoring	Council will utilise Supervisory control and data acquisition systems to monitor operation of the wastewater facilities The Supervisory control and data acquisition system provides surveillance of the operation of pumping stations in the wastewater system and provides alarms when equipment fails or when operating parameters are exceeded. The Supervisory control and data acquisition system also records operating data from the treatment plants and pumping stations

5.8 RENEWAL/REPLACEMENT PLAN

5.8.1 Introduction

Cyclic renewal strategies are intended to 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 City's wastewater infrastructure is maintained.

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

- The age profile of the system
- The condition profile of the system
- The ongoing maintenance demand
- Customer service issues, and
- The differing economic lives of individual assets comprising the overall asset system

Failure to maintain an adequate cyclic renewal programme will be reflected in a greater decline in the overall standard of the system of assets than would be expected from the age profile of the asset system. Cyclic renewal works fall into two categories:

- Rehabilitation: Involves the major repair or refurbishment of an existing asset. An example is the relining of an existing pipeline. Rehabilitation produces an extension in the life of an asset. It does not provide for a planned increase in the operating capacity or design loading
- Renewal: Does not provide for a planned increase to the operating capacity or design loading. Some minor increase in capacity may result from the process of renewal, but a substantial improvement is needed before system enhancement is considered to have occurred

For the purpose of developing asset renewal programmes, the wastewater assets have been separated into "discrete" and "non discrete" assets.

- "Discrete" assets are assets such as pumping stations, which are separately identifiable, generally above ground and which can readily be inspected
- "Non discrete" assets are assets such as buried pipelines which are part of an extensive network, are generally below ground and which cannot readily be inspected (other than by techniques such as excavation and Closed circuit television)

5.8.2 Renewal/Replacement Strategies

The following table sets out existing and future cyclic renewal strategies:

Table 5-10: Renewal Strategies

Strategy	Objective/ Description
Identification of renewal needs	Renewal/replacement needs are identified by analysing; Condition reports, maintenance records (asset failure and expenditure history), wastewater infiltration studies, request for service (RFS) records, and observations of staff and contractors Renewal forecasts are based on an assessment of remaining asset lives (integrated with the valuation process) For pipe assets (non discrete assets) remaining lives have been estimated using available condition data for asset groups with similar deterioration drivers (e.g. pipe material, location, etc.) and from factors such as maintenance history and customer issues Remaining lives for above ground assets (discrete assets) have been estimated from condition assessments, maintenance history

Strategy	Objective/ Description
	and customer issues The short-term asset renewal programmes are prepared from specific renewal needs identified from the above information Long-term asset renewal programmes are prepared from the remaining life profiles for the assets Consideration also given to assets directly impacted by road upgrades or other utility projects A review of the renewal strategy is required to take into consideration criticality and earlier intervention requirements along with the preparation of a integrated condition assessment programme as an input to determining useful lives of assets. This programme would include the optimisation of Closed circuit television in the repair or replace process
Prioritisation of renewal projects	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 Nelson City Council Engineering Standards
Deferred Renewals	The quantity and impact of deferred renewals (if any) is tracked. 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
Inspections prior to major road works	The condition of wastewater pipelines will be inspected prior to major road works to identify the risk of the road being damaged by pipeline failure or the need for pipeline replacement in the short/medium term. Where possible, Pipelines in poor condition will be programmed for replacement prior to or in conjunction with the road works

5.9 ASSET UPGRADE PLAN

5.9.1 Introduction

Asset upgrades provides for a planned increase in the service capability of the wastewater system to:

- Close gaps between the current capability of the wastewater system and target service standards
- Accommodate growth

Asset development and asset renewal can occur simultaneously. The purpose of asset renewal is to prevent a decline in the service potential of the assets whereas asset upgrade is concerned with the service improvements, measured by asset performance.

5.9.2 Asset Upgrade Strategies

Table 5.11 below sets out the strategies used for capital upgrade programmes for the wastewater activity. These strategies are intended to progressively close gaps between target service requirements (taking account of demographic and economic growth projections) and the current service capability of the asset system.

Table 5-11: Upgrade Strategies

Strategy	Objective/ Description
Identification of upgrade needs	Asset upgrade needs are identified from analysis of; Demand forecasts, System performance monitoring (pressure, flow, leakage rates, etc.), Network modelling, Risk assessments (Risk Management Plan), Nelson Resource Management Plan, performance monitoring and Customer service requests A provisional forward capital works development programme is maintained and updated at least annually
Project Categorisation	Upgrade Projects will be separated into projects to close service gaps and projects required to accommodate growth Projects to close service gaps are generally funded entirely by Nelson City Council. Projects to accommodate growth may be partly or wholly funded through Development Contributions
Prioritisation of projects	Decisions on upgrade works consider the short and long-term effects on the operating and structural integrity of the wastewater system In determining the requirement for capital or asset upgrade works the short and long-term effects on the operating and structural integrity of the system are considered, together with any forecast increase in loading upon the system All feasible options, including non-asset demand management options and the use of second-hand plant, are considered. Upgrade works are designed and undertaken in accordance with Nelson City Council Engineering Standards/Land Development Manual and system design loadings
Project Approval	A long-term programme is prepared from projects meeting the assessment criteria, and all projects are approved through the Long Term Plan process The actual timing of asset works will reflect the community's ability to meet the cost, as determined through the Long Term Plan process Scheduled projects meeting assessment criteria not funded are listed on the forward works programme for the following year
Project design	All asset upgrade works will be designed and constructed in accordance with Nelson City Council Engineering Standards/Land Development Manual and system design loading In determining capital or asset upgrade work requirements the short and long term effects on the operating and structural integrity of the system are considered, together with the demands of any forecast increase in loading upon the system The system will be designed to minimise supply disruptions as far as practically possible by building in an appropriate level of redundancy The standardisation of designs and specifications will be considered in the interest of facilitating replacement and operational simplicity
Funding Strategies	Nelson City Council will review annually funding requirements and strategies to achieve equitable funding of upgrade works through, targeted rates, development and or general ratepayer contributions
Gifted Assets	The risk, cost and benefits of accepting any new privately funded assets constructed in association with property development will be considered on a case by case basis in approval decisions Such assets will be accepted into public ownership when satisfactorily completed in accordance with approvals given. Council will not contribute to the cost of such work unless there are exceptional service standard or equity issues

5.10 DISPOSAL PLAN

5.10.1 Introduction

The disposal plan recognises that there can be activities and costs associated with the decommissioning and disposal of assets which are no longer required as part of the wastewater activity. In some situations there can be revenue resulting from asset disposal.

5.10.2 Asset Disposal Strategies

Table 5-12: Disposal Strategies

Strategy	Objective/ Description
Asset Disposal	Assess each proposal to dispose of surplus or redundant assets on an individual basis, subject to the requirements of the relevant legislation Asset disposal will comply with the requirements of the Local Government Act 2002 and in particular the requirement for Councils to retain a capability to provide wastewater services Redundant pipes are backfilled or removed where their alignment clashes with replacement pipelines or where their existence is considered dangerous. This is to ensure collapse or build-up of gases does not occur Possible use of abandoned pipes for telecommunication ducts is reviewed on a case by case basis. Currently Chorus and Network Tasman lease access to abandoned gas mains and abandoned water and wastewater pipes.
Residual Value	The residual value (if any) of assets, which are planned to be disposed off, will be identified and provided for in financial projections

5.10.3 Summary of Future Costs

Assets, which are disposed off, have generally reached the end of their useful lives and have minimal or no residual value. When a wastewater asset is abandoned or replaced the Geographic Information System and fixed asset register are updated. A system of job number creation and asset identification is used to document this process.

Redundant pipes are removed where their alignment clashes with replacement pipelines or where their existence is considered dangerous. Abandoned wastewater pipelines have possible future value for other purposes (such as ducting for cabling). As the extent of this value (if any) is uncertain it is not recognised in the asset valuation.

5.11 SIGNIFICANT NEGATIVE EFFECTS

The following identifies any significant negative effects for the Nelson City Council wastewater activity that the activity may have on the social, economic, environmental or cultural well-being of the community, and states the existing approach or proposed action to address the issue.

Table 5-13: Negative Effects – The Wastewater Activity

Effect	Status of Effect		Type of Effect (existing situation)		Impact on Well-Being (existing situation)				Existing Approach or Proposed Action to Address
	Existing	Potential	Negative	Significantly Negative	Social	Economic	Environmental	Cultural	
Wastewater Treatment Plant									
Discharge of treated wastewater to the ocean	Static	Static	√		Mod	Minor	Minor	Mod	Compliance with resource consent
Biosolids disposed to land	Static	Static	√		Minor	Minor	Minor	Minor	High degree of sustainability
Discharge of odour	Dynamic	Increasing	√		Minor	Minor	Minor	Minor	Further investigation and remedial works to ponds proposed
Outfall									
Curtailing of shellfish gathering in immediate area of outfall mixing zones	Static	Reducing	√		Minor	Nil	Minor	Mod	High degree of treatment prior to discharge and testing (both effluent and outfall environment)
Pump stations									
Discharge of odour	Static	Static	√		Minor	Minor	Minor	Minor	Reported and resolved within a short space of time
Overflows	Static	Reducing		√	Mod	Minor	Mod	Mod	Pump station overflows are generally reported and resolved within a short space of time
Noise	Static	Static	√		Minor	Minor	Minor	Nil	High degree of noise mitigation in residential areas
Rising Mains									
Overflows	Static	Reducing		√	Mod	Mod	Mod	Mod	High level of inspections carried out Duplication of the Atawhai rising main will reduce the risks of overflows
Discharge of odour	Static	Reducing	√		Minor	Nil	Minor	Minor	Reported and resolved within a short space of time

6. FINANCIAL

This Section sets out financial statements, funding strategy, depreciation forecast and charges for the wastewater activity in Nelson City.

6.1 OVERVIEW

The Local Government Act 2002 (Part 6 Subpart 3) requires local authorities to manage their finances "prudently and in a manner that promotes the current and future interests of the community. This implies compliance with applicable Financial Reporting Standards, which include New Zealand equivalents to International Financial reporting Standards (NZ IFRS).

In determining how activities will be funded local authorities are required to take the following into consideration:

- The contribution to the achievement of Community Outcomes (strategic alignment)
- Beneficiaries of each activity (beneficiary/user pays principles)
- The period over which benefits from the activity will occur (intergenerational equity issues)
- The extent to which identifiable individuals contribute to the need to incur expenditure (exacerbator and user pays principles)
- The costs and benefits of funding the activity compared to other activities (cost/benefit, prioritisation principles)
- The impact of funding the activity on the wellbeing of the community (ability to pay principles)

This Asset Management Plan provides the basis for meeting these requirements.

6.2 ASSET VALUATION AND DEPRECIATION

6.2.1 Definition

The basic value of an asset reduces in accordance with the wearing out over the asset's life arising from use, the passage of time, or obsolescence. This reduced value is called the depreciated replacement cost. It is accounted for by the allocation of the cost (replacement cost) of the asset less its residual value over its useful life.

6.2.2 Valuation Method

The 30 June 2012 asset valuations have been completed in-house, by Council staff, with the exception of the Nelson Waste Water Treatment Plant which required specialised knowledge. The in-house valuations have been based on Council's Hansen Asset Management System for wastewater, stormwater and water supply assets.

As the valuations have been completed in-house, there is a requirement from Audit NZ that the work be externally reviewed. Opus International Consultants performed this independent audit.

6.2.3 Assumptions

Typical useful lives from the NZ Infrastructure Asset Valuation and Depreciation Guidelines – Version 1.0 have been used as a guide in determining base lives. However the manual generally provides average expected life detail for asset components and Nelson City Council experience from the renewals of its assets has been used to vary these base lives where appropriate.

For the 2006 valuation an age adjustment factor was used which increased the life of an asset based on the age of the asset as a percentage of its base life. Actual experience has shown that Nelson City Council are replacing assets before their age adjusted life and advice from Opus is that the lives appear high from their experience. Accordingly the age adjustment factor was removed for the 2008 valuation. This has no affect on

the replacement value, but increases the depreciated replacement value and annual depreciation.

Sewer pipe lives vary based on:

- The pipe use (rising main, reticulation etc)
- Pipe material and soil conditions.

The Atawhai rising main was installed in 1969 within expected base life of 45 years. As a result of pipeline failures initiated by acid attack it was assessed by Duffill, Watts and Tse in 1994 and remedial work was completed in 1996 to give it a then remaining life of 45 years. Based on this work, the main has been given a base life of 72 years.

Where an asset has exceeded its nominated base life, and is shown to be in good condition, a residual life of 5 years is assumed.

Pump stations have been valued individually based on the size of the pumps and associated infrastructure. However standard component lives have been used for all pump stations. Lives have been extended from the previous valuation for steelwork, pumps and valves based on a new assessment of life expectancy from the assets in conjunction with experience from the Nelson Regional Sewerage Business Unit pump stations.

6.2.4 2012 Valuation Results

The results of the 2012 valuation as compared to the June 2010 valuation are presented in Table 6-1 below: Table 6.2 shows typical useful lives of network pipelines.

Table 6-1: 2012 and 2010 Valuation Comparison

Asset Category	June 2012				June 2010			
	km/ units	RV ($000)	DRV ($000)	Depr ($000)	km/ units	RV ($000)	DRV ($000)	Depr ($000)
Reticulation Mains	310	110,274	66,129	1,342	303	86,860	53,380	1,056
Trunk Mains	34	14,225	6,715	192	34	13,282	6,572	179
Swallow Mains	6	3,385	392	64	5	3,016	381	58
Rising Mains	28	20,892	9,094	345	28	19,727	9,146	328
Access points	870	781	610	10	850	752	604	9
Manholes	6,547	26,869	16,233	333	6,441	22,544	13,907	280
Tanks	11	86	42	1	11	81	41	1
Valves	139	183	68	6	141	177	74	6
Neale Park Retention Tank	1	576	464	7	1	543	458	7
Pump Stations	25	6,785	2,509	205	26	6,657	2,642	203
Wakapuaka Treatment Plant	1	18,398	14,692	354	1	17,503	14,656	338
Total		**202,453**	**116,949**	**2,859**		**171,142**	**101,860**	**2,464**

Table 6-2: Asset Lives –Pipe Lines (From Install Date)

Material	Good Soil	Average Soil	Poor Soil	Pressure
Black Asbestos Cement	80	70	65	40
Asbestos Cement	80	70	65	40
Blue Brute Pipe	80	80	80	
Ductile Cast Iron	65	55	50	40
PitCast Iron	85	75	70	40
Spun Cast Iron	90	80	75	40
Concrete (InsituFORM lined)				40
concrete	85	75	70	45
Earthenware	120	110	105	
Fibreglass				60
HDPE	105	105	105	60
PE1H (Pe 100 Material)	105	105	105	60
PVC	80	80	80	50
Steel Concrete Lined	85	75	70	45
Unknown	85	75	70	
Atawhai Rising Main Life				72
Soil condition - Poor refers to low lying sandy areas, subject to salt water infiltration. - Average soil conditions are gravel areas - Good soil condition are clay areas				

Table 6.2 has been derived from industry expectations and local performance data/

Table 6-3: Asset Lives Pump Stations

Component	Structure	Steelwork	Pump	Electrical	Valves	Telemetry	Flow Meters	Biofilters
Life	50	30	30	15	30	10	10	20

While the next full valuation is not required until June 2011 Council is currently carrying out a full valuation on an annual basis until such time as the international financial markets stablise.

6.3 REVENUE AND FINANCING POLICY - WASTEWATER

Distribution of Benefits

Community Benefits:

- Contributes to community health
- Provides recreational and environmental benefits associated with both inland and marine waters (for which there are increasing public expectations)
- Land is protected from the effects of sewage seepage
- Sewage treatment and disposal assists the local economy
- Meets the community's increasing environmental standards

Individual Benefits:

- Benefits are received by those connected to the sewage collection system

The Costs and Benefits of Funding the Activity Distinctly from Other Activities:

The benefit of funding domestic wastewater access to the wider population as well as those connected to the system and therefore a lump sum general rate is considered the most equitable form of funding this activity. Council uses Trade Waste Bylaws and volume based charges to ensure industrial and commercial businesses pay for their share of waste treatment and disposal costs.

Residential Wastewater Charge:

A separate targeted rate is set under section 16 of the Local Government (Rating) Act 2002 to recover the costs required for Council's wastewater and sewage disposal system. This charge is levied on all units to which the Council's wastewater and sewage disposal service is provided. Wastewater charges for previous seven years are:

- 2011/12 - $353.10 per unit (including GST)
- 2010/11 – $384.80 per unit (including GST)
- 2009/10 - $326.50 per unit (including GST)
- 2008/09 - $345.80 per unit (including GST)
- 2007/08 - $305.60 per unit (including GST)
- 2006/07 - $268.00 per unit (including GST)
- 2005/06 - $251.10 per unit (including GST)

A unit is defined as a rating unit (see Nelson City Council 2006/16 Long Term Council Community Plan Volume 2; Page 27)

6.4 ASSET MAINTENANCE PLAN

6.4.1 Definition

Maintenance is the regular ongoing day-to-day work necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again. This includes:

- Regular and ongoing annual expenditure necessary to keep the assets at their required service potential
- Day-to-day and/or general upkeep works designed to keep the assets operating at required levels of service
- Works which provide for the normal care and attention of the asset including repairs and minor replacements
- Unplanned (reactive) maintenance, i.e. isolated failures requiring immediate repair to make the asset operational again

6.4.2 Maintenance Contract

Prior to 2006 the operations of the Nelson waste water treatment plant assets were via Council's Maintenance Contractor Nelmac. A Performance based Design, Build and Operations Contract that includes the operation and maintenance of the treatment plant was instigated in October 2005. The maintenance portion of this contract commenced in July 2008 for a period running up to 2012, with the Maintenance Contractor being United Group but with maintenance sub contracted to Nelmac.

In 2012/13 Nelmac was appointed as Councils operations and maintenance contractor.

However Nelson City Council are still responsible for the overall resource consents.

The operations and maintenance of the reticulation network is operated under an agreement with Nelmac.

6.4.3 Total Cost Projections

The projected operations and maintenance costs based on the recommended levels of service of operating the Nelson City Council wastewater activity over the next ten years are shown in Table 6-4.

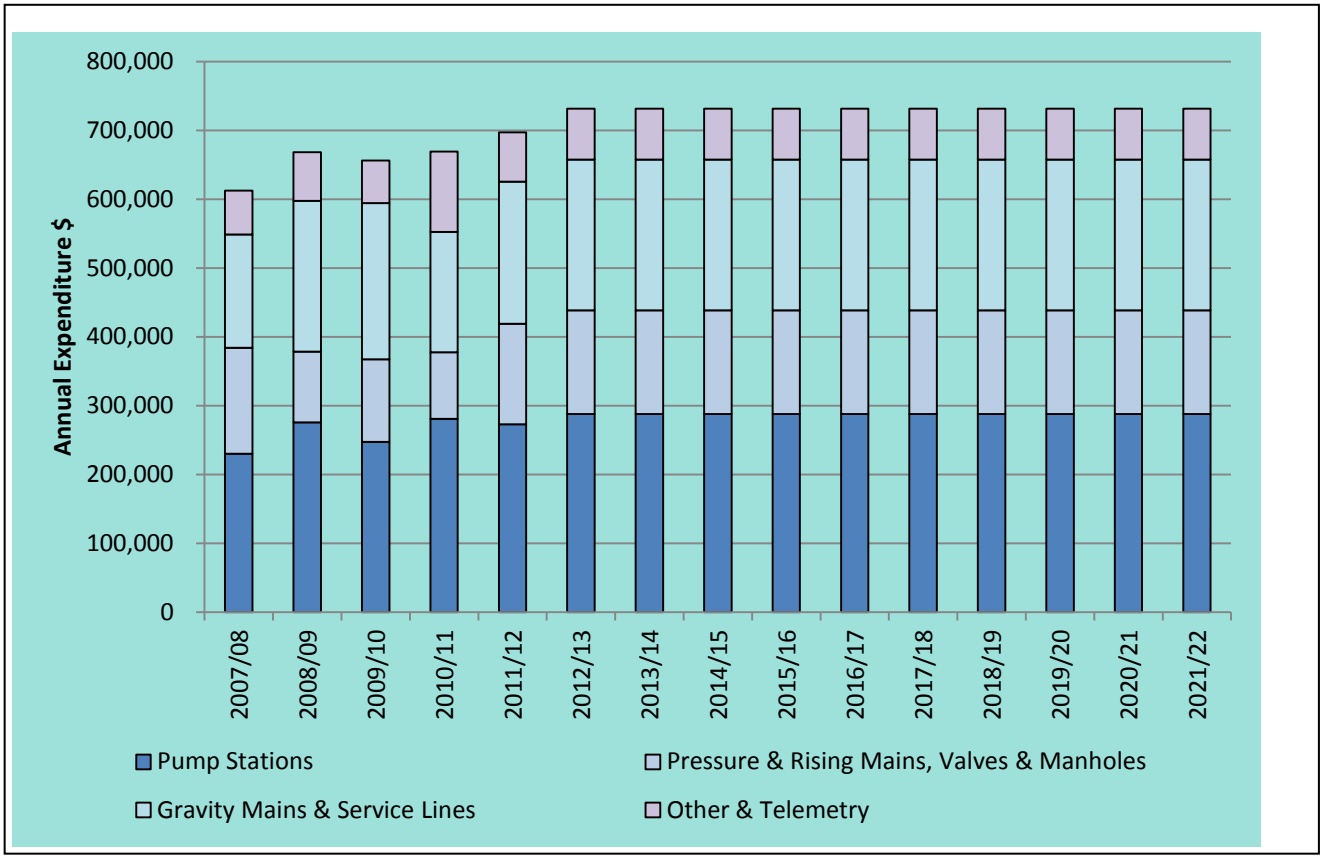
6.4.4 Maintenance Planning

Currently much of the asset maintenance is reactive and preventative. Further work is moving towards advanced asset management planning techniques for critical components where it is considered appropriate to apply predictive maintenance programmes. This approach would allow for maximising the useful life of an asset while minimising the consequences of unforeseen failures.

