Appendix C

Infrastructure strategy 2021-51

Purpose of this Infrastructure Strategy

Infrastructure accounts for over half of the Carterton District Council's (CDC) annual operating expenditure and over 80% of Council's capital expenditure. This infrastructure provides the foundations on which the Carterton district community is built. It is essential to the health, safety, and land transport needs of the district and has a significant impact on the physical environment.

Good quality local infrastructure facilitates social and economic wellbeing. It enables businesses and communities to flourish. Conversely, poor infrastructure will inhibit the economic performance of Carterton district. Getting infrastructure spending right is a pre-requisite to enhancing the quality of life and attracting people to live in the district.

This infrastructure strategy outlines:

- the key wastewater, water supply, stormwater and land transport infrastructural issues the Carterton district community must address over the next 30 years:
- the options under the most likely scenario for dealing with those issues;
- the cost and service delivery implications for residents and businesses of those options; and
- The Council's current preferred scenario for infrastructure provision.

This strategy will help the Council to make informed decisions to deal with the major decisions and investment opportunities that will occur over the next 30 years.

Background

Legislative Context

Section 101B of the Local Government Act 2002 requires all local authorities to prepare and adopt an infrastructure strategy covering a period of at least 30 years, as part of its Ten Year Plan. The statutory purpose of an infrastructure strategy is to identify significant infrastructure issues for the Council over the 30-year period covered by the strategy, and to identify the principal options for managing those issues.

This strategy addresses the above purpose by outlining how CDC intends to manage its water supply, wastewater, stormwater, and roads and footpath infrastructure assets. Inclusion of these asset types in the strategy is mandatory. Other asset types (eg parks, buildings, etc.) may be included, at the discretion of CDC, but are of a relatively minor scale and value and do not form part of this Infrastructure Strategy.

The strategy is consistent with and represents a culmination of the strategies underpinning CDC's corresponding activity management plans (AMPs). The AMPs are key supporting information for the Infrastructure Strategy.
The Infrastructure Strategy will be reviewed on a three-yearly basis in line with, and as an important component of, Council's 3-yearly review of its Ten Year Plan.

Historical Context – Formation of Carterton District Council

Carterton District Council was formed in April 1989 from a voluntary amalgamation of the former Carterton Borough and South Wairarapa County Councils. The Borough Council had been in existence since 1887 while the County Council's origins go back to earlier roads boards in the 1850s.

Geographical Context

Carterton district encompasses predominantly rural land on the eastern side of the lower North Island. The western boundary is the Tararua Ranges with the eastern boundary being the Pacific Ocean. The District is adjacent to Masterton District to the north, and South Wairarapa District to the south. Kāpiti Coast District adjoins its western boundary though buffered by parcels of Department of Conservation land.

FIGURE 1: CARTERTON DISTRICT BOUNDARIES

The usually resident population of Carterton district was 9198 in the 2018 census (up 11.6% from 2013). The administrative and main trading centre is Carterton Township, with over half (at 63% or 5,640 in 2018 census) of the district's usually resident population is residing in the town.

There are other, smaller, rural settlements located within the district including Gladstone, Flat Point and Clareville.

The predominant land use in the district is pastoral agriculture, principally beef and sheep and dairy farming, with a significant amount of forestry in the eastern hill country. The main employment sectors are agriculture, forestry, and fishing, with all of these sectors highly dependent on CDC's roading infrastructure for transport connections. Areas of viticulture and winemaking exist in the Gladstone area.

A moderate scale industrial precinct is located at the northern end of the district (Waingawa) with water and wastewater infrastructure connected to Masterton District Council's networks because of their proximity location. Masterton District Council provides, by agreement, potable water and treats and disposes of the wastewater and trade waste.

A large and expanding bacon and ham food processing factory is located within Carterton with water supply mostly sourced from its own bore but is totally reliant on CDC infrastructure for wastewater treatment and disposal.

Approach to Managing Infrastructural Assets

CDC's approach to managing its infrastructure assets involves optimisation of the whole of life costs of its infrastructure. There are three key components of that: operating and maintenance costs, renewal costs and development activities. The three are interrelated, with the timing of renewals or new capital development impacting on annual maintenance costs.

The strategy outlines how CDC intends to manage its three-waters and roading infrastructure assets, taking into account the need to:

- maintain, renew or replace existing assets
- respond to growth or decline in the demand for services reliant on those assets
- allow for any planned changes to levels of service provided through those assets
- maintain or improve public health and environmental outcomes or mitigate adverse effects on them
- provide for the resilience of infrastructural assets by identifying and managing risks relating to natural hazards and by making appropriate financial provision for those risks.

Operations and Maintenance

Operational activity is work or expenditure which has no direct effect on asset condition but which is necessary to keep the asset functioning, such as the provision of staff, inspections, consumable materials (chemicals etc.), resource consent applications and compliance, monitoring, and investigations.

Maintenance can be defined as the activities that preserve an asset in a condition which allows it to perform its required function. Maintenance comprises regular servicing and immediate repairs

necessary to keep the asset operational. The ongoing efficiency of routine maintenance is critical to achieve optimum asset life cycle costs that best suit the desired levels of service.

Maintenance falls into two categories, planned and reactive, each having quite different triggering mechanisms but similar objectives.

Planned maintenance comprises routine servicing of assets to maintain day to day functionality. It often entails scheduled servicing of key asset components on a rotational or seasonal basis – eg servicing of pumps, flushing of mains, mowing of roadside vegetation, etc.
Reactive maintenance entails responses to unplanned asset failure such as burst water mains, roadside slips, sewer overflows, etc.

The strategy is to maintain levels of service through timely and effective maintenance interventions until the age or condition of the asset makes it uneconomic to continue to maintain. Within this, striking a balance between the frequency of planned maintenance and the incidence of reactive maintenance, is key.

Renewal or Replacement

Asset renewal or replacement does not increase the assets' original design capacity but restores, rehabilitates, replaces or renews an existing asset to extend its economic life and/or restore the asset to its original service potential. It is a key driver of CDC's infrastructure strategy because of the age profile and condition of some of the assets, and the need to develop a replacement strategy which is both affordable and sustainable.

CDC's renewal strategy is, in general, to rehabilitate or replace assets when justified by:

Asset performance: renewal of an asset where it fails to meet the required level of service due to deterioration of asset condition. Non-performing assets are identified by the monitoring of asset condition, reliability, capacity, and efficiency during planned maintenance inspections and operational activity. Indicators of non-performing assets include:

- structural failure
- repeated asset failure (blockages, mains failure, pavement failure, etc),
- effectiveness of water or wastewater treatment.

Economics: Renewals are programmed with the objective of achieving:

- the lowest life-cycle cost for the asset (the point at which it is uneconomic to continue repairing the asset), and
- a sustainable long term cash flow by smoothing spikes and troughs in renewals programmes based on the estimated economic lives of asset groups, and
- efficiencies, by co-ordinating renewal works with capacity upgrade work or other planned works in the area.

Risk: The risk of failure and associated financial and social impact justifies action (eg probable extent of property damage, safety risk).

Renewal works are assessed and prioritised in accordance with the following priority ranking table, the cost/benefit ratio of each project, Council's objectives and strategies, and available funds.