Table 6-4: Wastewater 12 Year Operations and Maintenance Projections ($,000)

Year		1	2	3	4	5	6	7	8	9	10	11	12
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**		
O&M Expense	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Administration/interest	291	291	291	291	291	291	291	291	291	291	291	291	291
Depreciation	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066
Electricity	188	223	223	223	223	223	223	223	223	223	223	223	223
Mtce: Physical Works - Programmed	246	256	256	256	256	256	256	256	256	256	256	256	256
Mtce: Physical Works - Reactive	536	553	553	553	553	553	553	553	553	553	553	553	553
Mtce: Engineering Services	180	180	180	180	180	180	180	180	180	180	180	180	180
Mtce: NN Treatment Plant	460	700	700	700	700	700	700	700	700	700	700	700	700
NRSBU - NCC Share	3,383	3,562	3,460	3,436	3,930	3,884	3,859	4,827	4,911	4,873			
Mtce: Reduction in S/W Entry	90	150	150	150	150	150	150	150	150	150	150	150	150
Mtce: CCTV Inspections	42	44	44	44	44	44	44	44	44	44	44	44	44
Mtce: Flow Monitor	23	28	28	28	28	28	28	28	28	28	28	28	28
Mtce: Trade Waste Monitoring	3	15	15	15	20	20	20	20	20	20	20	20	20
Mtce: Ex-filtration (Maitai E.coli)	50	50	50	50									
Mtce: SCADA Remote site radio upgrade		60	60										
Mtce: SCADA upgrade		70	70										
NNWWTP - Desludging	246	346	346	346	346								
Total [(a)] ($,000s)	8,804	9,594	9,492	9,338	9,787	9,395	9,370	10,338	10,422	10,384	10,384	10,384	10,384

Figure 6-1: Physical Works Expense



Comments - Expenses

- There is a significant annual increases in costs associated with funding Nelson Regional Sewerage Business Unit

Sensitivity analysis on the financial forecasts have not yet been developed to the desired asset management level. It is considered that procedures for assessing sensitivity analysis should be instigated over the next three years.

6.5 RENEWAL STRATEGY

6.5.1 Definition

Renewal expenditure is major work that does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. Work over and above restoring an asset to original capacity is deemed to be new capital works. Work displaying one or more of the following attributes is classified as rehabilitation or renewal expenditure:

- Works which do not increase the capacity of the asset, i.e. works which upgrade and enhance the assets restoring them to their original size, condition, capacity etc
- The replacement component of augmentation works which increase the capacity of the asset, i.e. that portion of the work that restores the asset to their original size, condition, capacity etc
- Reconstruction or rehabilitation works involving improvements and realignment
- Renewal and/or renovation of existing assets, i.e. restore the assets to a new or fresh condition

6.5.2 Renewals Strategy

Nelson City Council renewal strategy is in a stage of transition from renewal, based on condition and age, to the strategy based on a combination of the following:

- Performance
- Asset criticality (using the business and extended asset risk schedules)
- Capacity
- Condition (age data used to estimate condition when condition data not held)

The transition to the above strategy will require supporting data and analysis of the following:

- Field maintenance condition feedback
- Asset failure records
- Pipe sampling programmes
- Specific inspections and condition rating of assets

Performance and condition of the assets are assessed with respect to the following criteria:

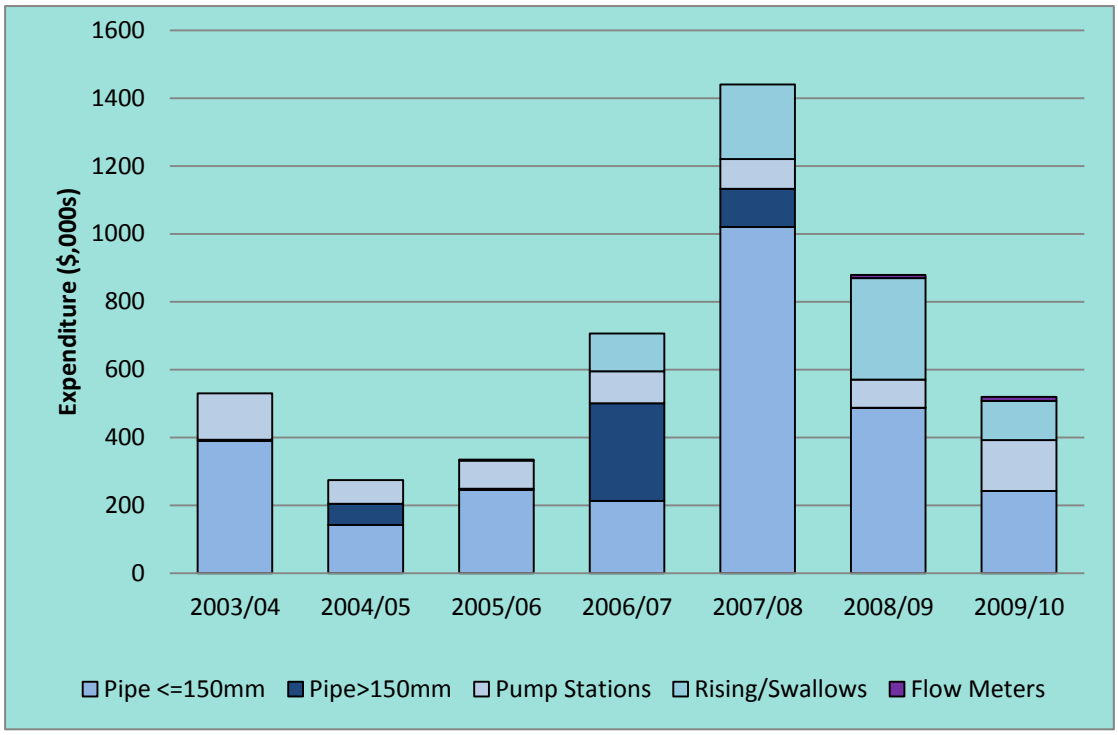
- Inflow and infiltration potential.
- Leakage from pipes, manholes and fittings where the network is adjacent to waterways, marine environment or areas of high groundwater.
- Areas with elevated levels of blockages.
- Areas with elevated maintenance costs.
- Parts of the network prone to overflows.
- Parts of the network with objectionable odour emissions

6.5.3 Actual Renewal Expenditure

The actual renewal expenditure for the period 2003/04 to 2012/13 is detailed in Figure 6.2.

Significant sections of rising mains and swallows have been identified as being in service for greater than their expected asset life of 40 – 45 years. Renewals of these sections have been programmed for period 2015 – 2027 based on expected remaining life. It is important to put in place a program of inspection and testing to confirm current condition and assessed residual life of these components.

Figure 6-2: Renewal Expenditure 2003/04 to 2009/10



6.5.4 Deferred Renewals

This plan indicates no deferred renewals.

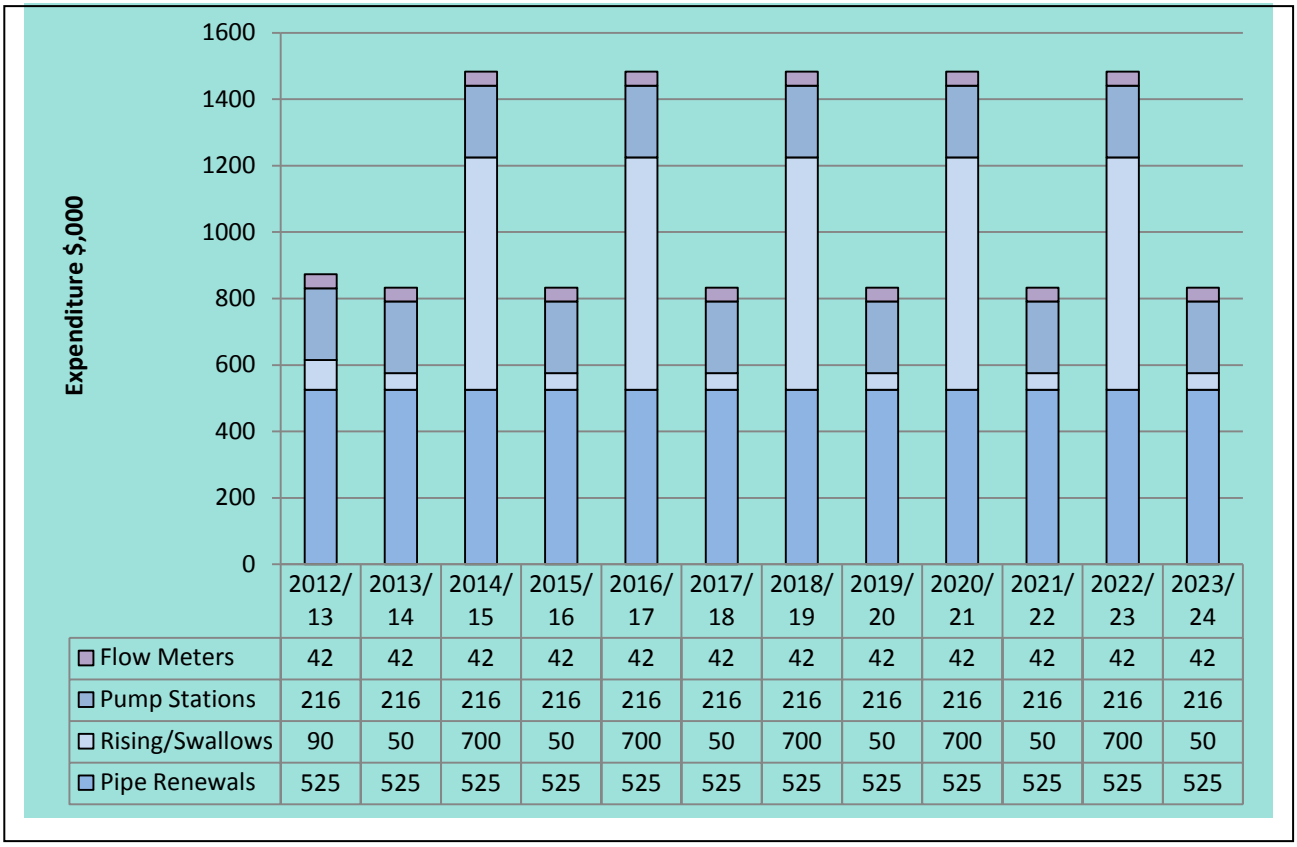
6.5.5 12 Year Renewal Plan

The renewal programme for 2015/16 to 2026/27 is detailed in Table 6-5.

Table 6.5 12 Year Renewal Plan $,000

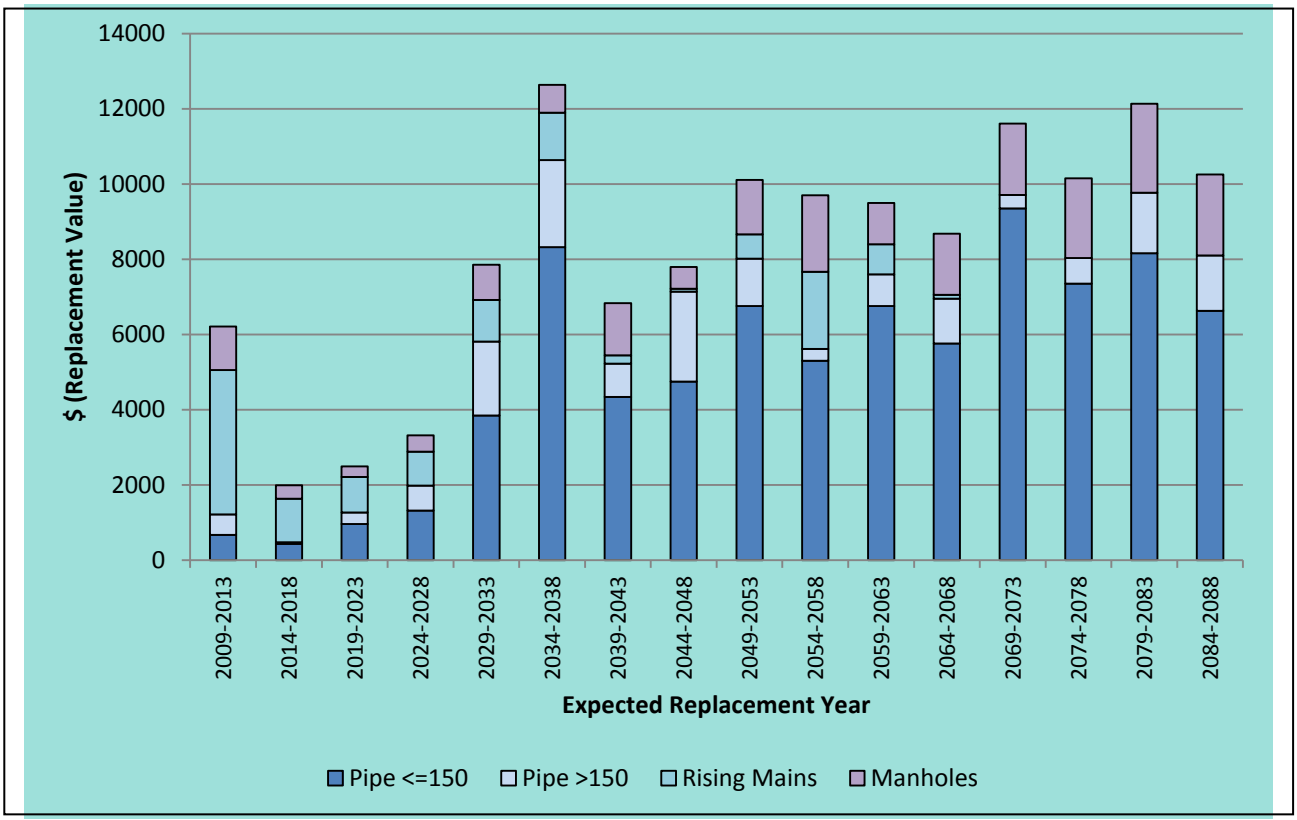
Year		1	2	3	4	5	6	7	8	9	10	11	12
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**		
Project Area	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Pipe Renewals	525	525	525	525	650	650	650	700	700	700	750	750	750
Renewal Rising/Swallows	0	80	150	430	80	150	430	80	150	430	80	150	430
NNWWTP Renewals	0	43	7	0	0	0	100	880	2	0	40	0	0
Pump Stations Renewals	130	150	150	150	200	200	200	250	250	250	300	300	300
Flow Meters	45	45	45	45	45	45	45	45	45	45	45	45	45
Total ($,000s)	700	843	877	1150	975	1045	1425	1955	1147	1425	1215	1245	1525

Figure 6-3: 12 Year Renewal Plan 2012/13 – 2023/24



	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Flow Meters	42	42	42	42	42	42	42	42	42	42	42	42
Pump Stations	216	216	216	216	216	216	216	216	216	216	216	216
Rising/Swallows	90	50	700	50	700	50	700	50	700	50	700	50
Pipe Renewals	525	525	525	525	525	525	525	525	525	525	525	525

Figure 6-4: Long-Term Renewal Profile 2009 – 2088



6.6 CAPITAL PROGRAMME

6.6.1 Definition

New works are those works that create a new asset that did not previously exist or works which upgrade or improve the capacity of the network. They may result from growth, social or environmental needs. Capital expenditure projects display one or more of the following characteristics:

- Construction works which create a new asset that did not previously exist in any shape or form
- Expenditure which purchases or creates a new asset (not a replacement) or in any way improves an asset beyond its original design capacity
- Upgrading works which increase the capacity of the asset
- Construction works designed to produce an improvement in the standard and operation of the asset beyond its present capacity

6.6.2 Capital works Programme 2015/16 to 2026/27

The Capital Works Programme for the 12 year period as outlined in Table 6-6, is based on the following:

- Corder Park and Neale Park pump station upgrades
- Awatea Place pump station construction, Airport rising main construction and associated trunk main changes
- Trunk main storage and upgrade for development in Marsden Valley, Ngawhatu Valley and Enner Glynn
- Arapiki / Quarantine catchment redirection
- Evaluation of storage capacity and emergency energy generation for pump stations
- Maximising gravity reticulation and efficiency of pump station upgrades in the upper stoke catchment

Table 6-6: Nelson City Council 12 Year Capital Upgrade Plan ($,000)

Year		1	2	3	4	5	6	7	8	9	10	11	12		
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**				
Project	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	**Growth**	**LOS**
Arapiki/Quarantine Trunk Main	1,554														
Awatea Place RM/PS/TM		300	50	650	3,000	600									
Corder Park	3,600	2,500													
Neale Park PS	215	250	3,000	3,000											
Ngawhatu Valley TM - Stage 1	500	335													
Ngawhatu Valley TM - Stage 2								180	20	1,000	1,000				
NNWWTP - Upgrades				50		100			200	200	200				
NNWWTP - Resource Consent							100	150	150	150	150				
Telemetry Upgrade															
Pump Station Storage		20	120	50	120	120									
Atawhai Rising Main - Stage 1											100	80	2,000		
Maitai (Ralphine Way)						50		250							
Hira - investigate adding to network												100	150		
Gracefield Beheading				*50*	*150*		*500*	*500*	*500*						
Atawhai Pump Stations (Brooklands & Marybank)		80	400	200	400	200									
Arapiki Rd #15 - Ridgeway		80	20	500											
Trafalgar Square - Betts Carpark			10	10	75										
Natural Hazards Risk Assessment		50	50		100	100	100								
Network Capacity Confirmation for Growth Areas		50	100						100	100	100	1,250			
Network Upgrades Nelson North															
Network Upgrades Nelson															

Central															
Network Upgrades Nelson South															
Total ($,000s)	**5,869**	**3,665**	**3,750**	**4,510**	**3,845**	**1,170**	**700**	**1,080**	**970**	**1,450**	**1,550**	**1,430**	**2,150**		

6.7 ASSUMPTIONS AND UNCERTAINTIES

Table 6-7 details possible and actual significant forecasting assumptions and uncertainties relating to the Nelson City Council wastewater activity.

Assumptions for 2015-25 Nelson Long Term Plan

Council is required to identify the significant forecasting assumptions it has made in preparing its ten year Long Term Plan. Assumptions are necessary to allow Council to plan for expenditure and costs over the next ten years. They are the best reasonable assessment made on the basis of currently available information.

(Any assumptions that apply only to specific activities are included in the discussion on that activity.)

Table 6-7: Significant Forecasting Assumptions and Uncertainties

Forecasting Assumptions	Risk	Impact	Comment
Population growth: Based on Statistics New Zealand figures from 2012. Forward projections will be revised following the release of data from the rescheduled 2013 census but present projections are for the Nelson population to increase by a small amount over the next decade.	That growth is higher than projected, possibly due to large numbers relocating from Christchurch, putting pressure on Council services and infrastructure.	Low	A small increase has been built into growth predictions to cover people who might be expected to relocate from Christchurch to Nelson as a result of recent earthquakes. As better data on relocation becomes available the projections will be updated. Current predictions are for low growth but moderate growth could still be accommodated within current levels of infrastructure provision. Council takes a generally conservative approach in applying population growth estimates in its infrastructure planning, using a mid-range estimate and continually updating and revising as new data is available. This limits the risk exposure.
Affordability: Older residents who are no longer in employment will be less able to fund increases in rates for new services/infrastructure.	That the ability of the community to afford rates increases will decrease.	Medium	This will be a medium to long term impact particularly if, as predicted, the average retirement age also rises significantly.
Inflation/Price changes: Will be based on BERL figures.	That inflation is higher than expected increasing costs for Council.	Medium	Likely to be some variation in actual rates of inflation from predictions and this will impact on the financial results of Council. Changing costs may mean the timing of projects needs to be adjusted.
Upgrade/capital estimates are as follows: Concept +/- 30% Initial & Planning +/-10 to +/- 25% Delivery/Construction +/- 5% Projects of unusual complexity or presenting landowner / regulatory issues that cannot be quantified and such that estimating with accuracy is difficult, may lie outside these figures.		Medium	Costs of upgrades are estimated only without detailed project planning.

Forecasting Assumptions	Risk	Impact	Comment
Interest rates: Interest on debt is calculated at X% per annum for 2012/13, X% in 2013–14, and X% in 2014–15 and outer-years.	Higher interest rates will increase costs for Council.	Medium	Rates used are based on detailed analysis and includes the cost of both funds already borrowed and anticipated new debt at anticipated future interest rates. If actual interest rates are higher than the assumed rate, this cost would be rated for or future borrowing requirements adjusted.
Development contributions: Assumptions on development contributions will be included within the Development Contributions Policy.			
Climate change: More frequent and more extreme weather events and exposure of low-lying land to sea level rise.	Climatic events lead to increased costs for Council in both responding to events and building greater resilience into infrastructure.	Medium	A characteristic of the Nelson community is the concentration of lifelines infrastructure (roading network, port, airport etc) on low-lying areas.
Useful lives of significant assets: It is assumed that there will be no reassessment of the useful lives of assets during the 10 year period covered by this plan.	That assets wear out earlier than predicted.	Low	The detail of useful lives for each asset category is covered in the Statement of Accounting Policies.
Loan arrangements: It is assumed that Council's bankers will continue to renew the existing loan facilities.	Access to committed loan facilities.	Low	The Local Government Funding Agency currently being set up should allow Council to diversify funding sources away from the local banks as well as being able to borrow for longer terms.
NZTA funding: It is assumed that the New Zealand Transport Agency will continue to provide assistance at current levels using current criteria.	That NZTA provide less funding than currently indicated and Council's share of project costs therefore increases.	High	Changes to the funding priorities of New Zealand Transport Agency are outside Council control.
Resource consents: It is assumed that resource consents held by Council will not be significantly altered and any due for renewal during the life of the plan can be renewed accordingly.	That conditions of resource consents are altered and there are significant new compliance costs or consents cannot be renewed.	Low	Budgets are in place for renewal of resource consents and there is no expectation of significant departure from requirements over the next 10 years.
Vested Assets: Assume to increase by $5m per annum adjusted by inflation.	That vested assets vary from budget.	Low	Assets must be maintained by Council.
Union with Tasman District Council: It has been assumed that this Long Term Plan should focus on the needs of Nelson City over the next ten years, whether it is to be implemented under the current structure or an amalgamated local authority.	That some projects need modification should union proceed.	Medium	The two Councils are collaborating closely in the development of their respective Long Term Plans.
Insurance costs: It has been assumed that insurance premiums continue at the level paid 2011/12 plus inflation (post Christchurch earthquakes) and that we can get 100% cover/Local Authority Protection Programme Disaster Fund continues	That premiums increase above inflation and/or Council cannot get 100% cover.	Medium	Any increase in premiums above the level assumed will have an impact on rates. Council may need to make decisions about cover levels during 10 year period.
Return on investments: It is assumed that the return on investments and retained earnings on subsidiaries will continue at current levels plus inflation.	That returns are lower than expected.	Low	Lower returns will impact on rates.
Rates cap: It is assumed that the rates	That rates increases	Low	If there is a large project it will

Forecasting Assumptions	Risk	Impact	Comment
and charges cap will be weighted 25% inflation (CPI) 75% Local Government Cost index (LGCI) plus 2% in each of the 10 year period (excluding any changes in Central Government funding or service provision)	are above the cap set by Council.		be difficult to undertake expenditure in one year or if did so, without impacting levels of service in other activities
Debt level cap: It is assumed that the net external debt as a percentage of total revenue is less than 150% at any point in time in the 10 year period.	That debt levels are above the cap set by Council.	Low	This would impact Council's ability to achieve a AA rating and would increase borrowing costs.

6.8 ASSET DISPOSAL PLAN

If pipes are left in the ground and cannot be reused for other services ducting, they will generally be sealed at the connections and backfilled with cement grout, apart for those located within the estuary.

Mechanical equipment that has been replaced will be reused for parts or sold as scrap metal unless it is considered to have genuine resale value. In this case, the piece of surplus equipment will be sold with income directed to the Nelson City Council wastewater account.

7. ASSET MANAGEMENT PRACTICES

This section outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the Asset Management Plan.

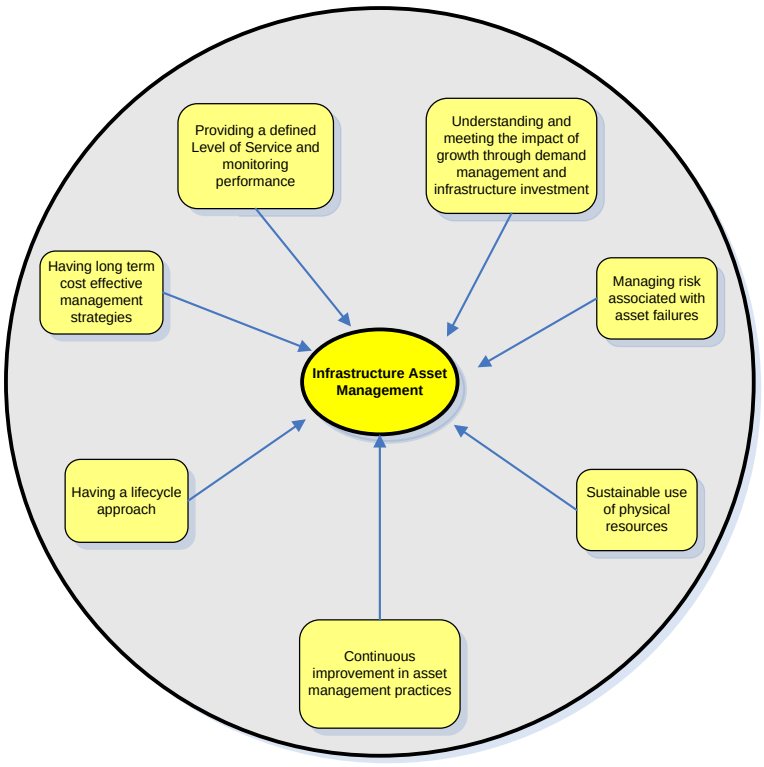
7.1 INTRODUCTION

The goal of infrastructure asset management is to: Deliver the required level of service to existing and future customers in a sustainable and cost effective manner.

A formal approach to the management of assets is essential in order to provide services in the most cost-effective manner, and to demonstrate this to customers and other stakeholders. The benefits of improved asset management are:

- Improved governance and accountability
- Enhanced service management and customer satisfaction
- Improved risk management
- Improved financial efficiency
- More sustainable decisions

The key elements of Infrastructure Asset Management are as shown below:



7.2 ADVANCED ASSET MANAGEMENT

The goal of infrastructure asset management for Nelson City Council is to: deliver the required level of service to existing and future customers in a sustainable and cost effective manner.

Council has defined an appropriate level of asset management for the wastewater activity through previous asset management plans. The purpose of defining the appropriate level of asset management is to identify appropriate practice for the size of the Council as measured against best practice so that asset management functions do

not become too onerous for the resources available and are financially justifiable for the level of asset management proposed.

Selection of the appropriate level of asset management for the wastewater activity included the following factors: The costs and benefits to the organisation, Legislative requirements, the size and complexity of the assets, the risk associated with failures, the skills and resources available to the organisation and Customer expectations.

The 2008 assessment indicated that the Nelson City Council desired asset management level for wastewater was approximately 85% of the "advanced" criteria[6]using an average of the ten asset management areas. The existing and desired level of asset management for the ten asset management areas is detailed below. Section 8 details the improvements that will be developed to enable the desired level of asset management to be achieved.

Improvement Programme

An important component of this asset management plan is the recognition that it is a "live" document in need of monitoring, change and improvement over time. The wastewater Asset Management Plan will be reviewed annually and updated every three years in conjunction with the Long Term Council Community Plan process.

The Asset Management Plan will be developed throughout its life cycle as further information about the wastewater system assets are collected in terms of condition, performance and service delivery. Nelson City Council is committed to advanced data collection and management systems that will allow for a greater appreciation of the performance and condition of the Nelson City Council wastewater assets and the achievement of the appropriate level of asset management.

Key areas for improvement are noted in the table below:

Improvement Areas
Review levels of service (especially in relation to sustainability & infiltration)
Improve accuracy of data through review and modification of collection, storage, and auditing
Include a more detailed strategy for critical assets
Expand focus on inter-relationship of network components and development of improved strategies for maintenance, renewals, and upgrades
Expand sustainable practice, as noted in the Sustainability Policy, throughout stormwater activity
Development of a Three Waters Activity Management Plan
Ongoing refinement of lifecycle decision making and financial forecasts

Nelson City Council Infrastructure Asset Business Unit has reviewed the various levels of advanced asset management for the wastewater activity and identified an appropriate level. The purpose of establishing an appropriate level of advanced asset management is twofold,

- To identify appropriate practice for the size of the Council as measured against "Best Practice" so that asset management functions do not become too onerous for the resources available and equally financially justifiable for the level of asset management proposed
- The associated GAP analysis identifies the current practice Council is performing, the GAP between Appropriate Practice and Current Practice. The projects in the Improvement Plan form the basis of closing the GAP. Progress will be measured by reviewing the GAP Analysis on a regular basis. A number of GAPS are not project related and do not require a budget but a commitment to a process and therefore are not identified in the improvement plan

[6] International Infrastructure Management Manual 2006: Section 2.4.7

Selection of the appropriate level of advanced asset management for the wastewater activity included the following factors:

- The costs and benefits to the organisation
- Legislative requirements
- The size and complexity of the assets
- The risk associated with failures
- The skills and resources available to the organisation
- Customer expectations

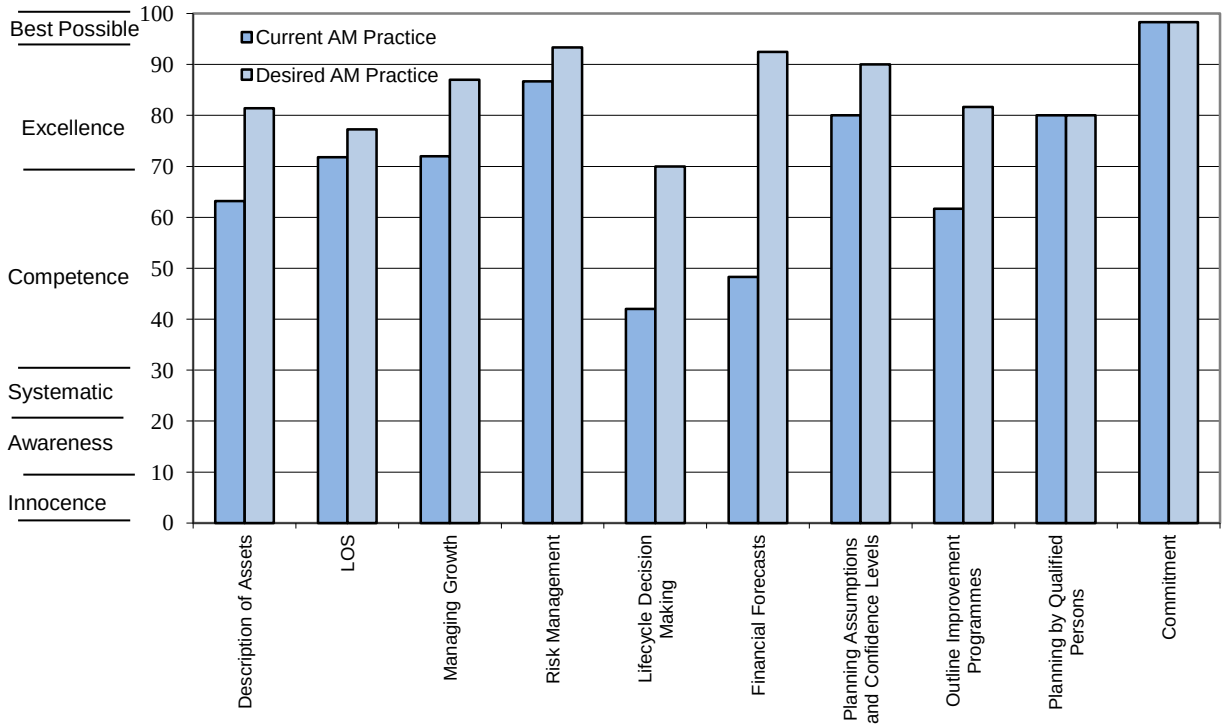
The 2008 assessment indicated that the Nelson City Council desired asset management level for wastewater was approximately 85% of the "advanced" criteria[7] (using an average of the ten asset management areas). The gap analysis used the following rating schedule in assessing the desired and existing levels of asset management.

Quality Level	Score	Description
Best Possible	96 - 100	
Excellence	70 to 95	Appropriate Practice
Competence High	69	Very Good
Average	50	Average/Good
Low	30	Low/Average
Systematic Approach	20 – 29	Poor
Aware	10 – 19	Unsatisfactory
Innocence	0 to 9	Unsatisfactory

Figure 7-1 below indicates the desired asset management level and performance in the ten areas of asset management for the wastewater services.

[7] International Infrastructure Management Manual 2006: Section 2.4.7

Figure 7-1: Nelson City Council Appropriate Asset Management and Performance Analysis



Some gaps are indicated across the ten areas of asset management practices, with ratings in the average competence to the high excellence range. The scoring matrix associated with the gap analysis is detailed in Appendix D.

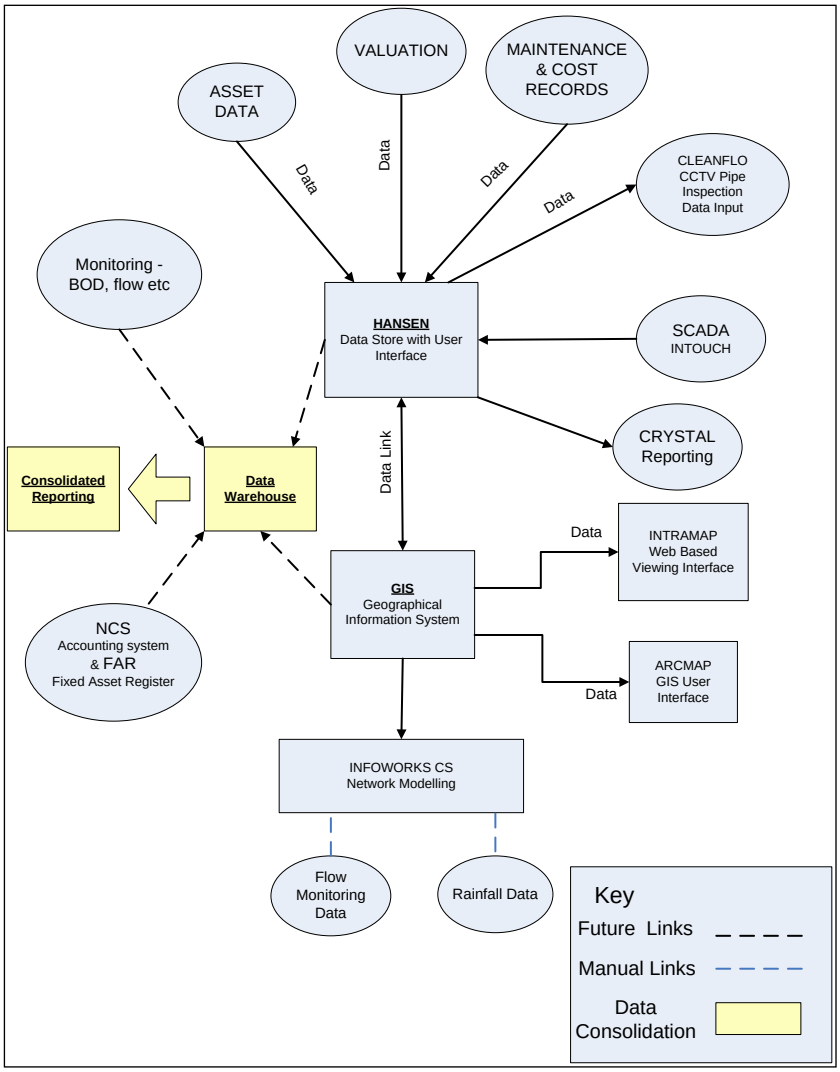
7.3 INFORMATION SYSTEMS

7.3.1 Background

All asset information is stored on ArcInfo, a computer based geographical information system, Hansen Asset Management System (Hansen), and Cleanflow (Closed circuit television results). The accounting system used is integrated computer software supplied by Napier Computer Systems (NCS). An overview of the asset information system in its existing state and future state is depicted in Figure 7-2 below. The warehousing of specific data and the development of a robust reporting system in the future will enhance management reporting and assist in the mitigation associated with succession planning.

The Council has a number of information systems (Hansen, InTouch, Network Model, and Closed circuit television) that are not integrated. The integration of these systems is considered to assist in the optimisation of operations, renewals and the ongoing development of the wastewater activity.

Figure 7-2: Asset Information Systems



7.3.2 Accounting and Financial Systems

Background

Accounting is currently carried out to New Zealand Financial Reporting Standards NZ (IFRS). Generally Accepted Accounting Principles (GAAP) to comply with the Local Government Act 2002. The Nelson City Council uses integrated computer software supplied by Napier Computer Systems (NCS). The General Ledger is linked to packages that run Debtors, Creditors, Banking, Rates, Fixed Assets, Invoicing, Water Billing, Job Costing, and Payroll. Internal monthly financial reports are generated by Council significant activity and sub-activity categories. External financial reports by significant activity are published in the annual report.

Definition of Expenditure Categories

All expenditure on infrastructure assets falls into one of three categories:

- Operations and Maintenance Expenditure
- Capital Expenditure – renewals
- Capital Expenditure – new or upgraded assets

Maintenance Expenditure

Maintenance may be planned or unplanned and is the regular day to day work necessary to keep assets operating, including instances where parts of the asset fail and need immediate repair to make the asset operational again. This includes:

- Regular and ongoing annual expenditure necessary to keep the assets at their required service potential
- Day to day and/or general upkeep works designed to keep the assets operating at required levels of service
- Works which provide for the normal care and attention of the asset including programmed repairs and minor replacements of sub-components (i.e. asset components not individually listed in asset register)
- Unplanned (reactive) maintenance, i.e. isolated failures requiring immediate repair to make the asset operational again

Capital Renewal/Replacement Expenditure

Renewal expenditure is major work that does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing component to its original capacity. This includes:

- Works that do not increase the capacity of the asset but restores them to their original size, condition capacity, etc
- Reconstruction or rehabilitation works involving improvements and realignment
- Renewal and/or renovation of existing assets, restoring the assets to a new or fresh condition consistent with the original asset

Capital Creation/Upgrading Expenditure

Capital works create a new asset that previously did not exist, or upgrade or improve an existing asset. They may result from growth, social or environmental needs. This includes:

- Expenditure which purchases or creates a new asset (not a replacement) or in any way improves an asset beyond its original design capacity
- Upgrading works which increase the capacity of the asset
- Construction works designed to produce an improvement in the standard and operation of the asset beyond its present capacity

7.3.3 Geographical Information System

Background

The Geographical Information System system was implemented in 1994 with data captured using photogrammetry (1994) and progressively delivered over the following three years. Nelson City Council staff carried out accuracy checks on the geographical co-ordinate data supplied, searched all the engineering plans and field books for information on pipe alignment, material and age and entered this information into the Geographical Information System.

Accuracy Limitations

The data captured by photogrammetry was required to be accurate to within a tolerance of +/- 0.3m. In inaccessible areas, it was not considered economic to search for buried fittings, instead, the best estimated position was entered and the accuracy limitation flagged. Similarly, only limited fieldwork has been done to confirm the pipe material and sizes. The accuracy of this information is verified through time by asset data collection procedures.

Maintenance of Geographical Information System Data

Procedures are in place to update new data into the Geographical Information System system on a monthly basis via Nelson City Council engineering staff.

Council's Engineering Standards require that any work on a Council sewer must be proposed to Council by means of an engineering plan for approval and an "As-built" record submitted at the completion of works.

Data on assets associated with renewal and upgrade capital are now updated into the asset register by Nelson City Council Engineering and Finance staff. This ensures a high level of reliability.

7.3.4 Modelling

Modelling has begun for the pumping and reticulation components of the wastewater system. Currently the Stoke/Tahuna catchment model is largely complete and development work has recently begun for the Nelson City catchment.

Pumping: The EPANET model is used in the majority of cases to calculate different pumping scenarios (especially in linked pump stations) and maximum flow rates from pump stations.

Reticulation: The modelling software package used is InfoWorks v.8 with external consultants used to carry out the modelling requirements.

To assist the modelling data requirements the Council uses portable flow meters and permanent flow meters that are installed at pump stations. Rain gauges are installed at most pump stations and other key sites within the city and linked to the Supervisory control and data acquisition system.

Nelson City Council will develop more detailed models in areas with high infiltration levels to accurately identify the location and quantity of infiltration within a catchment.

Details of the extent of modelling carried out to date and future modelling is described in Section 3.4.

7.3.5 Closed Circuit Television

Currently, Closed circuit television condition inspections are carried out by an external contractor of approximately 5km of gravity sewers each year. The pipelines have historically been selected based on operator experience, which takes into account age, maintenance records, pipe material, earth movement, infiltration, service upgrades and crossed connections. The review of the renewal strategy will include the optimisation of the use of Closed circuit television in the condition assessment and repair or replace process of sewer mains.

The Hansen system is used to assist in the selection of pipes to be checked. The Closed circuit television inspection records and scoring are input in Cleanflow.

7.3.6 Asset Management System

Background

In 2000 the Hansen Asset Management System was selected as best suited to meet the future asset management planning requirements of Council. The Hansen system presently uses Version 7.5. Updating to Version 8 is scheduled for 2014/15 and will require significant changes to the database structure. The use of the Hansen system has enabled the following:

- Customer enquiries being logged directly and sent immediately to the contractor for action
- Contractor directly enters resolution confirmation at completion of job
- Tracking of expenditure on assets to allow assets that have a disproportionately high maintenance cost to be identified - upgrade or renewal can then be prioritised

Nelson City Council principal contractor Nelmac has a live interface with Hansen. Any work associated with unscheduled maintenance is entered into the Hansen work order by the contractor. Completed work orders form the basis of the contractors' payment. There are known issues with the existing implementation of Hansen surrounding the work order processes including a lack of reporting to trend results and alert for operational issues. With confirming the required reporting outputs for all levels of management the work order processes and data captured by the contractor and/or Nelson City Council staff can be refined to ensure the needs of all parties are met.