TABLE 1: RENEWALS STRATEGY

Priority	Renewal criteria
1 (High)	Asset failure is imminent or has occurred and renewal is the most cost effective option The asset is a critical asset and asset failure is likely to have major impact on the environment, public safety or property Condition and performance ratings of asset is 4 - 5 (poor or very poor) Asset performance is non-compliant with resource consent requirements
2	Asset failure is imminent, but failure is likely to have only a moderate impact on the environment, public safety or property. Asset failure is imminent and proactive renovation is justified economically The asset is vulnerable to natural hazards and optimised renewal will improve resilience Condition and performance ratings of asset is 4 - 5 (poor or very poor) System upgrading scheduled within five financial years as asset is nearing end of economic life. Asset renewal is justified on the basis of benefit cost ratio and deferment would result in significant additional costs The asset has a high criticality rating
3	Asset failure is imminent, but failure is likely to have a minor impact on the environment, public safety or property Condition and performance ratings of asset is 3 (moderate/average) Asset renewal is justified on the basis of life cycle costs, but deferment would result in minimal additional cost The asset has a medium criticality rating
4	Existing assets have a low level of flexibility and efficiency compared with replacement alternative Condition and performance ratings of asset is 1 - 2 (good to excellent) The asset has a low criticality rating
5 (Low)	Existing asset materials or types are such that known problems will develop in time. Condition and performance ratings of asset is 1 (excellent)

Capital Improvements – Planning for the Future

Growth and demand are the main drivers of new capital development, and include:

- population increase and demographics
- changes to and the incidence of new land use activities
- more stringent regulatory standards and demand for higher levels of service (eg resource consents)
- community expectations and demand for additional services.

Mitigating the effects of demand can be achieved through demand management strategies, particularly in respect of the 3-waters. CDC's capital development strategy entails maximising the use of existing asset capacity as the first priority over investment in new infrastructure.

Further consideration of each component of the strategy relative to each of the four infrastructure asset groups is provided in Section 0.

Historical Expenditure

Whilst operating expenditure (Opex) has trended upwards in line with inflation and increased loan servicing costs, capital expenditure (Capex) tends to be more 'lumpy" due to the specific nature of capital projects (renewals and improvements), as illustrated in Table 2: Historical operating and capital expenditure 2014-20 below.

TABLE 2: HISTORICAL OPERATING AND CAPITAL EXPENDITURE 2014-2020

ACTIVITY	2014	2015	2016	2017	2018	2019	2020
Wastewater Opex	1,232,833	1,421,826	1,841,568	1,600,437	1,628,323	1,940,030	2,367,248
Wastewater Capex	657,907	1,609,015	856,935	783,163	645,553	2,921,885	3,279,153
Water Supply Opex	1,676,864	1,676,864	1,773,632	2,055,560	2,132,792	2,474,912	2,398,093
Water Supply Capex	613,865	93,911	106,126	397,612	704,002	148,621	873,468
Stormwater Opex	175,722	173,338	165,699	185,585	227,313	244,017	261,793
Stormwater Capex	712	28,123	26,786	559	300	0	159,479.03
Roading opex	3,229,949	3,429,985	3,156,942	3,357,647	3,517,416	3,537,160	4,151,159
Roading capex	1,908,043	1,701,863	1,729,596	1,572,402	2,055,437	1,886,470	1,810,036

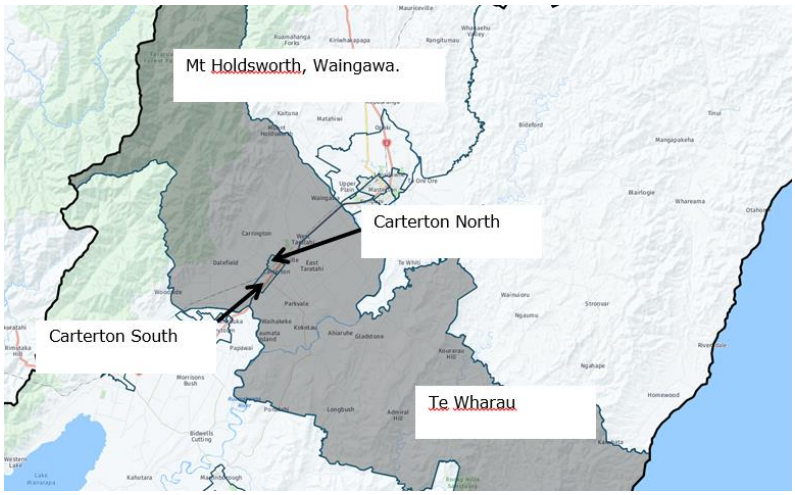
Demographic Factors

Population and households

Data for the current AMP's is built on the Wairarapa Population Projections – June 2020 report from Infometrics Limited and are waiting on the 2018 census data release for further confirmation of the projections.

Population growth in Carterton District has been strong over the past decade, aided by significant net migration flows in the past five years. Carterton District's current estimated population is 9,690. In Carterton District, growth is more evenly distributed across urban and rural areas, reflecting the historic propensity for rural lifestyle developments in the district and by 2051 the projected population will be approximately 13,098. Growth is expected to slow however in the next term with international net migration falling away due to COVID-19.
The Carterton district population was distributed across four area units (see Figure 2 below) for the population projection, Carterton North, Carterton South, Te Wharau and Mt Holdsworth Waingawa.

FIGURE 2: THE FOUR AREAS OF THE CARTERTON DISTRICT



Total district current and projected population, projected number of households and average size of those households is shown below with the individual areas displayed below.