7.3.7 Consolidated Reporting

Consolidated reporting is a methodology to allow continuous monitoring of performance. Increasingly the industry is focussing on how we present the data and analysis carried out by the asset management process with dashboard reporting being provided as the

future direction. Dashboard reporting is a graphic display that can be structured like an automobile speedometer or to individual's requirements and provides an ongoing display of operating and financial data. Consolidated reporting process can provide an overview of Nelson City Council status, overall direction and trends. The objectives for consolidated reporting are:

- Better management - By being better informed
- Compliance – Ensuring that legislative and KPI requirements are being met
- Risk management – Through knowing what is occurring or trending indicates
- Economics – Through timely intervention
- Accountability - Ensuring that maintenance contractors, Council staff and management are shown to be responsible
- Accomplishment – By indicating that Council, staff and maintenance contractors are achieving their goals and objectives

7.3.8 Reporting Methodology

The development of reporting methods should only be undertaken by those individuals who fully understand database relationships to ensure that the information provided is correct and not compromised by partially understood selection queries. These reports should then not be able to be subsequently changed by casual users.

There is a need to review all the processes that provide data to address the following:

- Review/ existing data requirements
- Review/ define processes of data collection (personnel and systems) and adjust as needed
- Review/ define process for data storage (the where, how, for how long, etc)
- Review integration among systems
- Evaluate existing reporting
- Evaluate existing steps for auditing of the entire process

The current reporting methodology from Hansen needs to be reviewed and audited and the most appropriate strategy adopted to meet the increased information needs going forward for both structured routine reporting as well as ad-hoc requirements.

7.4 CONFIDENCE RATING IN ATTRIBUTES, CONDITION AND PERFORMANCE

The Council has generally a high confidence in the processes for the attributes data, condition and performance of assets within the wastewater activity as indicated in Figure 7-3 below. Where the confidence rating is required to be increased additional resources will be required to resolve this issue. Examples of this are:

- The ongoing updating of the asset register of the pipe assets when repairs are carried out and the attributes are compared with the asset register attributes
- The ongoing modelling of the reticulation where increased areas within the city are modelled with the associated increase in the accuracy of the performance of the network

Figure 7-3: Confidence Rating in Attributes, Condition and Performance

Attribute	All Data Estimated	Significant Data Estimated	50% Estimated	Minor Inaccuracies	Accurate	Comment
Attributes						
Reticulation						
Size						The data was captured using photogrammetry in 1994 and progressively delivered over the following three years. Nelson City Council staff carried out accuracy checks on the co-ordinate data supplied, searched all the engineering plans and field books for information on pipe alignment, material and age and entered this information into the Geographical Information System
Depth						
Material						
Install Date						
Location						
Pipe Length						
Wastewater Treatment Plant – all components						Facility upgraded in early 2008 with a high level of knowledge on all aspects of the facility
Pump Stations– all components						High level of knowledge known on the majority of pump stations due to the upgrading programme that is nearing completion
Condition						
Reticulation						Limited inspections to date
Trunk Mains						
Rising Mains						
Swallow Mains						
Manholes						Limited inspections to date
Pump Stations– all components						High level of knowledge known on the majority of pump stations due to the upgrading programme that is nearing completion
Electronics– all components						
Waste water treatment plant						Upgraded in 2008
Outfall						
Performance						
Reticulation						Limited inspections to date
Trunk Mains						
Rising Mains						
Swallow Mains						
Manholes						Limited inspections to date
Pump Stations– all components						High level of knowledge known on the majority of pump stations due to the upgrading programme that is nearing completion and associated testing programme that was associated with this programme
Electronics						

Attribute	All Data Estimated	Significant Data Estimated	50% Estimated	Minor Inaccuracies	Accurate	Comment
Attributes						
Waste water treatment plant – all components						Upgraded in 2008 due to high level of testing that has occurred over the last 12 years
Outfall						

8. SUSTAINABILITY

8.1 OVERVIEW OF SUSTAINABILITY

The Local Government Act 2002 requires that local authorities take a sustainable development approach to everything they do.

The Local Government Act 2002 sets out principles that local authorities must act in accordance with. The legislation requires local authorities to ensure prudent stewardship and the efficient and effective use of its resources in the interests of its district or region; and in taking a sustainable development approach, take into account:

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

In 2011 Council began work on a 50 year vision of what Nelson could become, using sustainability principles. The vision statement was adopted in the Long Term Plan 2012-22 and the full Strategy in 2013. It identified ten goals that the Nelson community said were priorities for action and Council is now working to ensure that these goals and sustainability principles are integrated into all the decisions made about its activities.

Sustainable development actions and approaches are embedded throughout this asset management plan in the sections on: Levels of Service, Demand Management, Lifecycle Management Plans, and Financial. These include the following:

Goal Three

Our natural environment – air, land, rivers and sea – is protected and healthy

- Environmental Level of Service

  100% compliance with resource Consent Conditions is specified;

- Ongoing investigation of areas with high inflow and infiltration and reduction programme, renewal of pump station components and older pipe network.

Goal Seven

Our economy thrives and contributes to a vibrant and sustainable Nelson

- Wastewater network is available to the majority of Nelson residents. Specific provision is made for tradewaste capacity in new industrial areas.

Goal Nine

Everyone in our community has their essential needs met

- Ensuring a reticulated wastewater supply network is available to the greatest number of residents.

Goal 10

We reduce our consumption so that resources are shared more fairly

- Emergency Response Level of Service

  Prompt response to broken and leaking pipes and fittings reduces wastewater losses and reduces consequential damage;

- Demand Forecast

  The demand forecast reflects a decreasing demand into the future due in part to improved plumbing and pipe materials reducing inflow and infiltration, increased efficiency of industrial processes and reduced industrial demand for wet processing;

- Demand Management

In the short term, demand management for wastewater services is focussed on reducing inflow and infiltration into the network. This work will lead to more available capacity in pipes, pumpstations and treatment plants.

- Where appropriate, use of longer pipe sections, either coiled polyethylene or uPVC replacing shorter earthenware, concrete and asbestos cement pipes, leading to quicker installation and fewer joints;
- Water pump stations with variable speed drive units for pumps, leading to more economical use of pumps and longer service life;
- Maximising gravity reticulation to reduce reliance on pumps;
- Investing in new technologies to rehabilitate existing reticulation, where appropriate, rather than excavate and replace;

Community infrastructure is installed and maintained on the understanding that the assets are provided in perpetuity for the benefit of future generations. Longevity of an asset is a prime consideration when design and planning is undertaken for new or replacement components in the network.

Council recognises the benefits that come from formalising asset management plans and better monitoring and modelling of the condition and operation of the network.

Actions for Future Improvement

Further action in promoting the sustainability of this activity centres on the following areas:

- More strategic monitoring of the condition and operation of the asset to identify most appropriate renewal priorities;
- Enhanced network modelling to aid prediction of performance and renewal strategies;
- Additional effort to reduce infiltration rates and overflow risks;
- Re-development of Corder Park and Neale Park pump stations to extend life of the existing single main to the Nelson Wastewater Treatment Plant;
- Ongoing monitoring of wastewater quality and advances in treatment options to reduce odour and improve quality of eventual discharge to sea;
- Further investigation of recovery and treating wastewater from Bell Island for sports field irrigation via return pipeline.

8.2 SUSTAINABILITY AND LIFE CYCLE

Historically Council has recognised the fundamentals of sustainable development in the wastewater activity through the adoption of Engineering Standards and construction practises that lead to the maximisation of gravity reticulation and use of long life materials.

Latterly the recognition of formal asset management planning and Network modelling have created a framework for future improvements in this area.

Sustainability has been reflected in the decision making process when designing and constructing the wastewater network to meet the Sustainability Policy criteria of:

- Optimise the efficient use of resources and minimise waste
- Increase the use of renewable resources and reduce greenhouse gas emissions
- Deliver an improved quality of life for the current and future residents of Nelson.

Community infrastructure is installed and maintained on the understanding that the assets are provided in perpetuity for the benefit of future generations. Longevity of an asset is a prime consideration when design and planning is undertaken for new or replacement components in the network.

Increasingly Council is recognising the benefits that come from formalising asset management plans and better monitoring and modelling of the condition and operation of the network. Advances in technology are allowing Council to move towards better

prediction of an asset's performance and adopt a more strategic approach to maintenance and renewals.

8.3 ACTIONS FOR FUTURE IMPROVEMENT

Further action in promoting the sustainability of this activity is considered to centre on the following areas:

- More strategic monitoring of the condition and operation of the asset to identify most appropriate renewal priorities
- Enhanced network modelling to aid prediction of performance and renewal strategies
- Additional effort to reduce infiltration rates and overflow risks
- Redevelopment of the Corder Park and Neale Park Pump Stations
- Ongoing monitoring of wastewater quality and advances in treatment options to improve quality of eventual discharge to sea
- Investigation of further recovery and processing of wastewater components such as treatment pond sludge
- Expanded use of multi-criteria analysis (MCA) to determine the optimal solution while incorporating both short and long term economic, cultural, social, and environmental factors – (To date MCA has been at a formative level with the results of community consultation through the annual plan and specific resource consents process providing the majority of the input into the various factors. Pro-active early consultation, particularly for major items of construction, is seen as the best way of identifying and addressing the cultural and social factors especially.)

9. ASSET MANAGEMENT PLAN IMPROVEMENT AND MONITORING

This section outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the Asset Management Plan.

9.1 GENERAL

An important component of this Asset Management Plan is the recognition that it is a "live" document in need of monitoring, change and improvement over time.

Nelson City Council Wastewater Asset Management Plan will be a regularly revised and evolving document and will be reviewed annually and updated at least every three years to coincide with the Long Term Plan. The Asset Management Plan will be developed throughout its life cycle as further information about the wastewater system assets are collected in terms of condition, performance and service delivery. Nelson City Council is committed to advanced data collection and management systems that will allow for a greater appreciation of the performance and condition of the Nelson City Council assets.

9.2 PERFORMANCE MONITORING AND MANAGEMENT

The effectiveness of the Asset Management plan will be monitored by the following procedures:

- Levels of Service performance reporting to be on a quarterly basis
- Quarterly reporting on the improvement plan and action plan
- Operations reports on a daily, weekly and monthly basis
- Environmental reporting on a monthly basis

The continued monitoring of these performance measures and ongoing analysis of results will result in:

- Optimisation of expenditure through the asset lifecycle
- Service levels actively monitored and reported on
- Management of risk and control of failures

9.3 IMPROVEMENT PLAN

The improvement plan required is summarised in Table 9-1 below.

Table 9-1: Improvement Programme

Action
2014:Review levels of service (especially in relation to sustainability & infiltration)
2015-2025: Improve accuracy of data through review and modification of collection, storage, and auditing
2015: More detailed strategy for critical assets
2015-2025: Expand focus on inter-relationship of network components and development of improved strategies for renewals and replacement
2015-2025: Expand sustainable practice, as noted in the Sustainability Policy, throughout wastewater activity
2015-2025: Ongoing refinement of lifecycle decision making and financial forecasts

9.4 MONITORING AND REVIEW PROCEDURES

9.4.1 Asset Management plan Review

The plan will be reviewed annually and revised every three years coinciding with the Long Term Plan, to incorporate improved decision making techniques, updated asset information, and Nelson City Council policy changes that may impact on the levels of service.

9.4.2 Statutory Audit

The LGA requires that an independent, annual, financial audit of the operations of the Nelson City Council be carried out.

9.4.3 Internal Audit

Annual internal audits will be undertaken to assess the effectiveness of the plan in achieving its objectives. The internal audit will also assess the adequacy of the asset management processes, systems and data.

9.4.4 Benchmarking

Benchmarking of the parts of the Activity is expected to be developed to provide an increased understanding of:

- The efficiency and efficiency variations of individual activities
- Effects of any programmes instigated by the Asset Management Plan
- Operating costs over range of individual activities

Examples of types of benchmarking that are to be considered include tracking progress, responsiveness to service calls, operation costs i.e. $/m/year and energy costs. As trending is obtained and implications understood the benchmarking can be used for additional or revised levels of service.

Local Government New Zealand undertook an extensive benchmarking exercise for core infrastructure in 2014. Ongoing updating of this is expected.

10. ACTION PLAN

10.1 EXPLANATION

Throughout this Wastewater Asset Management Plan, objectives, targets, capital works, maintenance and improvements to general business processes are referred to. Table 10-2 details the Asset Management Plan Action Plan, bringing all of these initiatives together to clearly identify the actions required for the successful implementation of the Asset Management Plan.

The progress of the action plan items noted in the Asset Management Plan are shown in Table 10-1 below.

Table 10-1: 2015-2025 Action Plan

Priority	Action	Completion Date
Inflow and infiltration	Further investigate and develop strategy	2015
Neale Park and Corder Park Pumping Station Upgrades	Redevelop both pump stations	2019
Awatea Place – Pumping Station, Rising Main and Trunk Main upgrades	Construct new pump station and rising main.	2019
Marsden Valley Trunk Main and Express Sewer upgrades	Upgrade network to Songer Street P.S	2016
Quarantine Road Pump Station and Arapiki catchment beheading	Redirect catchment flows from Quarantine Road P.S to Songer Street P.S	2015
Rising Mains and Swallows (gravity pressure main) renewals strategy	Develop strategy for renewals.	2015
Nelson Waste Water Treatment Plant odour issues	Further investigation and desludging of pond to address odours.	Ongoing
Nelson Regional Sewage Business Unit water reuse	Construct pipeline and treatment facility for irrigation water.	On Hold
Sustainable Development	Integrating Council's sustainability vision into individual stormwater activities and projects	Ongoing
Documenting a process for prioritising projects with capital expenditure for growth	Complete process for taking utilities to areas with Services Overlay in the Nelson Resource Management Plan	2019

APPENDIX A: GLOSSARY OF TERMS

Term	Definition
Activity	The work undertaken on an asset or group of assets to achieve a desired outcome
Advanced Asset Management	Asset management which employs predictive modelling, risk management and optimised renewal decision making techniques to establish asset lifecycle treatment options and related long term cashflow predictions. (See Basic Asset Management)
Annual Plan	The Annual Plan provides a statement of the direction of Council and ensures consistency and co-ordination in both making policies and decisions concerning the use of Council resources. It is a reference document for monitoring and measuring performance for the community as well as the Council itself
Annual Report	The audited report published annually (by 30 November) which provides information on how the Local Authority has performed with respect to its policies, objectives, activities, targets, budgets and funding proposals
Asset	A physical facility of value which enables services to be provided and has an economic life greater than 12 months
Asset Management	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner
Asset Management Plan	A plan developed for the management of one or more infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the lifecycle of the asset in the most cost effective manner to provide a specified level of service. A significant component of the plan is a long term cashflow projection for the activities
Asset Management Strategy	A strategy for asset management covering, the development and implementation of plans and programmes for asset creation, operation, maintenance, renewal, disposal and performance monitoring to ensure that the desired levels of service and other operational objectives are achieved at optimum cost
Asset Management System	A system (usually computerised) for collecting analysing and reporting data on the utilisation, performance, lifecycle management and funding of existing assets
Asset Management Team	The team appointed by an organisation to review and monitor the corporate asset management improvement programme and ensure the development of integrated asset management systems and plans consistent with organisational goals and objectives
Asset Register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each
Asset	A physical component of a facility which has value, enables services to be provided and has an economic life of greater than 12 months
Benefit Cost Ratio (B/C)	The sum of the present values of all benefits (including residual value, if any) over a specified period, or the life cycle of the asset or facility, divided by the sum of the present value of all costs
Business Plan	A plan produced by an organisation (or business units within it) which translate the objectives contained in an Annual Plan into detailed work plans for a particular, or range of, business activities. Activities may include marketing, development, operations, management, personnel, technology and financial planning
Cash Flow	The stream of costs and/or benefits over time resulting from a project investment or ownership of an asset

Term	Definition
Components	Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality
Condition Monitoring	Continuous or periodic inspection, assessment, measurement and interpretation of resulting data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action
Consequence	The outcome of an event expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain. There may be a range of possible outcomes associated with an event
Critical Assets	An asset where failure would have significant consequences, either in the ability of the system to provide service to customers or the effect on the environment
Current Replacement Cost	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset
Deferred Maintenance	The shortfall in rehabilitation work required to maintain the service potential of an asset
Demand Management	The active intervention in the market to influence demand for services and assets with forecast consequences, usually to avoid or defer CAPEX expenditure. Demand management is based on the notion that as needs are satisfied expectations rise automatically and almost every action taken to satisfy demand will stimulate further demand
Depreciated Replacement Cost (DRC)	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset
Depreciation	The wearing out, consumption or other loss of value of an asset whether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for by the allocation of the historical cost (or revalued amount) of the asset less its residual value over its useful life
Economic life	The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. The economic life is at the maximum when equal to the physical life however obsolescence will often ensure that the economic life is less than the physical life
Facility	A complex comprising many assets (e.g. a water treatment plant, recreation complex, etc.) which represents a single management unit for financial, operational, maintenance or other purposes
Frequency	A measure of the rate of occurrence of an event expressed as the number of occurrences of an event in a given time
Geographic Information System	Software which provides a means of spatially viewing, searching, manipulating, and analysing an electronic data-base
GUI	Graphical User Interface is a particular case of user interface for interacting with a computer which employs graphical images in addition to text to represent the information and actions available to the user
IMS	Hansen IMS software - Asset Management software product purchased as result of an investigation and needs analysis project
InTouch	The brand of Graphical User Interface (GUI)
Infrastructure Assets	Stationary systems forming a network and serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of

Term	Definition
	its components. The network may include normally recognised 'ordinary' assets as components
Level of service	The defined service quality for a particular activity (i.e. wastewater) or service area (i.e. sewage disposal) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost
Life	A measure of the anticipated life of an asset or component; such as time, number of cycles, distance intervals etc
Life Cycle Cost	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs
Maintenance Plan	Collated information, policies and procedures for the optimum maintenance of an asset, or group of assets
Maintenance Standards	The standards set for the maintenance service, usually contained in preventive maintenance schedules, operation and maintenance manuals, codes of practice, estimating criteria, statutory regulations and mandatory requirements, in accordance with maintenance quality objectives
Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal
Multi-Criteria Analysis (MCA)	Analysis technique that takes a range of criteria into account which are both qualitative and quantitative and reflect the social, cultural, economic, and environmental characteristic of the project outcomes
NZPIM	New Zealand Pipe Inspection Manual - National manual for inspecting and scoring wastewater pipes. Published by New Zealand Water and Waste Association - Second Edition March 1999
NZWWA	New Zealand Water and Wastes Association - National industry association formed for the advancement and application of fundamental and practical knowledge to natural water resources, water use and wastes
Operations & Maintenance Expenditure (Operations and Maintenance)	The cost of operating and maintaining assets. Operations and Maintenance expenditure does not alter the value of an asset and is not included in the asset valuation
Objective	An objective is a general statement of intention relating to a specific output or activity. They are generally longer term aims and are not necessarily outcomes that managers can control
Optimised Depreciated Replacement Cost (ODRC)	The ORC after deducting an allowance for usage to reflect the remaining life of the asset
Operation	The active process of utilising an asset which will consume resources such as manpower, energy, chemicals and materials. Operation costs are part of the life cycle costs of an asset
Optimised Renewal Decision Making (ORDM)	An optimisation process for considering and prioritising all options to rectify performance failures of assets. The process encompasses NPV analysis and risk assessment
Optimised Replacement Cost (ORC)	The minimum cost of replacing an existing asset by another asset offering the same utility most efficiently. The optimisation process adjusts the value for technical and functional obsolescence, surplus assets or over-design
Outcome	The end result for the community which Council hopes to achieve

Term	Definition
Output	Services, actives or goods produced by Council which contribute to achieving an outcome
Performance Measure	A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction
Performance Monitoring	Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards
Rehabilitation	Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally involves repairing the asset using available techniques and standards to deliver its original level of service (i.e. heavy patching of roads, slip-lining of sewer mains, etc.) without resorting to significant upgrading or replacement
Renewal	Works to upgrade, refurbish, rehabilitate or replace existing facilities with facilities of equivalent capacity or performance capability
Renewal Accounting	A method of infrastructure asset accounting which recognises that infrastructure assets are maintained at an agreed service level through regular planned maintenance, rehabilitation and renewal programmes contained in an asset management plan. The system as a whole is maintained in perpetuity and therefore does not need to be depreciated. The relevant rehabilitation and renewal costs are treated as operational rather than capital expenditure and any loss in service potential is recognised as deferred maintenance
Repair	Action to restore an item to its previous condition after failure or damage
Replacement	The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and the likelihood of a particular risk
Risk Assessment	The overall process of risk analysis and risk evaluation
Risk Management	Risk Management is the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, evaluating and monitoring those risks that could prevent a Local Authority from achieving its strategic or operational objectives or Plans or from complying with its legal obligations
Routine Maintenance	Day to day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventative maintenance
Service Potential	The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset
Strategic Plan	Strategic planning involves making decisions about the long term goals and strategies of an organisation. Strategic plans have a strong external focus, cover major portions of the organisation and identify major targets, actions and resource allocations relating to the long term survival, value and growth of the organisation
TKN	Total Kjehldahl Nitrogen. TKN is the combination of organically bound Nitrogen and Ammonia. The combination of the organic nitrogen and the inorganic nitrogen (NH4 Ammonia, NO3 Nitrate, NO2 Nitrite) make up the total nitrogen
Unplanned Maintenance	Corrective work required in the short term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity

Term	Definition
Upgrading	The replacement of an asset or addition/ replacement of an asset component which materially improves the original service potential of the asset
Valuation	Estimated asset value which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels or market value for life cycle costing

A1 Acronyms

Term	Definition
AC	Asbestos cement pipe
ADWF	Average dry weather flow
ATAD	Autothermal thermophilic aerobic digestion plant
AV	Average flow
BNR	Biological nutrient removal
BOD	Biochemical oxygen demand
BTWWTP	Bells island wastewater treatment plant
CCTV	Close circuit television
CDEM	Civil Defence Emergency Management
COD	Chemical oxygen demand
DAF	Dissolved air floatation
FAR	Fixed asset register
FOP	Facultative oxidation ponds
GAAP	Generally Accepted Accounting Principles
HDPE	High-density polyethylene pipe
KPI	Key Performance Indicators
LA	Local Authority
LAPP	Local Authority Protection Programme Disaster Fund
LHCE	Lamp Hole Cleaning Eye
LOS	Levels of Service
LTCCP	Long Term Community Plan
NAMS	National Asset Management Steering Group
NCS	Napier Computer System
NPV	Net present value
NRSA	Nelson Regional Sewerage authority
NRSBU	Nelson Regional Sewerage Business Unit (replaced NRSA in July 2000)
NTL	Network Tasman Limited
NUGS	The Nelson Urban Growth Strategy
P/S	Pump station
PACC	Renewal strategy based on Performance, Asset criticality, Capacity and Condition
QA/QC	Quality Assurance and Quality Control
RCRRJ	Reinforced concrete rubber ring joint pipe
RMA	Resource management act
SCADA	Supervisory control and data acquisition
SS	Suspended solids
STP	Sewerage treatment plant
TA	Territorial Authority

Term	Definition
TKN	Total kjeldahl nitrogen
TP	Total potassium
TSS	Total suspended solids
uPVC	Unplasticised Polyvinyl Chloride pipe
WWTP	Wastewater treatment plant

APPENDIX B: BIBLIOGRAPHY

Title	Date	Author
Nelson City Council Wastewater Asset Management Plan	2005	Nelson City Council
The Development of Business Process Mapping for Asset Management Systems	June 2000	Opus International Consultants Limited
New Zealand Infrastructure Assets Grading Guidelines	1999	New Zealand Water and Waste Association
Member Authority Risk Profile for Infrastructure Assets for Nelson City Council	April 2008	Risk Management Partners
Nelson City Council Long Term Council Community Plan 2006-16	2006	
Nelson City Council Trade Waste Bylaw	2007	Nelson City Council
Nelson City Council Communities for Climate Change Protection Programme – Hearing Report	August 2008	Nelson City Council
Nelson waste Water Treatment lant - Odour Management Plan	April 2007	OPUS
High intensity Rainfall Analysis for Nelson Urban Area	2008	NIWA

APPENDIX C: ASSET DATA AND OVERVIEW

Appendix Table 1: Geographical Information System List of Code Definitions used by Nelson City Council

Value	Description
2000	2000: Meter type
3000	3000: Meter type
ACBK	Black Asbestos Cement
ACMT	Asbestos Cement
ALUM	Aluminium
ARMC	ArmourCoil
BLBT	Blue Brute Pipe
BLKA	Black Asbestos Cement
BRCK	Brick
CIDT	Ductile Cast Iron
CIPT	PitCast Iron
CISP	Spun Cast Iron
CNIL	Concrete (InsituFORM lined)
CONC	Concrete
COPR	Copper
DRNC	Drainage Coil
EWRE	Earthenware
FGLS	Fiberglass
FLDT	Field Tiles
GALV	Galvanised
HDPE	HDPE
HELA	Helcoil Aluminium
HELS	Helcoil Steel
MDPE	Medium Density Pe
NAPP	Not Applicable
OTHR	Other
PE1H	Pe 100 Material
POLE	Pole Construction
PRFC	Perforated Concrete
PVC	uPVC
STCL	Steel Concrete Lined
STNY	Nylon Coated Steel: Used in pump stations
STPL	Steel Pitch Lined
UNKW	Unknown

Appendix Table 2: Length of Mains (m) by Material and Decade of Installation

Decade Installed	Asbestos Cement	Concrete	Earthenware	High Density PE	PVC	Other	Grand Total
1900 - 1909			16			25	41
1910 - 1919	209		7,725			298	8,232
1920 - 1929			2,676				2,676
1930 - 1939		815	6,443			522	7,781
1940 - 1949		769	6,626			8	7,402
1950 - 1959	696	7,496	14,936		244	370	23,741
1960 - 1969	4,123	42,020	8,318		39	94	54,594
1970 - 1979	33,626	18,275	2,978		620	351	55,850
1980 - 1989	32,287	9,293	1,506	104	8,573	234	51,996
1990 - 1999	10,391	3,195	298	5,804	41,536	216	61,441
2000 - 2009		1,386		7,937	59,174	752	69,249
2010 - 2012		115		255	33,778	399	34,547
Total	**81,333**	**83,363**	**51,521**	**14,100**	**143,964**	**3,269**	**377,550**

APPENDIX D: GAP ANALYSIS AND APPROPRIATE PRACTICE

Appendix Table 3: GAP Analysis and Appropriate Practice

Gap Analysis	Assessment Score	Description of Assets												Levels of Service											Managing Growth				
		Physical Description of Asset		Financial Description of Asset		Remaining useful life		Aggregate & Disaggregate Information		- Physical attributes (location, material, age etc)		- Systematic monitoring of condition		- Systematic measurement performance		Define levels of service or performance	Linkage to strategic/community outcomes	Links to other planning documents	Levels of consultation identified and agreement	Service life of network stated	- Evaluating levels of service Options	- Consult levels of service options with community	- Adoption levels of service & Standards after consultation	- Public communication of service level via customer charter or similar	- Monitoring & public reporting	Asset Management Plan's reflect agreed levels of service & how service is delivered	Demand Forecasts (10 year)	Demand Management drivers & strategies	Sustainability Strategies	Forecasts include factors that comprise demand	Sensitivity of asset development (Capital Works) to demand changes
		1.2		1.3		1.4		1.5		1.6		1.7		1.8		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	3.1	3.2	3.4	3.5	3.6
Best	100																														
Excellence	95																														
	90																														
	85																														
	80																														
	75																														
Competent	70																														
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	55																														
	50																														
	45																														
	40																														
	35																														
Systematic	30																														
	25																														

Gap Analysis	Assessment Score	Description of Assets														Levels of Service											Managing Growth				
		Physical Description of Asset		Financial Description of Asset		Remaining useful life		Aggregate & Disaggregate Information		- Physical attributes (location, material, age etc)		- Systematic monitoring of condition		- Systematic measurement performance		Define levels of service or performance	Linkage to strategic/community outcomes	Links to other planning documents	Levels of consultation identified and agreement	Service life of network stated	- Evaluating levels of service Options	- Consult levels of service options with community	- Adoption levels of service & Standards after consultation	- Public communication of service level via customer charter or similar	- Monitoring & public reporting	Asset Management Plan's reflect agreed levels of service & how service is delivered	Demand Forecasts (10 year)	Demand Management drivers & strategies	Sustainability Strategies	Forecasts include factors that comprise demand	Sensitivity of asset development (Capital Works) to demand changes
		1.2		1.3		1.4		1.5		1.6		1.7		1.8		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	3.1	3.2	3.4	3.5	3.6
Aware	20																														
	15																														
Innocent	10																														
	5																														
		CA	NCA	CA	NCA	CA	NCA	CA	NCA	CA	NCA	CA	NCA	CA	NCA																
Current		100	100	80	60	80	50	80	80	80	80	50	10	25	10	90	90	80	80	50	50	50	80	50	80	90	90	80	60	60	70
Desired		100	100	95	80	95	60	80	80	95	80	80	50	95	50	90	90	90	90	90	50	50	80	50	80	90	90	90	95	80	80
5 year Gap		0	0	15	20	15	10	0	0	15	0	30	40	70	40	0	0	10	10	40	0	0	0	0	0	0	0	10	35	20	10

Gap Analysis	Assessment Score	Risk Management									Lifecycle Decision Making										Financial Forecasts					
		Identify critical assets	Identify significant negative effects	Identify associated risks and RM strategies	Recognition & application of principles of integrated risk management to assets	Apply standards (AU/NZ4360) & industry good practice	Integrated with Corporate risk management	-RM encompass identification and risk management strategies for critical assets	RM integrated with Lifelines, disasters recovery, Continuity plans	Integrate with maintenance and replacement strategies	Identify gaps btwn current and req'd svc capability - reflect in development programme		Evaluation and ranking based on criteria of options for significant capital invest decisions for		Ability to predict robust options for asset treatment that assist in achieving optimal costs over life cycle		- Apply agreed evaluation tools to prioritise work programmes		- Predictive modelling to support long-term financial forecasts for maintenance, renewals & new c apital		10 year Financial plan - Maintenance, Renewals, New apital (levels of service and demand)	Validate the Depreciation/ Decline in Service Potential	Translate operational, planned maint, renewal & new work into financial terms over timeframe in which the asset network must deliver services	Translate operational, planned maint, renewal & new work into financial terms over period of strategic plan	Provide consistent financial forecasts & Substantiate	Sensitivity of forecasts
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.2		5.3		5.5		5.6		5.7		6.1	6.2	6.3	6.4	6.5	6.6
Best	100																									
Excellence	95																									
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Competent	70																									
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	45																									
	40																									
	35																									
Systematic	30																									
	25																									
Aware	20																									
	15																									
Innocent	10																									
	5																									
											CA	NCA	CA	NCA	CA	NCA	CA	NCA	CA	NCA						

Gap Analysis	Assessment Score	Risk Management									Lifecycle Decision Making										Financial Forecasts					
		Identify critical assets	Identify significant negative effects	Identify associated risks and RM strategies	Recognition & application of principles of integrated risk management to assets	Apply standards (AU/NZ4360) & industry good practice	Integrated with Corporate risk management	-RM encompass identification and risk management strategies for critical assets	RM integrated with Lifelines, disasters recovery, Continuity plans	Integrate with maintenance and replacement strategies	Identify gaps btwn current and req'd svc capability - reflect in development programme		Evaluation and ranking based on criteria of options for significant capital invest decisions for		Ability to predict robust options for asset treatment that assist in achieving optimal costs over life cycle		- Apply agreed evaluation tools to prioritise work programmes		- Predictive modelling to support long-term financial forecasts for maintenance, renewals & new c apital		10 year Financial plan - Maintenance, Renewals, New apital (levels of service and demand)	Validate the Depreciation/ Decline in Service Potential	Translate operational, planned maint, renewal & new work into financial terms over timeframe in which the asset network must deliver services	Translate operational, planned maint, renewal & new work into financial terms over period of strategic plan	Provide consistent financial forecasts & Substantiate	Sensitivity of forecasts
		4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.2		5.3		5.5		5.6		5.7		6.1	6.2	6.3	6.4	6.5	6.6
Current		90	90	90	90	90	80	80	80	90	80	30	80	50	30	30	30	30	30	30	70	70	50	50	25	25
Demand		100	100	100	90	90	90	90	90	90	90	50	90	50	90	50	90	50	90	50	95	95	95	90	90	90
5 Year Gap		10	10	10	0	0	10	10	10	0	10	20	10	0	60	20	60	20	60	20	25	25	45	40	65	65

Gap Analysis	Assessment Score	Planning Assumptions and Confidence Levels									Outline Improvement Programmes						Planning by Qualified Persons		Commitment					
		List all assumptions and possible effects	Confidence level on asset condition, performance	Accuracy of asset inventory	Confidence level demand\ growth forecasts	Confidence level on financial forecasts	List all assumptions including organisations strategic plan that support asset management - linkages with other planning documents	Confidence levels - Inventory Data; Critical Assets (1), Non Critical (2)	Confidence levels - Condition Data; Critical Assets (1-2), Non Critical (1,2,3)	Confidence levels- Performance Data; Critical Assets (1-2), Non Critical (1,2,3)	Identify improvements to asset management processes & techniques	Identify weak areas & how they will be addressed	Timeframes for improvements	Identify resources required (human & financial)	Improvement programmes are monitored against KPI's	Previous improvements identified and formally reported against KPI's	Asset management Planning should be undertaken by a suitably qualified person	Process should be Peer reviewed	Plan adopted by Council including improvement programme	Plan key tool to support Long Term Council Community Plan	Asset management Plan regularly updated and should reflect progress on improvement plan	Asset management Plan requirements are being implemented and discrepancies formally reported	Asset management Plans evolving as asset management systems provide better information	Asset management Plans updated ever 3 years along with organizations strategic planning cycles
		7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.1	8.2	8.3	8.4	8.5	8.6	9.1	9.2	10.1	10.2	10.3	10.4	10.5	10.6
Best	100																							
Excellence	95																							
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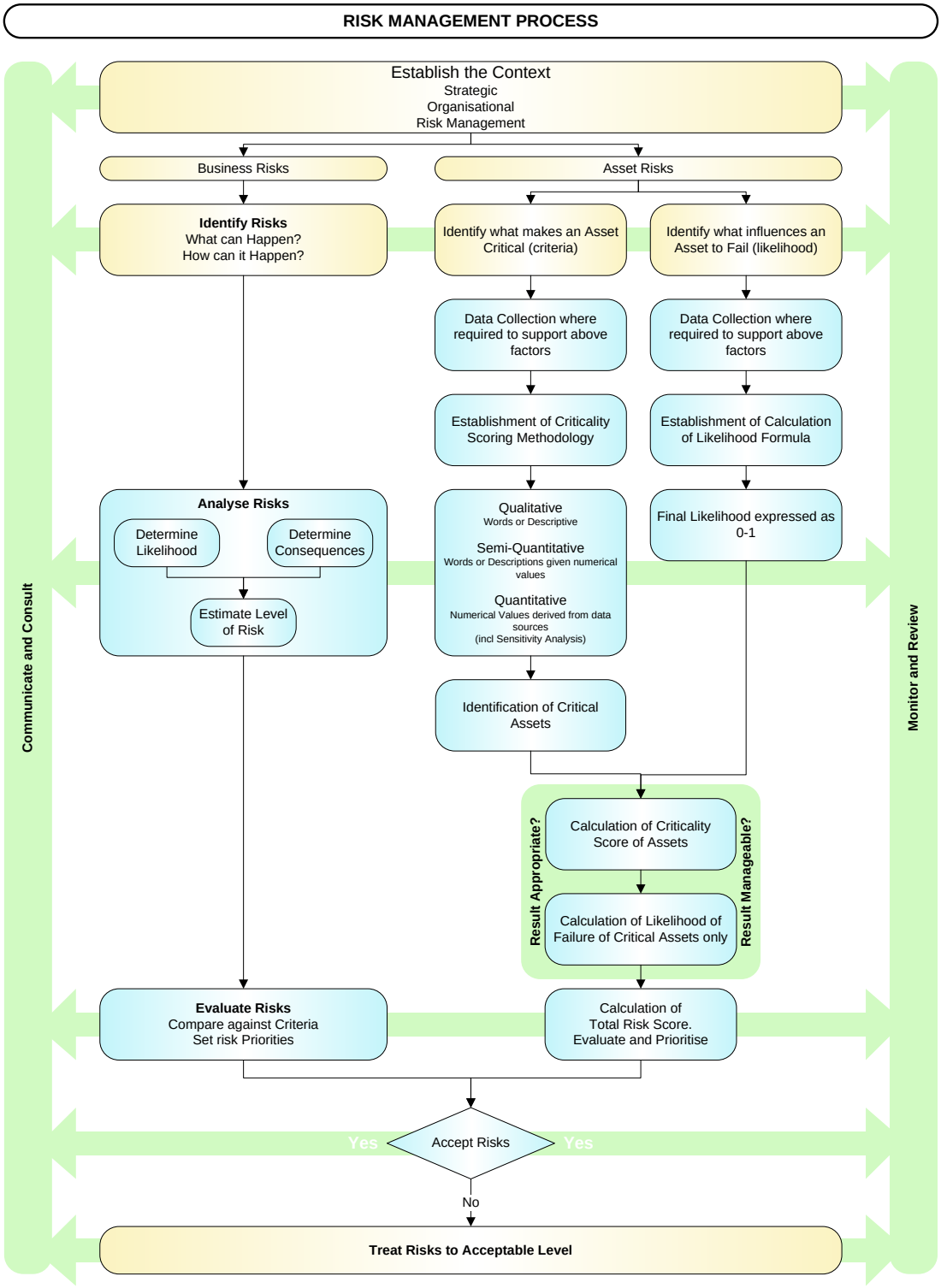
	35																							
Systematic	30																							
	25																							
Aware	20																							
	15																							

Gap Analysis	Assessment Score	Planning Assumptions and Confidence Levels									Outline Improvement Programmes						Planning by Qualified Persons		Commitment					
		List all assumptions and possible effects	Confidence level on asset condition, performance	Accuracy of asset inventory	Confidence level demand\ growth forecasts	Confidence level on financial forecasts	List all assumptions including organisations strategic plan that support asset management - linkages with other planning documents	Confidence levels - Inventory Data; Critical Assets (1), Non Critical (2)	Confidence levels - Condition Data; Critical Assets (1-2), Non Critical (1,2,3)	Confidence levels- Performance Data; Critical Assets (1-2), Non Critical (1,2,3)	Identify improvements to asset management processes & techniques	Identify weak areas & how they will be addressed	Timeframes for improvements	Identify resources required (human & financial)	Improvement programmes are monitored against KPI's	Previous improvements identified and formally reported against KPI's	Asset management Planning should be undertaken by a suitably qualified person	Process should be Peer reviewed	Plan adopted by Council including improvement programme	Plan key tool to support Long Term Council Community Plan	Asset management Plan regularly updated and should reflect progress on improvement plan	Asset management Plan requirements are being implemented and discrepancies formally reported	Asset management Plans evolving as asset management systems provide better information	Asset management Plans updated ever 3 years along with organizations strategic planning cycles
		7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.1	8.2	8.3	8.4	8.5	8.6	9.1	9.2	10.1	10.2	10.3	10.4	10.5	10.6
Innocent	10																							
	5																							
Current		80	80	80	80	80	80	80	80	80	70	60	70	70	50	50	80	80	100	100	100	95	95	100
Desired		90	90	90	90	90	90	90	90	90	90	80	80	80	80	80	80	80	100	100	100	95	95	100
5 Year Gap		10	10	10	10	10	10	10	10	10	20	20	10	10	30	30	0	0	0	0	0	0	0	0

APPENDIX E: RISK

E1 Risk Management Process

Appendix Figure 1: Risk Management Process



E2 Risk Schedules

Risk, likelihood and consequence are:

- Risk is the combination of the likelihood and consequence of an event occurring
- Likelihood is a description of the probability or frequency of an event occurring
- The consequence is the outcome of an event being a loss, injury, disadvantage or gain

For each event the likelihood score is multiplied by the consequence score for each area of impact (there will be only one likelihood but several consequences for each event) – See Appendix Table 4 below. These multiples are then totalled to produce the risk score for the event. The likelihood and consequence tables are shown in the Supplementary Section.

The risk priority ratings and the risk response of the mitigation strategies are detailed in Appendix Table below.

Appendix Table 4: Semi-Quantitative Measures of Consequence and Areas of Impact

Areas of Impact	Descriptor				
	Negligible (10)	**Minor (30)**	**Moderate (50)**	**Major (70)**	**Catastrophic (100)**
Health and Safety	Minor injury possible.	Serious injury to one person.	Serious injury to multiple members of staff, contractor or public.	Single fatality of staff, contractor or public.	Multiple fatalities of staff, contractors or public.
Public Health	Temporary but non-serious health impacts.	Localised serious health impact on one person.	Localised serious health impact on more than 20 people.	Localised or widespread serious health impact on more than 100 people.	Localised or widespread serious health impact on more than 1,000 people.
Asset Performance	Asset failure impacting on one or more persons.	Asset failure impacting on more than 4 people/ day.	Asset failure impacting on more than 40 people/ day.	Asset failure impacting on more than 400 people/day.	Asset failure impacting on more than 4,000 people/day.
Environment and Legal Compliance	Short term and temporary impact requiring no remedial action.	Medium term environmental impact with immaterial effects on environment or community.	Measurable environmental harm to an internationally or nationally significant site. Loss of public access or conservation value of the site.	Major environmental damage with long-term recovery significant investment. High profile legal challenge. Loss of public access or conservation value of a significant environment.	Permanent environmental damage to an internationally or nationally significant site. Large scale class action.
Historical or Cultural	Loss of important records about a site. Work required restoring them.	Unsympathetic development compromising the integrity of a registered historical, cultural or archaeological site.	Damage to a registered historical, cultural or archaeological site, but capable of restoration.	Loss or permanent damage to a registered historical, cultural or archaeological site.	Permanent loss of national icon.
Financial	Capital cost/loss	Capital cost/loss $100k - $500k.	Capital cost/loss	Capital cost/loss	Capital cost/loss
	<$100k.		$500k - $1million.	$1million- $5million.	> $5 million.
Public Perception	Service Request.	Minor complaint.	Justifiable complaint / information request.	Ministerial questions / third party investigations.	Public or ministerial enquiry.