FIGURE 3: CARTERTON DISTRICT FORECAST POPULATION COMPONENT CHANGE

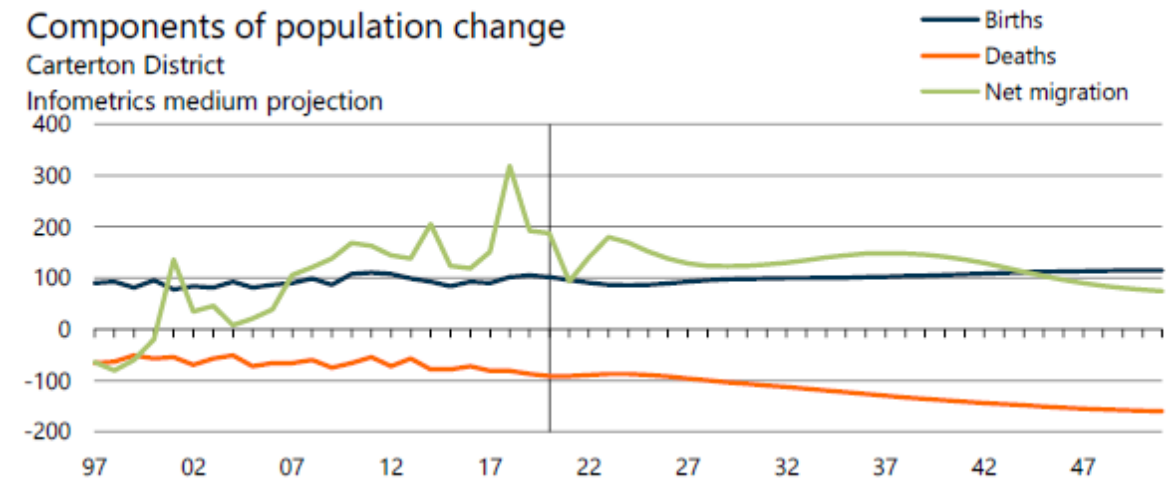


FIGURE 4: CARTERTON DISTRICT FORECAST POPULATION AGE CHANGE

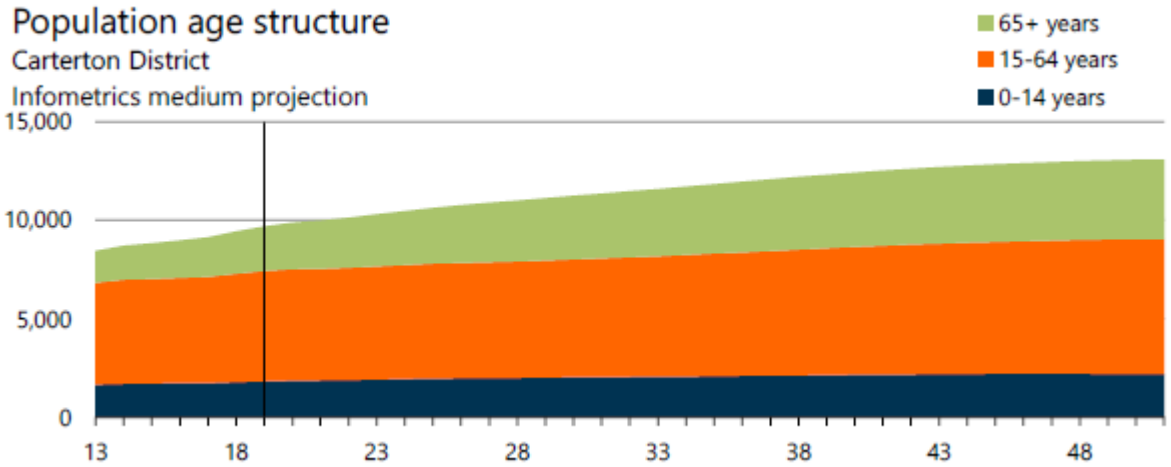


FIGURE 5: CARTERTON DISTRICT FORECAST POPULATION BY SUB DISTRICT

Carterton District Sub-District Population

Infometrics medium projection

Statistical Area 2	2019	2051	Change 2019-2051
Kokotau	1,305	2,283	978
Carterton North	2,669	3,494	825
Carterton South	2,939	3,619	680
Mount Holdsworth	1,854	2,332	478
Gladstone	923	1,369	446
Carterton District Total	**9,690**	**13,098**	**3,408**

Growth Projections

The Council has recently completed consultation for an urban growth strategy directing future urban development to be out to the east of the current CBD. A more detailed Urban Growth Plan for that area is currently being developed detailing infrastructure services required to support growth. Changes to the operative Combined Wairarapa District Plan may follow the urban growth plan and strategy.

Water for the Waingawa area is supplied via the Masterton Districts reticulated network from a metered trunk connection at the Waingawa Bridge. Reticulation from that point of supply at the Bridge then comes under Carterton's ownership of the Waingawa water reticulation assets and those assets are listed within this asset management plan.

The proposal shown in the draft Urban Growth Strategy has signalled an intention to provide a serviced area north of Hilton Road within the Rutland Road, Richmond road area. The draft plan to date has provision for approximately 530 lots.
Although at the early stages of development any re-zoning would require planning of how infrastructural services will be rolled out.

An indicator of future population growth trends can be drawn from the incidence of new lots and dwellings:

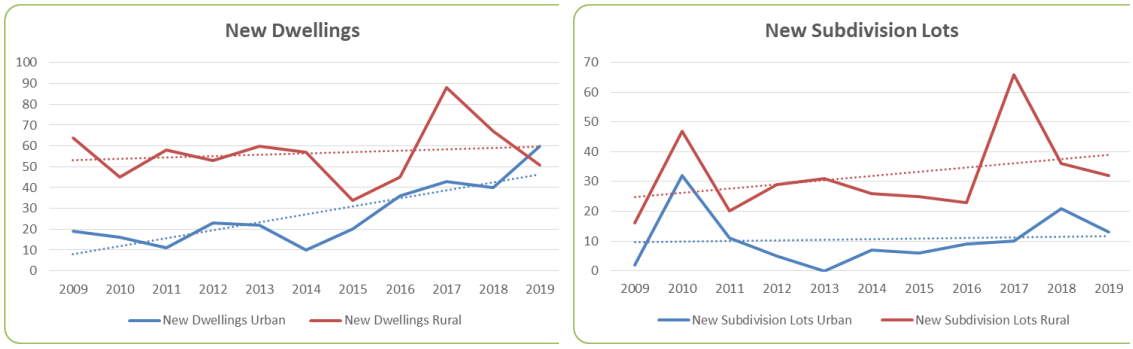


FIGURE 6: NEW LOTS AND DWELLINGS 2009 - 2019[33]

On average, 42 new lots per year were created over the 2009-2019 period, with 25% urban and 75% rural. An average of 84 new dwellings were consented over the same period with a split of 33% urban and 67% rural. Trend lines show an increasing number of urban dwellings being consented over the period sampled.

Plan. The current remaining areas for the residential zone and low density area are outlined in Figure 3 below.

33 From Council consent records

TABLE 3: CARTERTON RESIDENTIAL ZONE – REMAINING CAPACITY

Zone	Total Land Area of Zone (ha)	Current Remaining Capacity (ha)	Additional Housing Capacity Available
Residential	289.7	40.23	790
Low Density	219.1	38.2	164
Total Residential Zone	508.8	78.43	980

Carterton Township will need to accommodate approximately 1,124 additional houses by 2048, assuming the above growth projection. Boffa Miskell has identified that approximately 180 new houses can be accommodated in the current zoned areas for Carterton, and based on the minimum lot size of 400m^2 plus an additional 30% allowance for roads and reserves, an additional 800 houses could be accommodated within the existing zoned land. That would leave a deficit of approximately 7.5 ha (equivalent to 144 houses), as summarised in Table 4 below.

TABLE 4: CARTERTON TOWNSHIP RESIDENTIAL LAND CAPACITY BY 2048

Zone	Remaining Residential Land Area 2013 (ha)	Additional Housing Required	Land Required for Additional Housing (ha)	Land Capacity Available by 2048 (ha)
Residential	41.6	944	49.1	-7.5
Low Density	51.5	180	51.5	0
Total Residential Zones	93.1	1124	100.6	-7.5

At the rate of 50 new urban houses per year, the remaining residential zoned land in Carterton could be fully subscribed by about 2044, ie in 26 years' time. Beyond that, CDC will need to plan for future residential development outside the current zoning, together with the provision of infrastructure to support that development.

CDC's draft Urban Growth Strategy identifies proposed, supplementary residential areas to the west and east of the current residential zone to accommodate future growth. In both cases, provision will need to be made for extension of the CDC's network infrastructure to service these areas.
In summary, the above demographic trends indicate that there will be a medium increase in residential demand for urban water, wastewater and stormwater infrastructure at Carterton. For the past few years, Council has been working on improving the condition of its core infrastructure assets, particularly the water supply and wastewater activity areas, in order to support public health outcomes and to meet its resource consent requirements. The demographic growth trend supports an approach involving maintenance, renewal and capital improvements to the existing infrastructure to maintain current levels of service, alongside moderate increase in new capacity for water and wastewater treatment and storage.

The water, wastewater, and stormwater infrastructure in particular is principally designed for residential use in the urban area, with industrial access to these services secondary and dependent

on availability of capacity within current consent limitations, and appropriate on-site pre-treatment. Similarly, any additional reticulation capacity required within the respective pipe networks would need to be funded by developers.

Regional Spatial Planning

The Wellington Regional Growth Framework (see https://wrgf.co.nz/wp-content/uploads/2020/10/1246-GWRC-Draft-Framework-Report-SEPT-2020-14.pdf) is a 30-year spatial plan for the Wellington-Wairarapa-Horowhenua region.

It takes into account work already underway by Carterton District Council (through our Eastern Growth Plan and District Plan review process) and by other councils in the region. The Framework has been developed to deliver on the Urban Growth Agenda objectives of the Government, which includes improving environmental, employment, transport, and housing outcomes for communities. Similar objectives and challenges exist at both a local level (through Council and at a regional level through the Wellington Regional Growth Framework).