Appendix Table 5: Risk Priority Rating

Risk Score	Level of Risk	Risk Response
>200	Extreme	Awareness of the event to be highlighted to the board
150 - 200	High	Risk treatment required. Risk to be eliminated or mitigated by 30 June 2009
100 - 150	Moderate	Risk treatment required
0 - 100	Low	Managed by routine procedures

Appendix Table 6: Asset Risk Schedule

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
5	Treatment		Treatment Plant	Toxic Discharge to Plant	Failure of biological process resulting in the treatment plants discharges failing to meet consent conditions.	0.70	270	189	High	Current trade waste by-laws prohibit certain toxic discharges to the plant. Trade waste sampling and monitoring programme requires enhancement.	Yes	2	0.40	108	Mod	New AP item	Appoint additional Trade Waste monitoring staff
8	Treatment		Treatment Plant	Equipment/ component Failure	Failure to meet consent conditions.	0.7	230	161	High	Processes within treatment plant have contingencies for failure (duplication of pumps) and alarm systems (Supervisory control and data acquisition).	Yes	2	0.4	92	Low		
9	Treatment		Ponds	Failure to achieve consent conditions: Odour	Failure to comply with resource consents. Customer complaints.	0.7	230	161	High	Recent upgrading work has introduced pre-treatment processes to minimise loading fluctuations. Currently the pond is required to be operated and maintained in a manner that employs best practicable options that includes: - Pond loadings are adjusted for different seasons and conditions - Loading profile of the ponds are known and operated to these limits - A regular pond monitoring and sampling programme is in place	Yes	2	0.4	92	Low	2-2	
10	Treatment		Ponds	Overloading of Components Treatment Capacity	Failure to comply with resource consents. Customer complaints.	0.7	230	161	High	Currently the pond is required to be operated and maintained in a manner that employs best practicable options that includes: - Pond loadings are adjusted for different seasons and conditions - A regular pond monitoring	Yes	2	0.4	92	Low	2-5	

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
										and sampling programme is in place							
75	Treatment			Harm to operators from exposure to sewage	Operator becomes ill from exposure to sewage.	0.2	130	64	Low	Health and Safety training.	Yes	1	0.2	18	Low		
43	Treatment		Treatment Plant	Movement failure caused by, Earthquake, landslide or settlement.		0.01	240	2.4	Low	Civil Defence Emergency Management Plan Emergency procedures manual and exercises Wastewater supply Mutual Aid Plan	Yes	3	0.0	2.4	Low		
44	Treatment		Treatment Plant	Tidal Wave		0.01	240	2.4	Low	Civil Defence Emergency Management Plan Emergency procedures manual and exercises Wastewater supply Mutual Aid Plan	Yes	3	0.0	2.4	Low		
2	Rising Mains	Atawhai	Rising Mains - Concrete	Deterioration and acid attack	Deterioration and failure of asset resulting in loss of service, health and safety issues and wastewater discharges to the environment having an impact on environmental and cultural issues. No waste water from Nelson City can be pumped to waste water treatment plant.	0.7	360	252	Ext	A programme of regular pipe inspections of risk areas will be developed once duplicate main in use. Contingency Plan in EPM	No	2	0.4	144	Mod	5-1 & new AP item	New AP item: Develop Closed circuit television strategy & ensure grading recorded to system
71	Rising Mains	Atawhai	Sewer Mains	Discharge of hazardous substances to the sewer	Significant health and safety risks to operations and contracting personnel. Deterioration and failure of sewer asset resulting in loss of	0.4	290	69	Low	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.4	84	Low	new AP item	Appoint additional Trade Waste monitoring staff

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
					service. Possibility of impairing the treatment process and limiting the reuse of sludge and effluent.												
58	Rising Mains	Atawhai	Rising Mains	Inaccurate and/or Unknown Location of pressure line		0.2	310	62	Low	Develop As-Built Plan of reticulation.	Yes	2	0.2	18	Low		
56	Rising Mains	Atawhai	Rising Mains	Movement failure caused by, Earthquake, landslide or settlement.		0.01	410	4.1	Low	Civil Defence Emergency Management Procedures Manual.	Yes	3	0.01	3.2	Low		
57	Rising Mains	Other	Rising Mains	Deterioration		0.7	270	189	High	Prevention through inspection and remedial strategy.	Yes	2	0.7	175	High	5-1 & new AP item	New AP item: Develop Closed circuit television strategy & ensure grading recorded to system
71	Rising Mains	Other	Sewer Mains	Discharge of hazardous substances to the sewer	Significant health and safety risks to operations and contracting personnel. Deterioration and failure of sewer asset resulting in loss of service. Possibility of impairing the treatment process and limiting the reuse of sludge and effluent.	0.4	290	69	Low	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.4	84	Low	new AP item	Appoint additional Trade Waste monitoring staff
58	Rising Mains	Other	Rising Mains	Inaccurate and/or Unknown Location of pressure line		0.2	310	62	Low	Develop As-Built Plan of reticulation.	Yes	2	0.2	18	Low		
56	Rising Mains	Other	Rising Mains	Movement failure caused by,		0.01	410	4.1	Low	Civil Defence Emergency Management Procedures	Yes	3	0.01	3.2	Low		

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
				Earthquake, landslide or settlement.						Manual.							
50	Reticulation		Gravity - Trunk Mains	Sewerage Blockages (Overflow)		0.9	230	207	Ext	Renewal of old pipelines. Clear blockage.	Yes	1	0.7	105	Mod		Ongoing renewal programme.
51	Reticulation		Gravity - Trunk Mains	Non-compliant Trade waste / Hazardous Waste discharge to network		0.7	250	175	High	Prevention through future enhanced monitoring.	Yes	2	0.7	77	Low	new AP item	Appoint additional Trade Waste monitoring staff
49	Reticulation		Gravity - Trunk Mains	Stormwater Infiltration (Overflow)		0.9	190	171	High	Renewal of old pipelines and investigation of private sewers.	Yes	4	0.7	105	Mod	5-1 & new AP item	New AP item: Develop Closed circuit television strategy & ensure grading recorded to system
72	Reticulation		Sewer Mains	Discharge of deleterious substances to the sewer	Silt and gravel in the sewer system can obstruct and block sewer pipelines as well as cause excessive wear to pump stations. Fat and grease can deposit on the inside of the pipeline causing obstruction and blockages.	0.7	150	161	High	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.7	77	Low	new AP item	Appoint additional Trade Waste monitoring staff
54	Reticulation		Gravity - Trunk Mains	Design of future infrastructure		0.4	290	116	Mod	Continuous improvement and innovation in design.	Yes	1	0.4	60	Low		
55	Reticulation		Gravity - Trunk Mains	Pipe Collapse		0.4	250	100	Low	Strategic approach to renewal regualr inspection.	Yes	2	0.4	60	Low		Develop Closed circuit television monitoring strategy
73	Reticulation		Sewer Mains	Discharge of high flows and/or loads	High peak flows to the sewer increase the likelihood of overflows	0.9	130	96	Low	Regular monitoring of pump station flows.	Yes	3	0.9	99	Low	new AP item	Calibrate pump station flow meters & regular

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
				to the sewer	at manholes and pump stations. Discharge of high loads to the sewer can effect the operation of the treatment plant.												monitoring to detect possible inaccuracies
71	Reticulation		Sewer Mains	Discharge of hazardous substances to the sewer	Significant health and safety risks to operations and contracting personnel. Deterioration and failure of sewer asset resulting in loss of service. Possibility of impairing the treatment process and limiting the reuse of sludge and effluent.	0.4	290	69	Low	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.4	84	Low	new AP item	Appoint additional Trade Waste monitoring staff
52	Reticulation		Gravity - Trunk Mains	Inaccurate and/or Unknown Location of sewer line		0.4	170	68	Low	Develop As-Built Plan of reticulation.	Yes	2	0.4	60	Low		
53	Reticulation		Gravity - Trunk Mains	Odours from Reticulation		0.3	150	45	Low	Trunk mains vented.	Yes	1	0.2	22	Low		
47	Reticulation		Gravity - Trunk Mains	Mains up to 175mm dia.Failure caused by Earthquake, landslide or settlement.		0.01	350	3.5	Low	Localised facilities to be isolated and repaired as a priority work. Extensive failures discharge to environment and public health warnings put in place by Civil Defence Emergency Management Plan.	Yes	1	0.01	3.5	Low		
48	Reticulation		Gravity - Trunk Mains	Mains > 175mm Failure caused by, Earthquake, landslide or settlement.		0.01	330	3.3	Low	As above.	Yes	1	0.01	3.5	Low		
59	Pump Stations	Neale Park	Pump	Power failure/Syste		0.9	230	207	Ext	Stand-by generators and additional storage capacity	Yes	2	0.5	105	Mod	new AP	Formalise strategy for failure of

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
			Stations	m failure						[reduces probability of failure]						item	pump station
7	Pump Stations	Neale Park	Pump Stations	Equipment/ component failure	Wastewater discharges to the environment having an impact on environmental, cultural and health issues. Customer complaints. No wastewater from Nelson City can be pumped to waste water treatment plant.	0.9	190	171	High	Processes within pump station that have contingencies for failure (duplication of pumps) or alarm systems (Supervisory control and data acquisition) installed.	Yes	3	0.7	133	Mod	new AP item	Formalise strategy for failure of pump station
72	Pump Stations	Neale Park	Sewer Mains	Discharge of deleterious substances to the sewer	Silt and gravel in the sewer system can obstruct and block sewer pipelines as well as cause excessive wear to pump stations. Fat and grease can deposit on the inside of the pipeline causing obstruction and blockages.	0.7	150	161	High	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.7	77	Low	new AP item	Appoint additional Trade Waste monitoring staff
12	Pump Stations	Neale Park	Pump Stations	Insufficient Wet Weather Storage Capacity	Insufficient storage or capacity resulting in wastewater discharges to the environment having an impact on environmental and cultural issues	0.7	210	147	Mod	All pump stations have high level and overflow alarms for advance warning of an overflow event and high capacity pumps for peak flow conditions. Wet weather overflows due to volumes greater than the design limit require storage or resource consent for discharge to the environment.	Yes	3	0.7	147	Mod	new AP item	Investigate storage capacity of network, document, & develop mitigation strategy
61	Pump Stations	Neale Park	Pump Stations	Odours from pump Stations		0.7	190	133	Mod	Ventilation and biofilters. Distance from public areas.	Yes	2	0.7	105	Mod	new AP item	Identify pump station in need of odour mitigation and develop strategy to include possible

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
																	use of biofilters
62	Pump Stations	Neale Park	Pump Stations	Corrosion and sulphur attack		0.4	210	84	Low	Regular inspection and monitoring of effluent.	Yes	2	0.4	68	Low		
71	Pump Stations	Neale Park	Sewer Mains	Discharge of hazardous substances to the sewer	Significant health and safety risks to operations and contracting personnel. Deterioration and failure of sewer asset resulting in loss of service. Possibility of impairing the treatment process and limiting the reuse of sludge and effluent.	0.4	290	69	Low	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.4	84	Low	new AP item	Appoint additional Trade Waste monitoring staff
64	Pump Stations	Neale Park	Pump Stations	Designs of infrastructure		0.2	250	50	Low	Continuous improvement and innovation in design.	Yes	2	0.2	30	Low		
65	Pump Stations	Neale Park	Pump Stations	Vandalism		0.2	110	22	Low	Construction compounds or of vandal resistant materials.	Yes	2	0.2	18	Low	new AP item	Review all pump stations for vandalism risk.
60	Pump Stations	Neale Park	Pump Stations	Movement failure caused by earthquake, landslide or settlement.		0.01	280	2.8	Low	Civil Defence Emergency Procedures Manual.	Yes	3	0.01	2.8	Low		
63	Pump Stations	Neale Park	Pump Stations	Tidal wave inundation		0.01	250	2.5	Low	Civil Defence Emergency Management Plan. Emergency Procedures Manual.	Yes	2	0.01	2.5	Low		
59	Pump Stations	Other	Pump Stations	Power failure/System failure		0.9	230	207	Ext	Stand-by generators and additional storage capacity.	Yes	2	0.7	147	Mod	new AP item	Formalise strategy for failure of pump station
72	Pump Stations	Other	Sewer Mains	Discharge of deleterious substances to the sewer	Silt and gravel in the sewer system can obstruct and block sewer pipelines as well as cause excessive wear to	0.7	150	161	High	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.7	77	Low	new AP item	Appoint additional Trade Waste monitoring staff

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
					pump stations. Fat and grease can deposit on the inside of the pipeline causing obstruction and blockages.												
12	Pump Stations	Other	Pump Stations	Insufficient Wet Weather Storage Capacity	Insufficient storage or capacity resulting in wastewater discharges to the environment having an impact on environmental and cultural issues	0.7	210	147	Mod	All pump stations have high level and overflow alarms for advance warning of an overflow event and high capacity pumps for peak flow conditions. Wet weather overflows due to volumes greater than the design limit require storage or resource consent for discharge to the environment.	Yes	3	0.7	147	Mod	new AP item	Investigate storage capacity of network, document, & develop mitigation strategy
	Pump Stations	Other	Pump Stations	Insufficient Dry Weather Storage Capacity	Insufficient storage or capacity resulting in wastewater discharges to the environment having an impact on environmental and cultural issues	0.7	210	147	Mod	All pump stations have high level and overflow alarms for advance warning of an overflow event and high capacity pumps for peak flow conditions. Back up emergency generation Increase system storage capacity for 4 hrs average dry weather flow	Yes	1	0.4	84	Low	new AP item	Investigate storage capacity of network, document, & develop mitigation strategy
61	Pump Stations	Other	Pump Stations	Odours from pump Stations		0.7	190	133	Mod	Ventilation and biofilters. Distance from public areas.	Yes	2	0.7	105	Mod	new AP item	Identify pump station in need of odour mitigation and develop strategy to include possible use of biofilters
62	Pump Stations	Other	Pump Stations	Corrosion and sulphur attack		0.4	210	84	Low	Regular inspection and monitoring of effluent.	Yes	2	0.4	68	Low		
71	Pump Stations	Other	Sewer Mains	Discharge of hazardous substances to the sewer	Significant health and safety risks to operations and contracting personnel.	0.4	290	69	Low	Trade Waste consents and Trade Waste Bylaw. Regular inspection of pump stations.	Yes	3	0.4	84	Low	new AP item	Appoint additional Trade Waste monitoring staff

Item	Asset Group	Sub group	Risk Location	Risk Event	Consequence or Outcome	Gross Risk				Mitigation Strategy			Residual Risk			Action Plan	
						Likelihood	Impact	Gross Risk	Risk Assessment	Description	Operational	Control Effectiveness	Likelihood	Residual Risk	Risk Assessment	(AP) Ref	Action Plan Description
					Deterioration and failure of sewer asset resulting in loss of service. Possibility of impairing the treatment process and limiting the reuse of sludge and effluent.												
64	Pump Stations	Other	Pump Stations	Designs of infrastructure		0.2	250	50	Low	Continuous improvement and innovation in design.	Yes	2	0.2	30	Low		
65	Pump Stations	Other	Pump Stations	Vandalism		0.2	110	22	Low	Construction compounds or of vandal resistant materials.	Yes	2	0.2	18	Low	new AP item	Review all pump stations for vandalism risk.
60	Pump Stations	Other	Pump Stations	Movement failure caused by earthquake, landslide or settlement.		0.01	280	2.8	Low	Civil Defence Emergency Procedures Manual.	Yes	3	0.01	2.8	Low		
63	Pump Stations	Other	Pump Stations	Tidal wave inundation		0.01	250	2.5	Low	Civil Defence Emergency Management Plan. Emergency Procedures Manual.	Yes	2	0.01	2.5	Low		

E3 Local Authority Protection Programme Disaster Fund

Local Authority Protection Programme Disaster Fund is a cash accumulation mutual pool with Civic Assurance as the Fund's Administration Manager.

The Fund was established in 1993 by Local Authorities to meet Government legislation brought out in 1991 and covers local authority owned infrastructural assets which are considered generally uninsurable. These include:

- Water reticulation, treatment and storage
- Wastewater reticulation and treatment
- Stormwater drainage
- Dams and canals
- Flood protection schemes including stop banks
- Flood gates, seawalls and harbour risks such as buoys, beacons and uninsurable foreshore lighthouses

Roads and bridges are not covered by the Fund as local authorities have access to NZ Transport Agency subsidies.

The Fund is designed as catastrophe protection only, covering serious disruptive loss or damage caused by sudden events or situations which may or may not involve the declaration of a Civil Defence Emergency. Perils include but are not necessarily limited to earthquake, storms, floods, cyclones, tornados, volcanic eruption, tsunami and other disasters of a catastrophic nature such as a major gas explosion.

In July 1991 central government introduced a Disaster Recovery Plan which places specific responsibilities on local authorities. In order for them to be eligible for a contribution by Central Government of up to 60% of the restoration costs of infrastructural damage from a catastrophe, local authorities have to demonstrate it can meet the remaining 40% through:

- Proper maintenance
- The provision of reserve funds
- Effective insurance

The Local Authority Protection Programme Disaster Fund was established in 1993, to help its New Zealand local authority members pay their share of infrastructure replacement costs in a catastrophe.

- Of the 85 local authorities in New Zealand, 53 are currently fund members. Fund equity is approximately NZ$30 million and targeted to reach $40million when contributions are likely to be suspended; the fund is also supplemented with reinsurance to enhance this balance

The trustees require as a condition of fund membership that all member authorities undergo a full risk management assessment programme. As a result, high risk exposures are identified and remedial action taken to help reduce the potential drain on the fund and to minimise the impact on communities.

APPENDIX F: LEVELS OF SERVICE 2012-2022 Long Term Plan, 2009-2019 Long Term Council Community Plan, 2006–2016 Long Term Council Community Plan & 2005 Asset Management Plan

The following detail the levels of service indicated in the 2012-2022 Long Term Plan, 2009-2019 Long Term Council Community Plan 2006 – 2016 Long Term Council Community Plan and the 2005 Wastewater Asset Management Plan.

2012-22 Long Term Plan

Table 2-5: Levels of Service

What Council will provide	Performance Measures	Targets			Targets in Years 4 - 10
		Year 1	Year 2	Year 3	
A fully operational wastewater treatment plant	Level of compliance of treatment plant with resource consent conditions	100% compliance	Maintain 100% compliance	Maintain	Maintain
Emergency response	Time taken to respond and investigate emergencies	Respond and investigate emergency works within 30 min and repairs within eight hours	Maintain	Maintain	Maintain
Environmental protection	Level of compliance with resource consent conditions for accidental discharges from the network	100% compliance	Maintain	Maintain	Maintain
	Number of confirmed odour complaints per annum associated with a pump station	No more than three confirmed odour complaints a year associated with a pump station	Maintain	Maintain	Maintain

Appendix Table 7: Levels of Service: 2009 – 2019 Long Term Council Community Plan

What Council will provide	Performance Measures	Current Performance	Targets			Targets in Years 4 - 10
			Year 1	Year 2	Year 3	
A fully operational wastewater treatment plant	Level of compliance of treatment plant with resource consent conditions	Not Achieved Complied with all existing conditions for discharge consents. Breached odour conditions for Nelson North Wastewater Treatment Plant	100% compliance	Maintain 100% compliance	Maintain	Maintain
Emergency response	Time taken to respond and investigate emergencies	Achieved Contractor records show 100% response within 30 minutes for emergency works and 100% response within two hours for other non-urgent investigations. All repairs within eight hours	Respond and investigate emergency works within 30 min and repairs within eight hours	Maintain	Maintain	Maintain
Environmental protection	Level of compliance with resource consent conditions for accidental discharges from the network	No base line data Application lodged for resource consent for accidental discharges from the network, not yet processed*	100% compliance	Maintain	Maintain	Maintain
	Number of confirmed odour complaints per annum associated with a pump station	Achieved Two odour events from central Nelson pump station	No more than three confirmed odour complaints a year associated with a pump station	Maintain	Maintain	Maintain

Appendix Table 8: Levels of Service: 2009 – 2019 Long Term Council Community Plan

What Council will provide	Measures	Target(s)	Current status	How we will do this
A fully operational wastewater treatment plants and network reticulation/pipes	Number of complaints for odour and number of dry weather overflows	Less than three odour events for the Nelson North Waste Water plant and only one dry weather overflow per annum.	There was one odour complaint and no dry weather overflow events in 2007/08	Through scheduled maintenance and renewals.
	Response time to emergencies	Provide a prompt and reliable response to service requests and system failures. Respond and investigate emergency works within 30 minutes and undertake repairs within eight hours.	A satisfactory 24/7 response is provided by contractors with 100% compliance with response within 30 minutes and 97% of repairs completed within eight hours.	Through provision of a 24 hour phone service and contractors on call out. Upgrade pump stations and implement emergency generator response plan. Continue inflow and infiltration monitoring and target critical areas.
	Compliance with resource consent conditions	All resource consent conditions are complied with	New resource consent conditions come into effect 1 July 2008 and will be reported on in the 2008/09 Annual Report.	Stage 2 wetlands are under construction. Network reticulation upgrades and renewals ongoing. Complete construction of wetlands in 2009/10, which will cost a total of $2.5 million.

Appendix Table 9: Levels of Service: 2006 – 2016 Long Term Council Community Plan

Criteria	Service levels	Performance measures and targets	Current results
Resident satisfaction	Results from residents' survey	80% satisfied or very satisfied	n/a
Environmental quality	Odour events	• No complaints after plant upgrade • <3 complaints per annum re reticulation network	☺ No odour events from Nelson North ponds recorded 2004/05 (2005 annual report) ☹ 9 complaints in 2004/05 (2005 annual report)
Capacity	Amount of flow during wet weather	Infiltration during wet weather < 10 times the flow during dry weather	😐 New monitoring systems being installed at pump stations
Reliability	The number of pump station overflows	< 2 dry weather overflows per annum	☹ (2005 annual report)
Reliability	Sewer blockages	< 100 blockages per 100 km of pipes	☺ only 249 blockages in 350 km of pipes (2005 annual report)
Customer response	Speed of response to problems raised by public	Respond and investigate emergency works within 30 minutes. Repair within 8 hours.	☺ (2005 annual report)
Environmental quality	Resource consents	All resource consent conditions complied with	☺ (2005 annual report)

Appendix Table 10: Wastewater Levels of Service: 2005 Asset Management Plan

Consent	Key Criteria	Current Levels of Service	Target Levels of Service	Performance Measure	Action
Consents Level of Service Summary					
Treated effluent discharge consent	Iwi consultation	Consultation provided	5 yearly consultation with iwi on treatment facility and outfall	Record consultation with iwi	Consult with local iwi in 2009 and every 5 years thereafter
	Record accuracy	Magflow meter installed specified accurate to +/- 5%	Records of outflow to +/- 5% accuracy to be kept	Record overflows	Annual analysis of outflow records to confirm accuracy
	Outflow limit	Peak outflow 28,000m³/day	Peak daily flow not to exceed 38,000 m³/day in a 2 year rainfall event	Record daily flows	Annual analysis of outflow records to confirm compliance
	Faecal coliforms	Mean 312,000 / 100ml. 22% of samples exceed 80,000 / 100ml	Median faecal coliform count not to exceed 10,000 / 100ml and not more than 1 of 12 monthly samples to exceed 80,000 / 100mls	Record monthly faecal coliform test results	All results to be kept, action to be taken if any breach of consent is identified
	Biochemical oxygen demand 5	Mean 81g/m³ 74% of samples exceed 50g/m³	Median five day Biological Oxygen Demand (Biochemical oxygen demand 5) over a one year period is not to exceed 40g/ m³ and not more than 8.3% of samples shall exceed 50g/ m³	Record monthly (outflow) Biochemical oxygen demand 5	All results to be kept, action to be taken if any breach of consent is identified
	Trace metals	No records	9 trace metals not to exceed limits detailed in consent	Record annual trace metal test results	All results to be kept, action to be taken if any breach of consent is identified

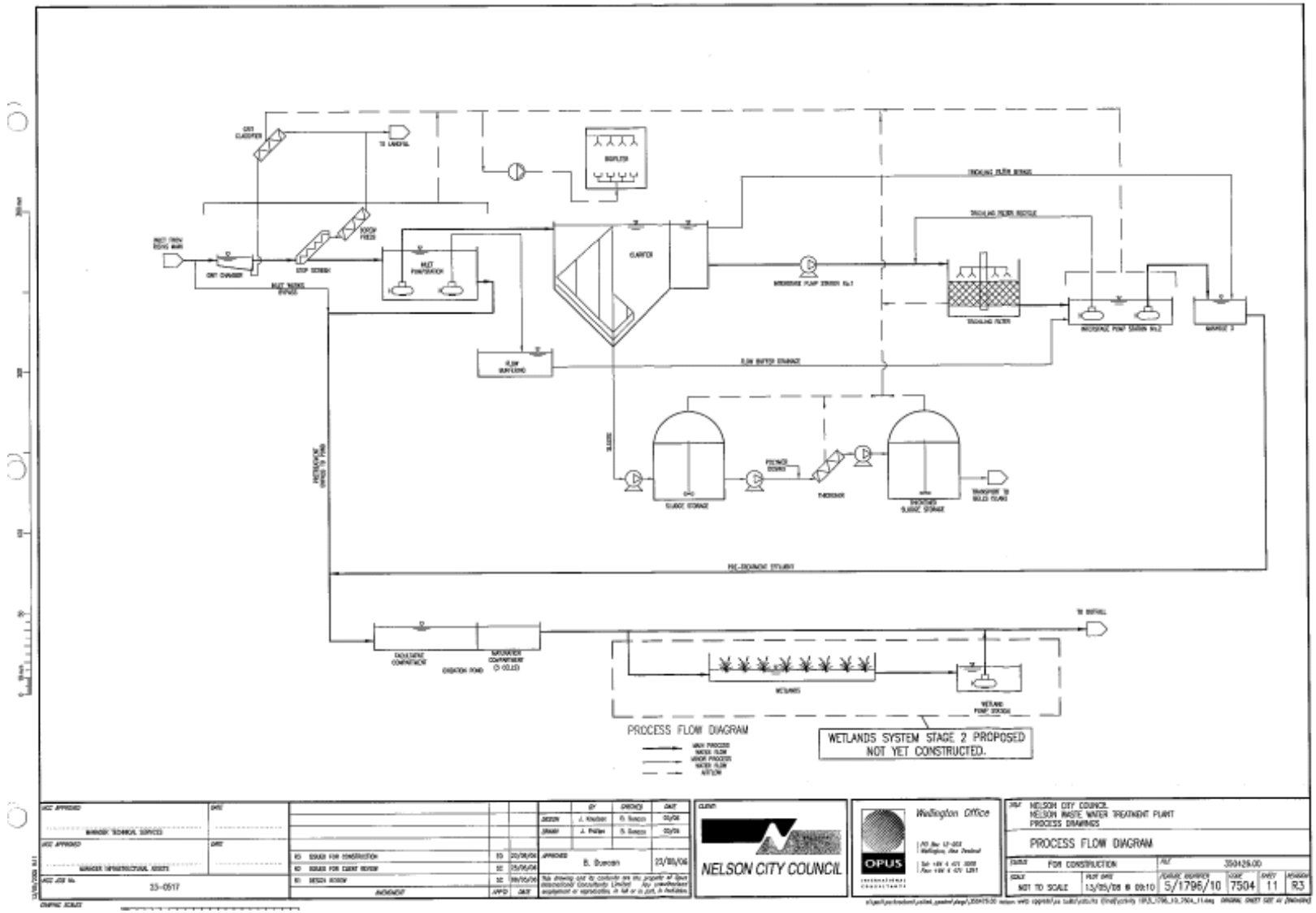
Consent	Key Criteria	Current Levels of Service	Target Levels of Service	Performance Measure	Action
	Receiving environment	No records	3 monthly monitoring of enterococci, e-coli and faecal coliform tests at 250m, 500m and 100m from outfall point	Record monitoring results	All results to be submitted to Divisional Manager Planning and Consents. Note this requirement may lapse after 2 years at the discretion of DM P&C
	Reporting requirements	First due June 2005	Annual report to be submitted to Divisional Manager Planning and Consents on June 30 each year	Report and feedback to be recorded in file system	Complete report annually
	Wetlands	Due 2009	Wetlands to be constructed to commence in 2009 (November)	Record progress on wetland construction	Construct wetlands as required
	Outfall monitoring and maintenance	First due 2009	Reports of 5 yearly inspection of outfall required and maintenance to be completed as required	Record outfall inspection results	Inspect outfall in 2009 and every 5 years thereafter
Overflow discharge to freshwater	*Consent not yet obtained*	No Consent	No more than 10 wet weather overflows and no more than 2 dry weather overflows per annum	Record pump station overflows	Obtain consent by 31 June 2006
Overflow discharge to coastal marine	*Consent not yet obtained*	No Consent			Obtain consent by 31 June 2006
Odour Complaint Level of Service Summary					
Treatment Plant	No odours from upgraded treatment plant	<=5 complaint events per year regarding odours originating from the treatment plant	No complaints about odours originating from the treatment plant (once the upgrade has been	Record odour complaints in Hansen System	Complete treatment plant upgrade as programmed Improve Hansen system to accurately log odour source

Consent	Key Criteria	Current Levels of Service	Target Levels of Service	Performance Measure	Action
			completed)		
Reticulation	Odours from reticulation system	<=3 complaint events per year regarding odours originating from the reticulation system	<=3 complaint events per year regarding odours originating from the reticulation system	Record odour complaints in Hansen system	Improve Hansen system to accurately log odour complaints in particular to identify their source by 31 June 2005 Act on any records of odour complaints that exceed levels of service
Capacity Level of Service Summary					
Reticulation	Reduce inflow/ infiltration	Peak flows of up to 15xaverage dry weather flow	Peak flows no more than 10xaverage dry weather flow with a long term vision of 6 x average dry weather flow	Record PWWF: average dry weather flow ratio for each pump station	Model the network and establish priority catchments for inflow/infiltration reduction Target inflow/infiltration reduction programmes to priority catchments
Pump station overflows	Wet weather overflows	Up to 15 overflows per annum	≤5 per rainfall overflow event ≤10 storm induced overflows per annum	Record Pump station overflows	Ensure all pump stations are fully equipped with Supervisory control and data acquisition telemetry system Where a pump station causes repeated overflows during wet weather investigate the causes and work to reduce the risk of overflows re-occurring
Treatment Plant	Ensure capacity is not exceeded	Pond prone to failure due to inability to manage loads	Operate the treatment plant to ensure that the capacity of the components is not exceeded	Record load and flow impact on components	Identify capacity limits of the components and compare loads and flows with these limits
Reliability Levels of Service Summary					
Pump stations	Dry weather overflows	Up to 5 overflows per annum	≤2 overflow events per annum	Record Pump station overflows and corresponding weather conditions	Provide 4 x average dry weather flow flow storage where site and budget constraints permit Identify causes of overflows and ensure that renewal/upgrade programme considers priority of assets that are causing excessive overflows Upgrade all motors and pumps by 2014 (10 year

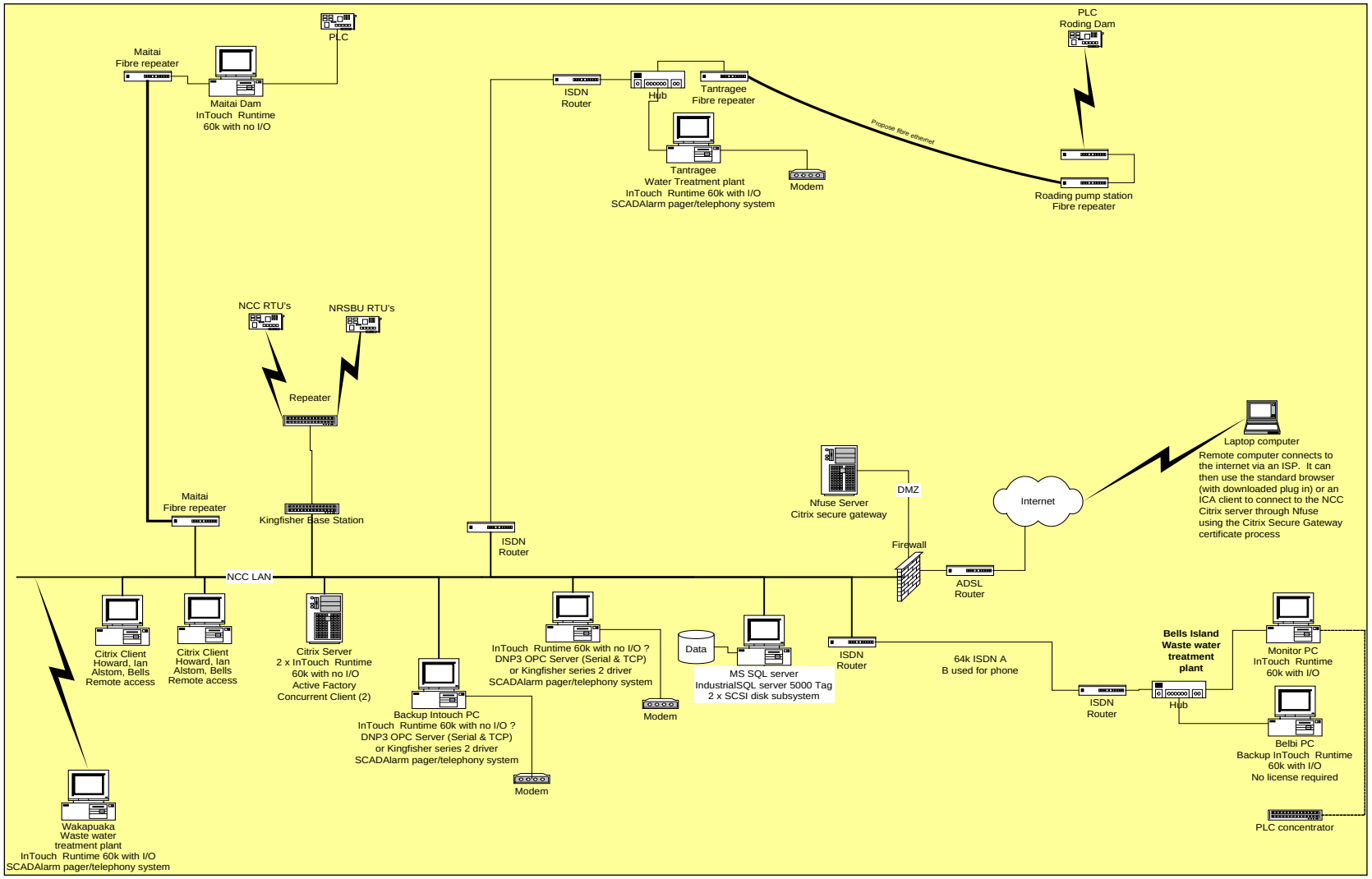
Consent	Key Criteria	Current Levels of Service	Target Levels of Service	Performance Measure	Action
					programme)
Reticulation blockages	Reduce blockages	Approx 100 blockages per 100km of pipe	Blockages in gravity reticulation system to be less than 100 blockages per 100 km of reticulated gravity system per annum	Record all blockages in Hansen system	Produce an annual Closed circuit television survey programme that represents older sections of the reticulated network for ongoing maintenance work Ensure renewal/upgrade programme considers priority of assets that are failing due to repeated blockages
Trade Waste Level of Service Summary					
'A'	By-Law compliance	95% + compliant. Only occasional breaches of limits are detected	Category 'A' trade waste discharge is in accordance with Clause 12 of Nelson City Council's Trade Waste By-Law and that 100% compliance is met	Record all Category 'A' users discharges on a 3 monthly basis	Category 'A' discharges are monitored every 3 months Breaches are identified
'B'	By-Law compliance	None	Category 'B' trade waste discharge is in accordance with Clause 12 of Nelson City Council's Trade Waste By-Law and that 100% compliance is met for those contributors audited	Record all Category 'B' users	Consent and monitor trade waste 'B' sites by 2006/7
'C'	Discharges are identified	None	Category 'C' trade waste discharges are identified	Record all Category 'C' users	

APPENDIX G: SCHEMATICS

Appendix Figure 2: Nelson Waste Water Treatment Plant Schematic



Appendix Figure 3: Supervisory control and data acquisition Schematic



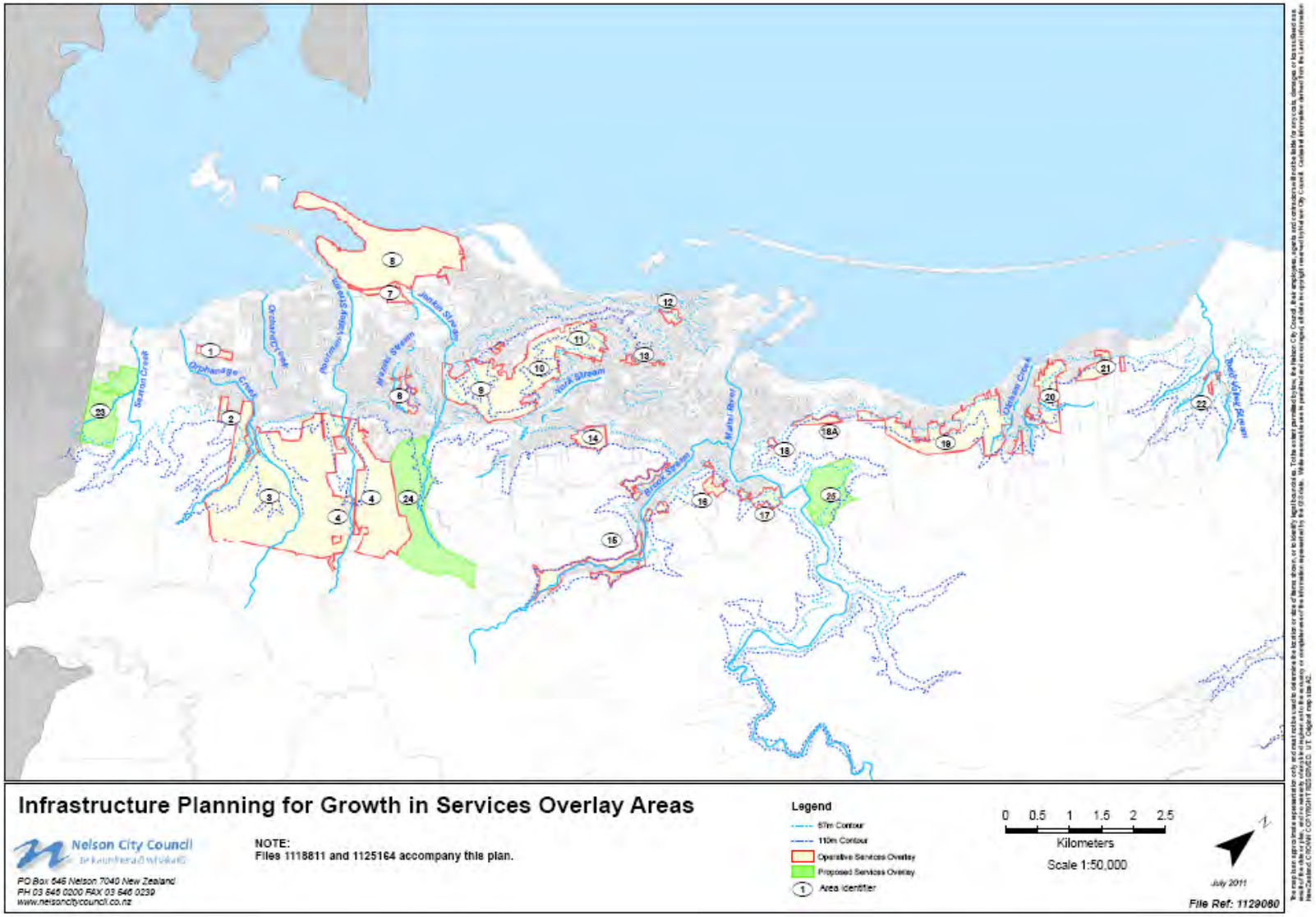
APPENDIX H: SUMMARY FINANCIALS

CAPITAL EXPENDITURE ($000)

Project	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
Arapiki/Quarantine trunk main	91	1,558	1,610							
Atawhai air valve odour control	19	21	64							
Atawhai pump station									108	
Awatea Place		311	54	722	2,301	716				
Awatea Place pump station	11									
Beatson Road	120									
Corder Park pump station	78	1,039	1,932							
Enner Glynn trunk main							62		474	
Franklyn Street	170									
Jenner Road	50									
Kawai Street	190									
Marsden Valley express sewer	94			777						
Marsden Valley trunk main	584	260								
Neale Park pump station	226		215	266	92	3,582	2,485			
Ngawhatu Valley trunk main	44		376							
North Nelson Wastewater Treament Plant	2,251								14	
Pipe Fittings: flow meters	42	43	45	46	48	49	50	52	54	55
Portable generators	60									
Pump station storage				133	138	143				
Regional Sewerage Business Unit/ Bell Island (NRSBU)	824	0	0	3,408	0	0	2,832	324	5,588	5,845
Renewals pump stations	215	224	232	240	248	258	268	280	292	306
Renewals: NRSBU	286	119	141	550	1,017	446	494	337	2,272	244
Renwick Place	11									
Rising/swallows renewals	134	52	746	55	799	60	863	65	941	71
Stoke/ Tahuna	6									
Tasman: Halifax-Grove	25									
Wastewater pipe renewals	26	545	563	583	604	627	652	680	711	743
Staff Time	329									
Total	**5,883**	**4,172**	**5,977**	**6,780**	**5,247**	**5,882**	**7,707**	**1,737**	**10,453**	**7,265**

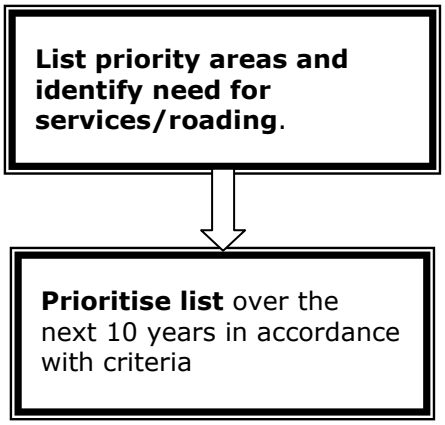
APPENDIX I: INFRASTRUCTURE PLANNING TOOL FOR GROWTH PROJECTS

Appendix Figure 4: Services Overlay Areas



Infrastructure Planning Process for Growth Projects in Asset Management Plan's which inform the Long Term Plan

This document outlines the strategic planning process with respect to the prioritisation of projects going into Councils core Asset Management Plans (roading, wastewater, water and stormwater) to facilitate growth and therefore support their inclusion in the Long Term Plan.



These are areas zoned for development but located within the Services Overlay (including PC 13, 14, 17 & 18)

Refer Map 1129060 and Document 1139245

Criteria (Weight for objectivity):

Cost to service versus estimated Household Unit of Demand (HUD) or HUD equivalent yield (i.e. maximise development potential/$, including any extraordinary ongoing maintenance costs of future assets vested in Council)

Risk and Hazards for utility development

Appropriateness of onsite mitigation for utilities

Indication of development timing and other Council projects in the same vicinity that can be brought together at the same time.