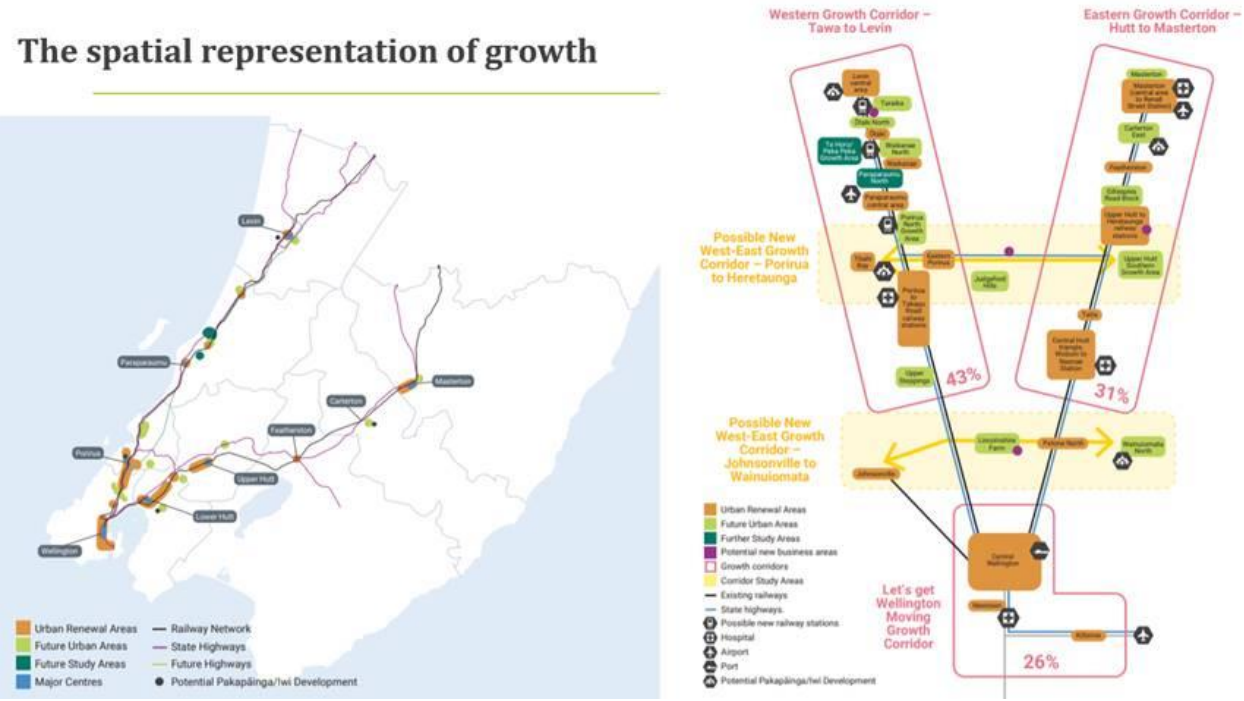
The Framework takes account of the requirements of the National Policy Statement on Urban Development. In future it will also need to consider government policy work such as the Resource Management Act reform and the three waters review. The Framework provides for a scenario of accommodating an additional 200,000 people and 100,000 jobs over the 30-year period, of which Carterton District's population is a subset.

The Framework outlines how the region can accommodate additional people and jobs and meet the Framework's objectives, which requires the region to:

- Enable more housing development around transport nodes (i.e. train station) and support transformational change in key locations across the region - where there is good access to public transport that supports mode-shift.
- Develop more well located greenfield[34] housing development, ensure that where appropriate it is higher density than most current greenfield (i.e. in the metro part of the region townhouses and apartments and in Carterton smaller property sizes), and that is it connected to public transport and/or walkable to schools, work and shopping.
- Increase housing capacity in the region's major centres by expanding the housing footprint and permitting higher densities than are currently enabled in many places.
- Investigate improved multi-modal west-east connections across the region that benefit the region's economy and accessibility and include urban development along these corridors.

[34] Greenfield land is undeveloped land in a city or rural area either used for agriculture or landscape design or left to evolve naturally. Rather than building upon greenfield land, a developer may choose to redevelop brownfield, which have been developed but left abandoned or underused. Source Wikipedia.

Proposed regional spatial changes are outlined in the diagrams below and will be incorporated into Council's Proposed District Plan through the current review process.



The Framework was endorsed by Carterton District Council in October 2020. It signals a number of potentially significant infrastructure issues for councils and central government over the 30-year period. The Framework includes the following key initiatives that will impact on future infrastructure requirements:

- Develop a regional approach to climate change impacts including coastal protection, longer term development areas and areas to stop developing. This will include a programme to consider management of three waters, rail and road assets at risk and how to protect taonga
- Develop a 50- to 100-year regional three waters strategy to support anticipated growth, including upgrades to infrastructure (including bulk infrastructure) that supports growth in key development areas and improves environmental outcomes. This has already been taken into account in the Council's water infrastructure projects
- Increase rapid transit rail/bus network accessibility, capacity and frequency including inter-regional connectivity to address over-crowding, provide for future growth and enable higher service frequencies including inter-regional connectivity
- Significantly improve multi-modal connections to rapid transit stops as part of master planning and delivery of higher density urban development in major centres and at transport nodes.
- Establish a connected regional cycling network by eliminating pinch points on the network and delivering transformational projects to improve access.

Climate

Climate change projections[35] for Wairarapa are there will be significant impacts to the Wellington Region by 2090 if global emissions are not significantly reduced. They include:

- warmer temperatures (+3^0 C)
- significant increase in the number of hot days (>25^0 C) from 24 days now to 94 days
- frosts in the high elevations of the Tararua Ranges are likely to disappear
- spring rainfall will reduce by up to 10% on eastern areas
- the risk of drought will increase in Wairarapa
- more extreme rainfall events.

These impacts will require Council to consider the capacity and resilience of Carterton's water supply, stormwater drainage and wastewater systems.

More frequent droughts may affect the security of the Carterton water supply. Currently the supply relies on adequate water flows from the Kaipaitangata River and Lincoln Road well-field to maintain a supply throughout the year and has limited storage capacity for a sustained drought. The impact of that is further considered under chapter 5.3.

Conversely, more frequent, high intensity rainfall will challenge the existing capacity of the urban stormwater drainage network and downstream drainage channels. Similarly, increased inflow and infiltration to the sewerage network is likely to be a consequence of higher rainfall events.

Equally, the roading network can be expected to be exposed to harsher environmental conditions, impacting on roadside bank stability and drainage.

Risks and Resilience of Infrastructure

The main risks to CDC's infrastructure from natural hazards are major earthquakes, droughts, and flooding. Climate change variability in rainfall patterns and hence groundwater and surface flows, is a potential risk for all water utilities and associated changes to environmental effects.
Parts of Carterton district are built on old flood plains that could be subject to liquefaction in a major earthquake. Part of the Council's reticulation renewals programme will involve using different construction methods and materials to provide greater earthquake resilience in pipelines. Council does not consider this risk is so great that it should bring forward its renewals programme. Instead it will address resilience at the time pipes are replaced.

Previous risk mitigation measures include the installation of baffles and seismic valves for the town water reservoirs to reduce water "surge" during a major seismic event and retain water in the

35 Greater Wellington Regional Council's Climate Change Report (June 2017)

reservoirs following an event. Bore-field development to provide an auxiliary supply in the event of drought or trunk main failure from the Kaipaitangata supply, and incorporation of seismic design in the construction of all pipework crossing bridge structures and known quake zones.

Risk mitigation and resilience measures are incorporated in CDC's renewals strategy as a means of prioritising replacement work and include the replacement of brittle pipe materials with modern, flexible materials and jointing systems. The funding of these measures is built into forecast asset renewal and capital works programmes, with funding from depreciation reserves, contributions, or loans.

Additional assessment of the likelihood and consequence of the above risks, followed by intervention and mitigation strategies to improve resilience of CDC's critical assets, is an on-going process. This work has been developed and costed in CDC's asset management plans. Financial provision for any necessary risk mitigation measure identified has been included in the 2018 review of the Infrastructure Strategy.

Risk mitigation measures will be maintained, funded from forecast programmes, to ensure CDC's critical assets including bridges, treatment plants, storage reservoirs and trunk mains are designed and routinely inspected, assessed, and strengthened to improve resilience to natural hazards. Critical assets are defined as those that would have the greatest consequence in the event of failure.

Flood protection of the district is the responsibility of GWRC and is therefore not addressed in this strategy.

Significant Infrastructure Issues for Carterton District

General

This strategy relates to Carterton District Council's (CDC's) wastewater, water supply (including water races), stormwater drainage, and road and footpath infrastructure. The tables on the following pages summarise the significant infrastructure issues facing CDC, the proposed response to those issues, and the implications of taking or not taking the action proposed by the response. In many instances, the same principal response option is capable of addressing several infrastructure issues.

Carterton District Wastewater Schemes

Wastewater assets

CDC owns and manages two community wastewater schemes in the district, one entire scheme in Carterton and the second partial scheme consists of just reticulation discharging into the Masterton scheme.
The reticulation pipe length is 66.1km and comprises of 44.9km of *mains* sewer pipe ranging in size from 50mm to 380mm diameter and 21.2km of wastewater *lateral connections* to the mains.
65% of the *mains* network is 150mm diameter, reflecting the relatively small catchment and gentle ground contours.

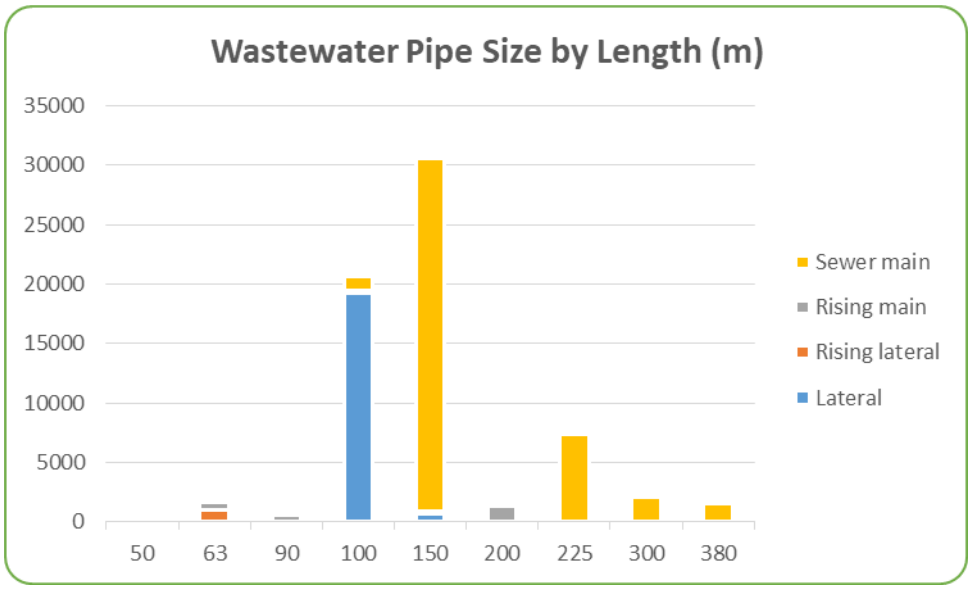


FIGURE 7 : WASTEWATER PIPE SIZE (ASSETFINDA DATA BASE)

Roughly half the pipe material used is comprised of asbestos cement and earthenware (40.9%). The bulk of the reminder material used for pipework is either PVC or PE (42%) and concrete (13.9%).

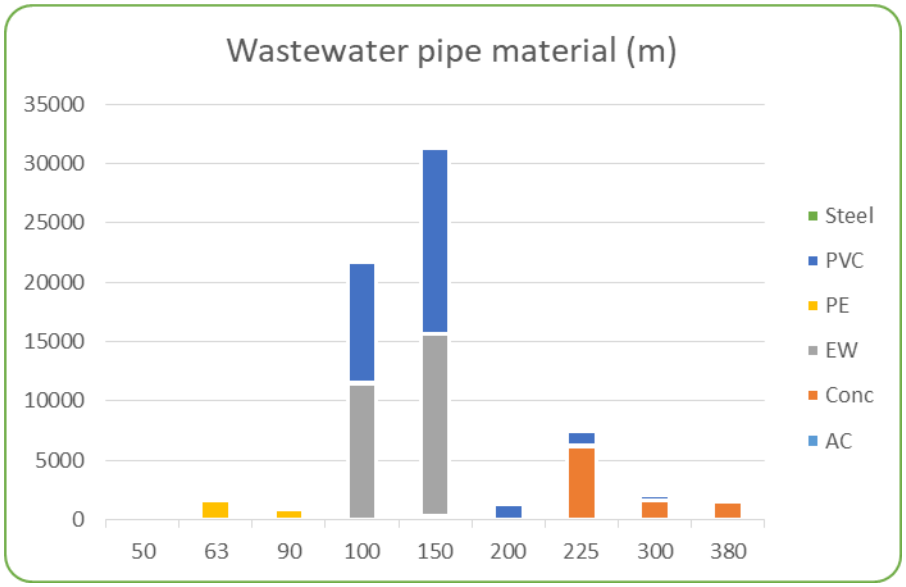


FIGURE 8: WASTEWATER PIPE MATERIAL (ASSETFINDA DATA BASE)

Earthenware, asbestos cement, and concrete pipe material types (54.9% of the total length) tend to be brittle and a large proportion is approaching the end of their useful lives—an important factor used when determining the wastewater renewals profile.

Pipe condition assessments are used to inform renewal planning, noting that the timing of pipe replacements is usually influenced by deterioration in serviceability of the network as distinct from structural capacity. Poor condition sewer pipes located above the groundwater table will continue to provide relatively high serviceability compared with the same condition pipes located below groundwater tables.

Pipe condition data shows that 72.5% of the wastewater network is in an excellent to average condition. 27.4% of pipes are rated as being in a poor condition, as illustrated below:

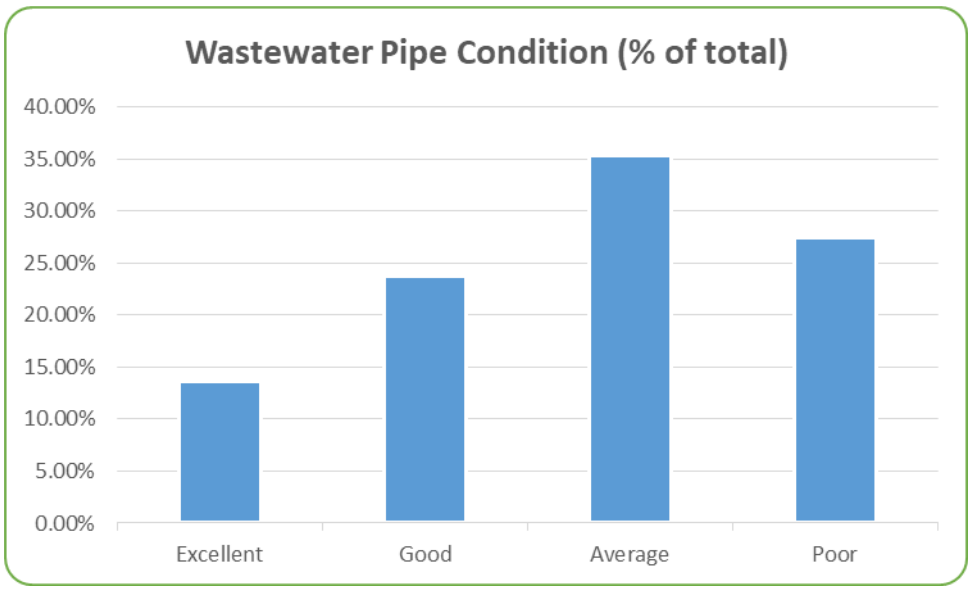


FIGURE 9: WASTEWATER PIPE CONDITION (ASSETFINDA DATA BASE)

It is noted that the predominantly earthenware wastewater mains servicing High Street North and South (approximately 1400 connected dwellings) is rated as being in poor condition and will need renewal in the near future. Both mains have been rated using CCTV and have been programed for renewal.