Capital expenditure already identified in previous Annual Plan or Long Term Council Community Plan/LONG TERM PLAN

Coordinate

Ensure projects identified and prioritised for inclusion in the Asset Management Plan's are coordinated with each other across Asset Management Plan's (i.e. funding servicing to eliminate constraints to areas in the Services Overlay one by one in an integrated manner – not in a piecemeal fashion).

Include in Asset Management Plan's

Include map and standard paragraph in Asset Management Plan's as follows:

Council is concentrating on providing services to areas that are zoned for development (Residential, Rural Zone High Density Small Holdings, Suburban Commercial, Industrial) but are covered by the Services Overlay because one or more servicing constraints have been identified as needing to be addressed prior to the development of that property/area. The projects to facilitate future growth identified in this Asset Management Plan therefore only consist of works required to eliminate servicing constraints on sites zoned for development and these have been prioritised in accordance with Council's strategic planning process. A Map of the areas zoned for growth but constrained by lack of services is attached in Appendix ##.

Inform Development Contributions policy and figures

Alignment with the Sustainability Strategy– i.e. if supports intensification or development adjacent to services/reticulation as a priority.

Assist Council to assess merits or otherwise of proposals coming in as submissions to the LONG TERM PLAN that seek to get projects funded by Council to service areas outside of the those listed in the Asset Management Plan. In the absence of the Strategic City Development Plan use the above process to outline and provide justification for why projects should or shouldn't be funded over the next 10 year life of the LONG TERM PLAN.

Appendix Table 11: Prioritisation Analysis of areas within the Services Overlay for scheduling of expenditure on addressing servicing constraints through the Asset Management Plan's and Long Term Plan

Area No.	Description	Reasons located in Services Overlay[1]	Criteria Rating [2]			Indication of development timing[3]	Prior approval through Annual Plan or Long Term Plan[4]
			Costs to Service versus anticipated Development HUD Yield[5]	Degree of risk/hazards[6]	Appropriateness of onsite mitigation for utilities[7]		
1	Main Road Stoke/ Saxton Road/ Railway Reserve	SW1					
2	Ballard Drive/ Ashdonleigh	W4 W5 T3					
3	Solitaire / Ngawhatu Valley	SW1 WW1 W1 W4 W5 T3					
4	Marsden Valley	SW1 WW1 W3 W5					

[1] Evaluated for each area and will change as utility services are installed
[2] Ratings are applied on a scale to be determined
[3] This reflects owners plans for development and other Council projects in the same vicinity that can be brought together at the same time. This criteria is likely to be subject to change.
[4] Approval for capital expenditure through an earlier Annual Plan or LONG TERM PLAN is expected to have the highest priority for expenditure
[5] This is assessed on a case by case basis and reflects the permitted activity requirements of the Nelson Resource Management Plan
[6] Based on hazards identified in the Nelson Resource Management Plan planning maps
[7] Relates to the suitability of the area for onsite utility servicing

Area No.	Description	Reasons located in Services Overlay[1]	Criteria Rating [2]			Indication of development timing[3]	Prior approval through Annual Plan or Long Term Plan[4]
			Costs to Service versus anticipated Development HUD Yield[5]	Degree of risk/hazards[6]	Appropriateness of onsite mitigation for utilities[7]		
		T1 T3					
5	Enner Glynn	SW1 WW1 W3 W5 T1 T3					
6	Coster Street	SW3 W4					
7	Lower Quarantine	WW3 W2 T2					
8	Airport Land	D					
9	Tasman Heights	SW1 W3 W4 T1 T3					
10	Emano/Murphy	SW1 WW1 W3 T3					
11	Toi Toi St	W3 T3					

Area No.	Description	Reasons located in Services Overlay[1]	Criteria Rating [2]			Indication of development timing[3]	Prior approval through Annual Plan or Long Term Plan[4]
			Costs to Service versus anticipated Development HUD Yield[5]	Degree of risk/hazards[6]	Appropriateness of onsite mitigation for utilities[7]		
12	Washington Valley	T3					
13	St Vincent Street	Infrastructure constraints addressed, only in Services overlay now for roading connection purposes.					
14	Campbell/Braemar	SW1					
15	Upper Brook	W3					
16	Atmore/Cleveland	SW1					
17	Upper Nile St	SW1 W2 W4					
18	Upper Halifax St	SW1					
19	Davies Drive – Dodson Valley	SW1 WW2 WW5 W4 W5 T2 T3					
20	Werneth	SW1 W3 W4 T2 T3					
21	Wastney Terrace	SW1 W3					

Area No.	Description	Reasons located in Services Overlay[1]	Criteria Rating [2]			Indication of development timing[3]	Prior approval through Annual Plan or Long Term Plan[4]
			Costs to Service versus anticipated Development HUD Yield[5]	Degree of risk/hazards[6]	Appropriateness of onsite mitigation for utilities[7]		
		WW4					
22	Todd Valley	SW1					
23	Plan Change 18 Nelson South	SW1 SW2 SW6 WW1 WW2 WW5					
24	Plan Change 17 Enner Glynn	SW1 WW1 W3 W5 T1 T3					
25	Plan Change 14 Ralphine Way						

Appendix Table 12: Services Overlay Infrastructure Upgrade Codes

Stormwater	
SW1	Adequacy of downstream system – capacity constraint
SW2	Upgrade of Saxton Creek
SW3	Upgrade of Arapiki Stream
SW4	Upgrade of Jenkins Stream
SW5	York Stream Pressure System
SW6	Provision of Services to adjoining land

Wastewater	
WW1	Adequacy of downstream system – capacity constraint
WW2	System not available
WW3	Provision of Pump Station
WW4	Adequacy of Pump Station
WW5	Provision of Services to adjoining land

Water	
W1	Adequacy of downstream system– capacity constraint
W2	System not available
W3	Source of supply dictated by elevation
W4	Above the water contour or landlocked if below
W5	Provision of Services to adjoining land
W6	Supplied by Tasman District Council

Transport	
T1	Adequacy of downstream system– capacity constraint
T2	System not available - landlocked
T3	Provision of Roads to adjoining land

Other	
D	Provision of integrated services will be necessary. Distance from existing services will need to be addressed

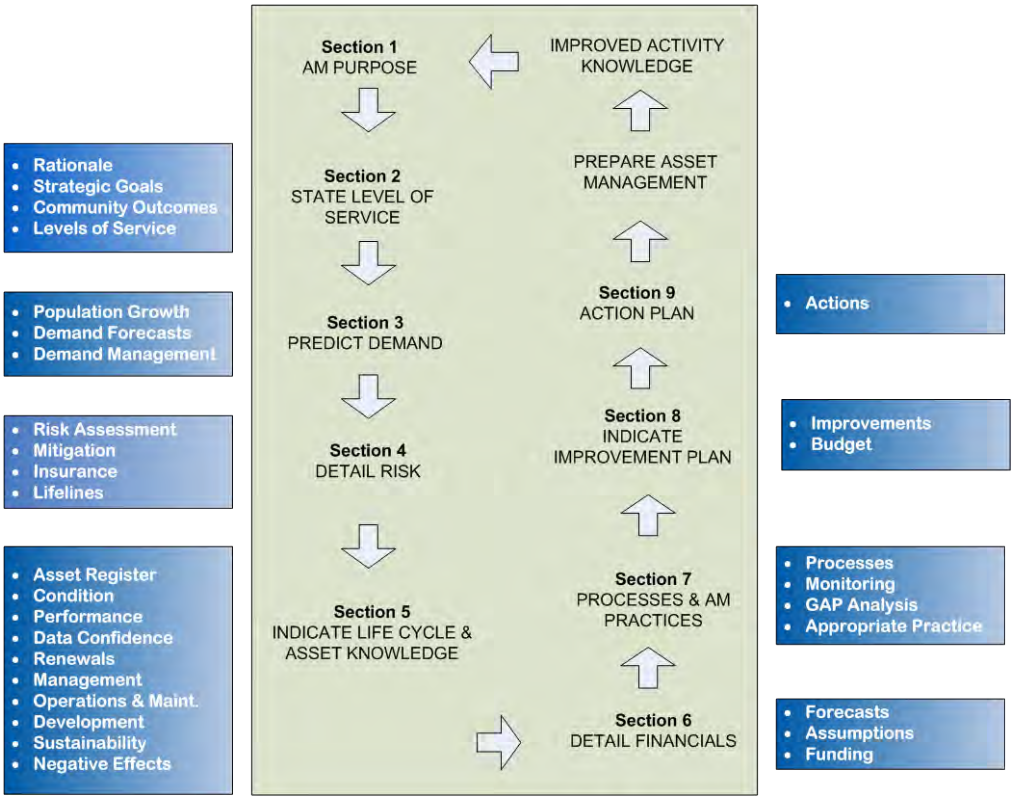
APPENDIX J: PREVIOUS Asset Management Plan's

- The first asset management plan was completed in June 1999 and further plans were prepared in 2003 and 2005 to meet minimum requirements. Asset management changes since 1999 include:
- Significant Asset Management awareness at Council representative level
- Increased understanding and implementation of risk management principles in decisions
- Asset register implemented into Hansen
- Customer complaints and maintenance activities logged to Hansen
- Awareness of reticulation & pump stations issues via network modelling
- Awareness of pipe condition and performance
- Increased monitoring and data collection of pump stations performance and capacity through Supervisory control and data acquisition system
- Increased use of advanced asset management practices for strategic planning
- Expanded demand management strategies

The Asset Management Plan Format

A mixture of the top down and bottom up approaches has been taken to develop this Asset Management Plan by using existing data followed by data improvement. The structure of this plan mirrors the logical process followed for asset management planning as shown in Figure 10-1 below:

Appendix Figure 5: Asset Management Process



Key Elements of the Plan

The key elements of this Wastewater Asset Management Plan are shown in Table 10-3 below.

Appendix Table 13: Key Elements of the Asset Management Plan

Section	Content
Executive Summary	Provides an overview of the entire Asset Management Plan and emphasises the key issues contained in the body of the document for inclusion in the Long Term Council Community Plan
Section 1 Introduction	Sets out the philosophy for the ongoing operation and development of the Nelson City Council wastewater service and the scope and layout of the plan
Section 2 Levels of Service	Outlines goals of the Nelson City Council wastewater Service in providing the recommended levels of service that the Council wished to achieve. Assesses the current levels of service and actions required to achieve the recommended levels
Section 3 Growth and Demand Management	Outlines the existing demand, demand forecasts, growth and expectations. and the demand management strategies that Council utilise
Section 4 Risk and Emergency Management	Outlines the Risk Management processes and mitigation along with emergency management carried out by the Nelson City Council wastewater activity
Section 5 Lifecycle Management Plan & Asset Knowledge	Provides detail on planning to improve asset management systems that will improve the level of confidence in the Asset Management Plan and to manage and operate the assets at the agreed levels of service while optimising lifecycle costs This section of the plan also provides reasons and justification for asset ownership, describes the assets, identifies critical assets and provides an overview of the asset capacity, performance and condition
Section 6 Financial Summary	Identifies the financial requirements (operations, maintenance, renewal and capital programmes) resulting from all of the information presented in the previous sections
Section 7 Asset Management Practices and Systems	Provides details of the information systems, asset details and process used to make decisions on how the asset will be managed
Section 8 Sustainability	Provides detail of Council's current thinking on sustainability and how this links with work carried out on the wastewater network.
Section 9 Plan Improvement and Monitoring	Provides details on planning for monitoring the performance of the Asset Management Plan and improvements to the wastewater activity to ensure the appropriate level of asset management for the activity.
Section 10 Action Plan	A summary of the action points identified in this Asset Management Plan and the long term programme for capital, renewals and asset management
Appendices	Provides Risk Analysis data, Valuation data, Reports list and any other information which is considered important and relevant that supports the wastewater Asset Management Plan

APPENDIX K: 30 YEAR INFRASTRUCTURE STRATEGY

The requirement for an infrastructure strategy arose from advice provided by Better Local Government programme advisory groups. The strategy is intended to improve local authorities' delivery of core infrastructure and management of physical assets. It should identify strategic issues facing the council and the future implications and is intended to add transparency for residents and ratepayers about these issues and their consequences.

The strategy is included in the LGA 2002 Amendment Bill (No 3) which is expected to be passed in current form in June 2014.

This Asset Management Plan contains the information that would form the basis of the Wastewater utility section of an integrated strategy, in particular the following are addressed in the sub sections of the plan either directly or as areas that will require future work:

a) What level of infrastructure investment, if any, is necessary to provide for growth in the community. See section 3.2 -Demand Forecast and section 6.6- Capital Programme;

b) Managing the timing of investment for growth, to avoid constraints on growth from limited infrastructure capacity while minimising the costs to the community of underutilised infrastructure capacity. See section 3.2 -Demand Forecast and section 6.6- Capital Programme;

c) What level of investment is needed to maintain, renew and replace existing assets.See section 6.5-Renewal Strategy;

d) Balancing service level expectations with affordability in the context of demographic changes such as depopulation and aging. See section 2- Levels of Service;

e) What level of investment, if any, is needed to improve the level of service provided by those assets. See section 2- Levels of Service;

f) Planning for maintenance, growth and possible increases or decreases in levels of service provided. See section 2- Levels of Service, section 3- Future Demand, section 5.7 -Operations and Maintenance Plan;

g) Managing or improving public health and environmental outcomes, or mitigating adverse effects on them. See section 2 -Levels of Service;

h) Managing the risks to and resilience of, infrastructure assets from natural disasters. See section 4- Emergency and Risk Management;

i) Managing the financial provision for risks to infrastructure assets from natural disasters. See section 4- Emergency and Risk Management;

j) Indicative estimates of the projected operating expenditure and capital requirements for each year. See section 5.7- Operations and Maintenance Plan, sections 5.8 and 6.5- Renewal Strategy, sections 5.9 and 6.6 -Capital Programme;

k) Assumptions about service levels and asset lives on which the projections are based.

See section 2- Levels of Service and section 6.2- Asset Valuation and Depreciation;

l) Assumptions involving significant uncertainty- the nature of that uncertainty and its potential impacts. See section 4- Emergency and Risk Management .

Wastewater 30 Year Operations and Maintenance Projections ($,000) Figures are in 2015 dollars and will be adjusted for inflation in each Annual Plan.

Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**			**2027/37 LTP**			**2030/40 LTP**			**2033/43 LTP**			**2036/46 LTP**			**2039/49 LTP**			**2042/52 LTP**		
O&M Expense	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45
Administration/ interest	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Depreciation	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066	3,066
Electricity	188	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223	223
Mtce: Physical Works - Programmed	246	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256	256
Mtce: Physical Works - Reactive	536	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553	553
Mtce: Engineering Services	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	182	182	182	182
Mtce: N Treatment Plant	460	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
NRSBU - NCC Share	3,383	3,562	3,460	3,436	3,930	3,884	3,859	4,827	4,911	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873
Mtce: Reduction in S/W Entry	90	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Mtce: CCTV Inspections	42	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Mtce: Flow Monitor	23	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Mtce: Trade Waste Monitoring	3	15	15	15	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Mtce: Ex-filtration (Maitai E.coli)	50	150	50	50																											
Mtce: SCADA Remote site radio upgrade		60	60														60	60													
Mtce: SCADA upgrade		70	70														70	70													
NWWTP - Desludging	246	346	346	346	346															3,500	500	500	500	500	500						
Total [a] ($,000s)	**8,804**	**9,694**	**9,492**	**9,338**	**9,787**	**9,395**	**9,370**	**10,338**	**10,422**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**	**10,514**	**10,514**	**10,384**	**13,884**	**10,884**	**10,884**	**10,884**	**10,884**	**10,884**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**

30 Year Renewal Plan $,000

Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**			**2027/37 LTP**			**2030/40 LTP**			**2033/43 LTP**			**2036/46 LTP**			**2039/49 LTP**			**2042/52 LTP**		
Renewals Project Area	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45
Pipe Renewals	525	525	525	525	650	650	650	700	700	700	750	750	750	800	800	800	850	850	850	900	900	900	950	950	950	1000	1000	1000	1000	1000	1000
Renewal Rising/Swallows	0	80	150	430	80	150	430	80	150	430	80	150	430	80	150	430	80	150	430	80	150	430	80	150	430	80	150	430	80	150	430
NWWTP Renewals	0	43	7	0	0	0	100	8780	1.5	0	40	0	0	0	100	0	0	1164	0	0	90	0	38	135	0	0	0	0	0	0	0
Pump Stations Renewals	130	150	150	150	200	200	200	250	250	250	300	300	300	350	350	350	400	400	400	450	450	450	500	500	500	550	550	550	600	600	600
Flow Meters	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Total ($,000s)	700	843	877	1150	975	1045	1425	1955	1147	1425	1215	1245	1525	1275	1445	1625	1375	2609	1725	1475	1635	1825	1613	1780	1925	1675	1745	2025	1725	1795	2075

Wastewater Capital Expenditure Projections

Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Long Term Plan		**2015/25 LTP**			**2018/28 LTP**			**2021/31 LTP**			**2024/34 LTP**			**2027/37 LTP**			**2030/40 LTP**			**2033/43 LTP**			**2036/46 LTP**			**2039/49 LTP**			**2042/52 LTP**		
Capital Projects	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40	2040/41	2041/42	2042/43	2043/44	2044/45
Arapiki/Quarantine Trunk Main	1,554																														
Atawhai Air Valve Odour Control																															
Awatea Place RM/PS/TM		300	50	650	3,000	600																									
Corder Park	3,600	2,500																								100	750				
Marsden Valley Trunk Main																															
Neale Park PS	215	250	3,000	3,000																				100	750						
Ngawhatu Valley TM - Stage 1	500	335																													
Ngawhatu Valley TM - Stage 2								180	20	1,000	1,000																				
NWWTP - Upgrades				50		100			200	200	200																				
NWWTP - Resource Consent							100	150	150	150	150																				
NWWTP - Expansion/Upgrade for future growth																				50	50	50		500	500	1,000	500				
Telemetry Upgrade															100											100					
Pump Station Storage		20	120	50	120	120																									
Atawhai Rising Main - Stage 1											100	80	2,000	2,000																	
Atawhai Rising Main - Stage 2															100	80	2,000	2,000													
Atawhai Rising Main - Stage 3																	100	80	2,000	2,000											
Maitai (Ralphine Way)						50		250																							
Hira - investigate adding to network												100	150		1,000	1,000															
Gracefield Beheading				50	150		500	500	500																						
Atawhai Pump Stations (Brooklands & Marybank)		80	400	200	400	200																									
Airport Storage Tanks -																						100	500	500							

Upgrade/refurb																														
Arapiki Rd #15 - Ridgeway		80	20	500																										
The Glen Rising Main Upgrade																			80	20	500									
Trafalgar Square - Betts Carpark			10	10	75																									
Natural Hazards Risk Assessment and response		50	50		100	100	100															100	250	250	250		1,000	1,000	1,000	1,000
Network Capacity Confirmation for Growth Areas		50	100						100	100	100	1,250						100	100	100	1,250					100	100	100	1,250	
Network Upgrades Nelson North																											100	100	100	1,500
Network Upgrades Nelson Central														100	100	100	1,500													
Network Upgrades Nelson South																						100	100	100	1,500					
Total (a) ($,000s)	**5,869**	**3,665**	**3,750**	**4,510**	**3,845**	**1,170**	**700**	**1,080**	**970**	**1,450**	**1,550**	**1,430**	**2,150**	**2,100**	**1,300**	**1,180**	**3,600**	**2,180**	**2,100**	**2,230**	**1,320**	**750**	**700**	**1,450**	**3,000**	**1,450**	**1,350**	**1,200**	**1,200**	**2,350**	**2,500**

APPENDIX L: NELSON WASTEWATER TREATMENT PLANT ASSET MANAGEMENT PLAN

Asset Management of the Treatment Plant is not well documented. At this point in time there are renewal details but no single document that covers all aspects of asset management. Further work is required to develop a full Asset Management Plan

(A833480)

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te kaunihera o whakatū

Nelson City Council

Report for Nelson Waste Water Treatment Plant

5th Annual Audit

September 2013

1. Documentation and Records

Asset Management Plan

NCC staff report this aspect of the audit is in place and satisfactory. Updated databases of Maintenance Management Plan (MMP-Tardis –1591234 November 2012 to October 2013) and Asset Management Plan (AMP-Tardis- 1591236, updated plan for 2013) have been forwarded to the Nelson City Council. New assets have been included (new aerators have been installed as per EC3444). AMP includes an overview of plant assets, preventive maintenance and life expectancy schedules.

Emergency Response Plan

NCC staff report this aspect of the audit is in place and satisfactory. There is evidence of training for operators at the plant or for Waste Water related courses.

Annual Report

Annual report was submitted on 30th July 2013; Satisfactory result.

Nelmac have updated their H & S requirements on site. They have also implemented a drug and alcohol testing policy.

- Annual report for shows 1 H & S incident during the year; minor.
- There was 1 non-compliance item in the resource consent conditions; odour complaints at the State Highway.
- Public Relations – ongoing consultation with Clifton Tce School with any potential odour problems.
- Reasonably regular monthly tailgate meetings are taking place.

(A872235)

Nelson City Council

Contract 2918
Nelson Waste Water Treatment Plant
Annual Renewal Plan

November 2013 – October 2014