Figure 10 below shows wastewater pipe lengths and materials grouped by asset age. The majority of the total of 66.1km of the wastewater pipes are 50-80 years old approximately 29.6km. There is a small percentage of pipes in the reticulation network that are older than the generally expected lifespan of 80 years (761m), pipe age is however only an indicator for pipe longevity, with some pipes lasting longer or shorter than the nominal life. Pipe condition is monitored using CCTV and maintenance reports to assess the remaining useful life and amending replacement programming taking account of pipe serviceability factors.
Pipe condition does not always impact on a pipe assets serviceability.

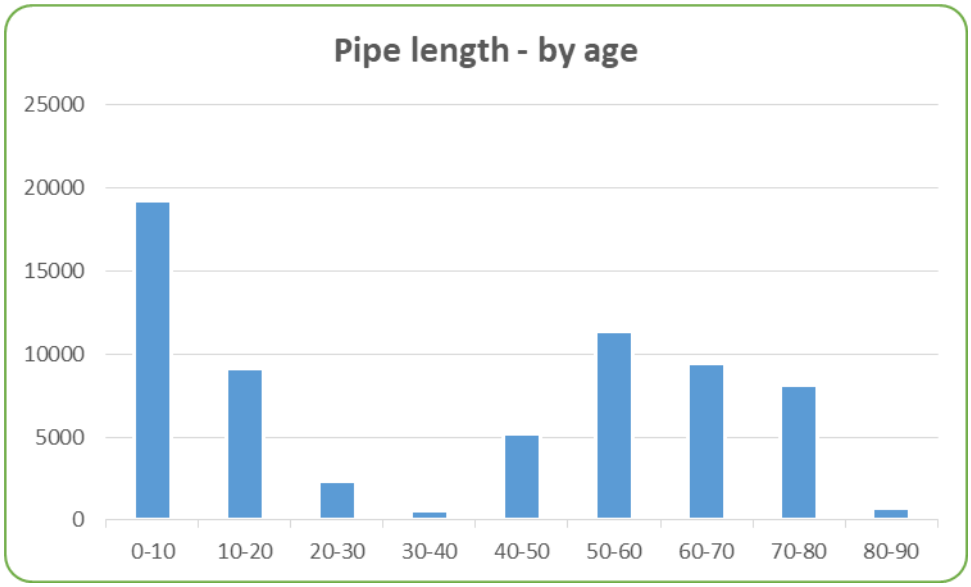


FIGURE 10: WASTEWATER PIPE AVERAGE AGE (ASSETFINDA DATA BASE)

Converting pipe age, condition, and pipe history into a remaining useful life figure produces the following indicative profile:

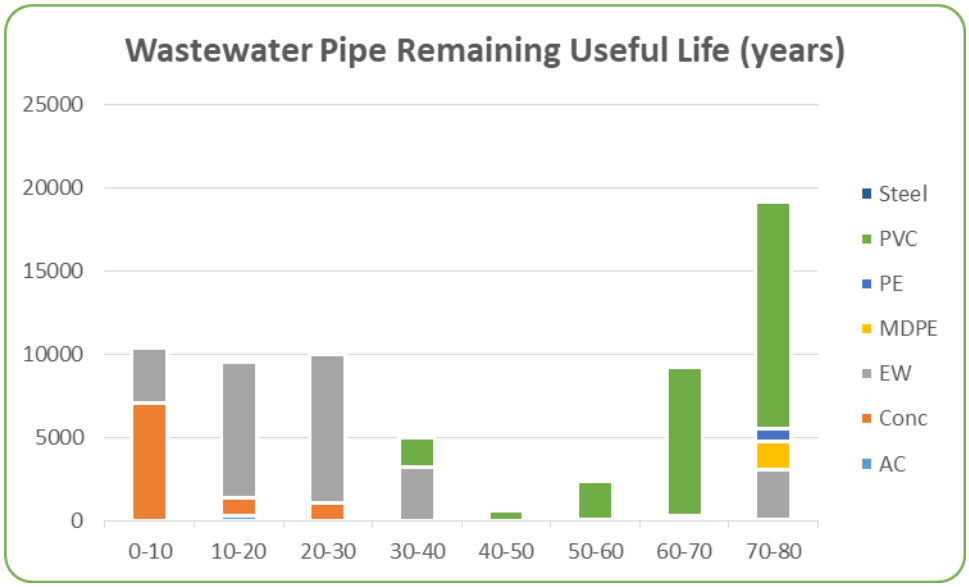


FIGURE 11: WASTEWATER REMAINING USEFUL LIFE (ASSETFINDA DATA BASE)

CDC has established an annual replacement programme to address deterioration of its older wastewater infrastructure and to maintain current levels of service. A long-run programme has been developed to smooth the peaks and troughs of the indicative programme based on remaining useful life and historical demand.

In addition to the pipe reticulation, the Carterton wastewater infrastructure assets include 17 pump stations and a three stage wastewater treatment plant with tertiary effluent irrigated to a 65.6ha CDC owned property.

Asset data confidence

Asset data confidence is reliable or highly reliable as summarised in Table 5. Part of CDC's asset management improvement programme involves the continued capture of asset condition data using CCTV pipe surveys and condition rating during repair work.

TABLE 5: WASTEWATER ASSET DATA CONFIDENCE LEVELS

Attribute	Very uncertain	Uncertain	Reliable	Highly reliable
Physical Parameters			X	
Asset Capacity			X	
Asset Condition			X	
Valuations				X
Historical Expenditures				X
Design Standards			X	

Asset value

The wastewater infrastructure had an optimised depreciated replacement value in 2019[36] of $7,849,765 as summarised in Table 6:

TABLE 6: WASTEWATER ASSET VALUATION SUMMARY 2019 (WSP OPUS)

Asset Type	Optimised Replacement Cost	Optimised Depreciated Replacement Cost
Pipe Reticulation	$10,677,021	$4,429,884
Reticulation fittings	$2,375,927	$1,107,996
Pump Stations	$678,953	$386,256
Treatment Plant	$3,433,988	$1,390,724
Wastewater upgrade	$1,765,184	$534,905
Total	$18,931,073	$7,849,765

Levels of service

The key levels of service to be met through the wastewater infrastructure are both customer based and technical, but are dominated by the latter—essentially, compliance with the operative resource consents for the discharge of treated effluent and associated activities. Customer levels of service relate to odour management, incidence of overflows, responsiveness to service requests etc.

New discharge consent applications and a notice of requirement for designation of the entire wastewater treatment and irrigation site were made in April 2017. The new consents were issued effective from 19 January 2018 for a period of 35 years, expiring 2053. (WAR160341)

Wastewater Treatment Plant Upgrade

The Council has a long-term vision of ultimately removing the discharge of effluent to Mangatārere Stream all year round, except in exceptional circumstances. The Council is finalising the upgrade to its wastewater treatment systems to meet that vision with the expected completion of construction of the reservoirs in late 2021 and the pipework, and pumps by March 2022. The Council is entering into an agreement with GWRC to make use of the land area previously assigned for the pivot and therefore the second pivot is no longer required.

The scheme has been designed for a projected population of 8,500 by the end of the new 35-year consent period (ie by 2052). Critical to that will be careful management and control of trade waste discharges, in particular that from a major Carterton industry, being Premier Beehive NZ. Premier's current organic load is significant—equivalent to approximately 50% of the total load discharged to the WWTP.

36 CDC asset revaluations for the 3-waters infrastructure are completed every three years. The most recent valuation of the waters was in 2019.

The now formalised trade waste agreement between premier Beehive NZ and Carterton District Council is fundamental to managing trade waste discharges to the WWTP.

Infrastructure management issues

Infrastructure management issues include:

TABLE 7: SUMMARY OF ISSUES - CARTERTON WASTEWATER SCHEME

Issue	Description	Options	Implications
Asset Renewal or Replacements	Infiltration rates entering pipe network.	**Preferred option** Proactive programme of condition assessment of entire pipe network, including visual inspection, CCTV, and recording findings during maintenance work. This will be used to identify priority repairs and renewals in line with the Pipe Repair Manual and following the optimised decision making process codified in NAMS. This will be followed by programmed repairs and renewals. There will also be ongoing reactive repairs and renewals.	Assessment work to be continued with budgeted capital expenditure amounts allocated in the long term plan for CCTV assessment over the long term plan of $137,000 (21-31 LTP) Some mains renewals will incorporate assessment expenditures relating to those pipes when confirming the decision for renewals. Routine maintenance will also to provide condition data. Repairing or replacing pipes to stop infiltration will result in less wastewater needing to be treated and discharged from the wastewater treatment plant. A pipe replacement program is estimated for the following ten years at $5,547,000 (LTP 21-31) Undertake wastewater hydraulic modelling $73,000 (LTP 21-31)
		Other options Continue current approach of reactive renewals as issues arise.	Being unplanned and ad hoc is likely to be at a higher unit cost. Failures will be likely which will result in an unacceptable level of service, including increased wastewater requiring treatment.
Response to Demand	Future demand includes increased residential growth projection beyond capacity of current residential zoning. Projected population growth could see the current urban population in Carterton township increase by 605 over the 2018–48 planning period.	**Preferred option** Treatment plant and disposal capacity is being upgraded in line with current and projected demand. Application of trade waste by-law to provide mechanism for controlling trade waste discharges and recovering costs from industrial users	The forecast cost of treatment plant upgrades is approximately $6,775,000 over the 30-year planning period. Loan servicing and associated operating costs have been provided for in the Ten Year Plan.

Issue	Description	Options	Implications
		proportional to volume and concentration of discharge. The by-law has been reviewed. Wastewater servicing planned to the east of Carterton township to accommodate projected residential growth in the north-east of town.	An additional trunk main and new reticulation is proposed in the draft Urban Growth Strategy area at an estimate of $2,430,000
		Other options There are no other viable options. "Do-nothing" is not a viable option as the current infrastructure would not meet future demand and would likely result in failures, loss of service levels and adverse impacts on the environment.	
Levels of Service (LoS)	LoS focus is on reliability of service, capacity, public health, and environmental protection. There is potential for higher environmental standards in the next 30 years.	**Preferred option** Environmental protection will be enhanced through implementing the planned treatment and disposal upgrade in line with the new resource consents, which take into account the expected implications of the GWRC's proposed Natural Resources Plan.	Current levels of service, as improved through replacement and upgrades of main components of scheme, will be increased and then maintained through the period. This is part of the overall treatment plant upgrade project (see immediately above).
		Other options There are no other viable options. "Do-nothing" is not a viable option as the current infrastructure would not meet future demand and would likely result in failures which would adversely affect the environment and potentially on public health.	
Public Health and Environment	The operative resource consents provide the legal right to operate the Carterton sewage treatment plant and to ensure any adverse effects of the activity on the environment are avoided or mitigated. Operational practices mean there are no public health issues.	**Preferred option** Ongoing monitoring of the treatment plant to ensure it complies with the new discharge consent conditions. Any unanticipated requirements from the proposed Natural Resources Plan could be dealt with as part of this expansion.	The financial impacts of the recent and future treatment plant and effluent disposal upgrades are to be reviewed. An estimate to expand the land discharge was $3,266,000. (Year 15 of the 30year IS plan)
		Other options Do not move towards total land discharge of treated wastewater	The expectation of the community is that the Council will ultimately remove all

Issue	Description	Options	Implications
			treated wastewater from natural waterways for environmental and cultural reasons. Monitoring the impacts of the upgraded treatment and disposal system currently being installed will confirm and quantify any impacts of the new discharge regime. The benefits and affordability of total land discharge will be tested prior to a final commitment to the preferred option.
Risk and Resilience	Gradual ground movement or more sudden and significant ground movement caused by a seismic event.	**Preferred option** Wastewater service continuity and environmental and public health is threatened by breakage or leaks. Network components will have specific vulnerability to risk according to materials. The design and materials used for renewals will take into account earthquake resilience. The planned 200,000m^3 effluent storage reservoirs will be designed to protect against potential liquefaction of the foundations or embankment failure due to a large seismic event.	Current risk mitigation measures will be maintained through the strategy period and no additional cost. Condition assessment and subsequent rehabilitation/replacement programming, commencing with critical assets, will be given a high priority.
		Other options There are no other viable options.	
Risk and Resilience	Climate change is likely to cause increased intensity storm events, including flooding. Conversely, drought conditions are more likely and will cause low flows in the receiving waterways, limiting the opportunity to discharge treated wastewater.	**Preferred option** The additional 200,000m^3 storage capacity will act as a buffer in high rainfall events when the farm soil conditions prevent land discharge. Should that be inadequate, treated effluent can be discharged to the river, provided it is in high flow. Long periods of low flow in Mangatārere River will also be buffered by the storage capacity, along with the ability to irrigate.	If the reservoir capacity is inadequate, there is the potential to breach the land discharge consents and contaminate surrounding groundwater with untreated waste. The probability of this risk occurring is considered to be low within the term of this strategy but the potential consequences are high.
		Other options There is no viable alternative option.	

Funding mechanism

The CDC wastewater scheme is funded using a combination of rates and user charges (trade waste charges). The rate component is split between a targeted rate (90%) and general rates (10%).

Disposal of wastewater infrastructure

There are no disposal issues in respect of CDC's wastewater assets.

Carterton District Water Supply Schemes

CDC owns and manages a water supply scheme for Carterton Township, and the Water reticulation for the Waingawa area. It also owns and manages and two rural water race schemes – the Carrington and Taratahi water race schemes.

Carterton water supply assets

The Carterton urban supply comprises a surface take at Kaipaitangata with a dam and two storage reservoirs totalling 1500 m^3 intake, which is supplemented by a four-bore well-field and 500 m^3 storage in Lincoln Road.

Only three of the bores are used for production, with one being disused since 2015 and a bore being unstable, producing high turbidity on start-up. This unstable bore is planned for remedial works in October 2020. The well-field details are summarised in Table 8 below:

TABLE 8: CDC WELL FIELD DETAILS

Bore No.	GWRC Category	Date drilled	Consent expiry	Depth to top of screen	Long Term Yield m3/d	Status
1	C	1991	2034	25.9	1382	Current production bore
2	B	1988	2034	14.0	1123	Disused
3	B	2005	2034	13.3	1382	Current production bore
4	C	2006	2034	26.0	518	Unstable – high turbidity on start-up
5	B	2020	2022	14.0	1300	Current production bore

Water treatment involves pH adjustment, chlorine and UV disinfection at both sources, with filtration provided at the Kaipaitangata Stream source.

The water supply reticulation consists of approximately 75.8km of water mains including water laterals, of that length 8.2km of 375mm diameter is the trunk main from the Kaipatangata supply.

TABLE 9: WATER SUPPLY RETICULATION ASSETS

Asset type	Unit	Quantity	Comments
Pipes (including laterals)	km	75.811	Diameter from 15 – 375mm
Hydrants	No.	322	
Valves	No.	351	Includes 10 'air' relief valves
Tobies	No.	2,940	Metered water connections
Kaipaitangata storage 1	m^3	1,000	Timber tank
Kaipaitangata storage 2	m^3	500	Reinforced concrete tank

Asset type	Unit	Quantity	Comments
Lincoln Road borefield storage 1	m^3	200	Timber tank
Lincoln Road borefield storage 2	m^3	300	Timber tank

Mains and *lateral* pipe diameters range from 15mm to 375mm diameter, with the most common mains pipes comprising of 28.6% of a 100mm diameter and a further 25% of the overall length being split approximately evenly between 150mm and 200mm diameter pipes. Most lateral connections range from pipe sizes 15mm to 32mm being 13.7% of the overall pipe length.

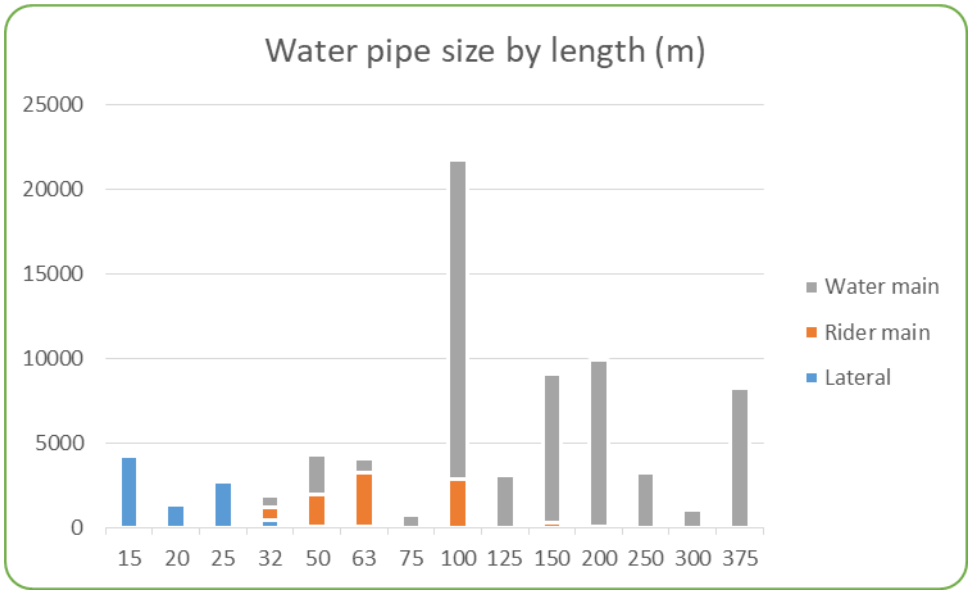


FIGURE 12: WATER PIPE SIZE (ASSETFINDA DATA BASE)

A proportion of the total length of pipe is nearing the end of its theoretical design life (70-80 years). Pipe age is, however, only an indicator of actual pipe longevity, with pipes lasting longer and shorter than the nominal design life. Pipe condition is monitored during maintenance activities to assess remaining useful life and replacement programming that will maintain the required levels of service.

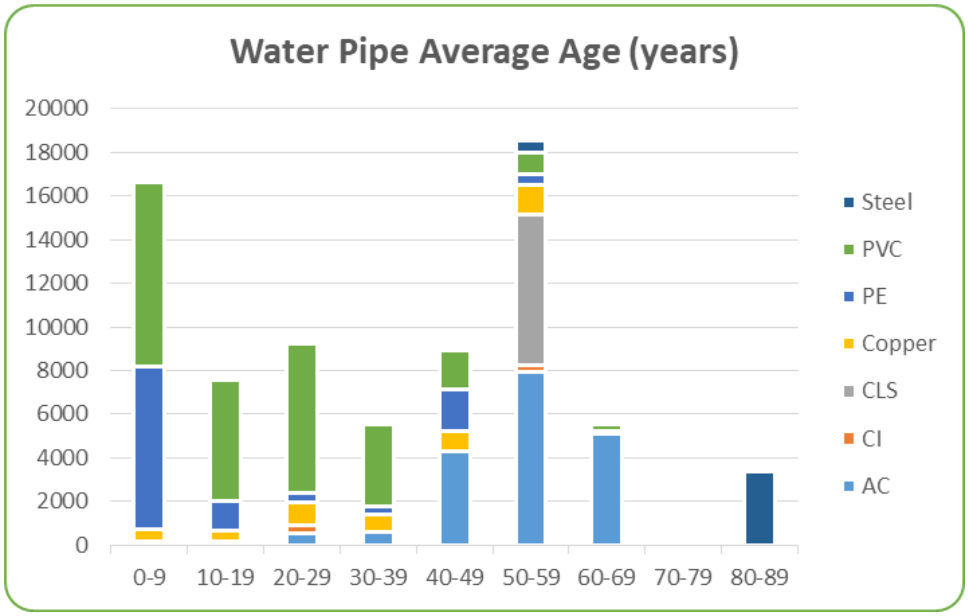


FIGURE 13: WATER PIPE AVERAGE AGE (ASSETFINDA DATA BASE)

40% of the reticulation is split between asbestos cement (30%) and PVC (32%) pipe material. The use of asbestos cement pipe over other materials was common place on New Zealand from 1950s through to the 1970s and is 18% of the reticulation materials used at Carterton.

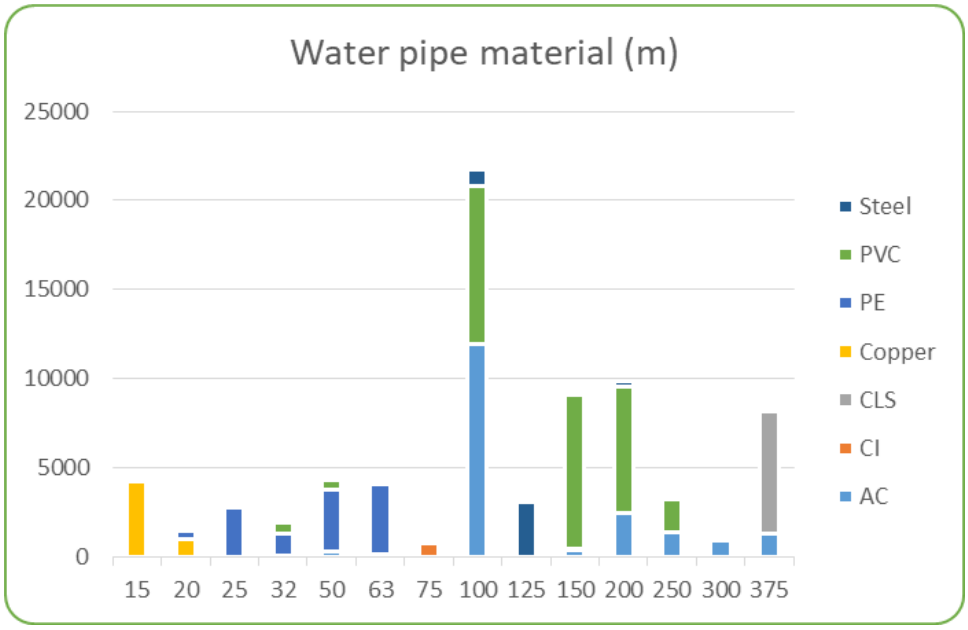


FIGURE 14: WATER PIPE MATERIAL (ASSETFINDA DATA BASE)

The condition assessment, shows 70.5% of the total pipe length is rated average to excellent, and 29.4% is rated poor to very poor.

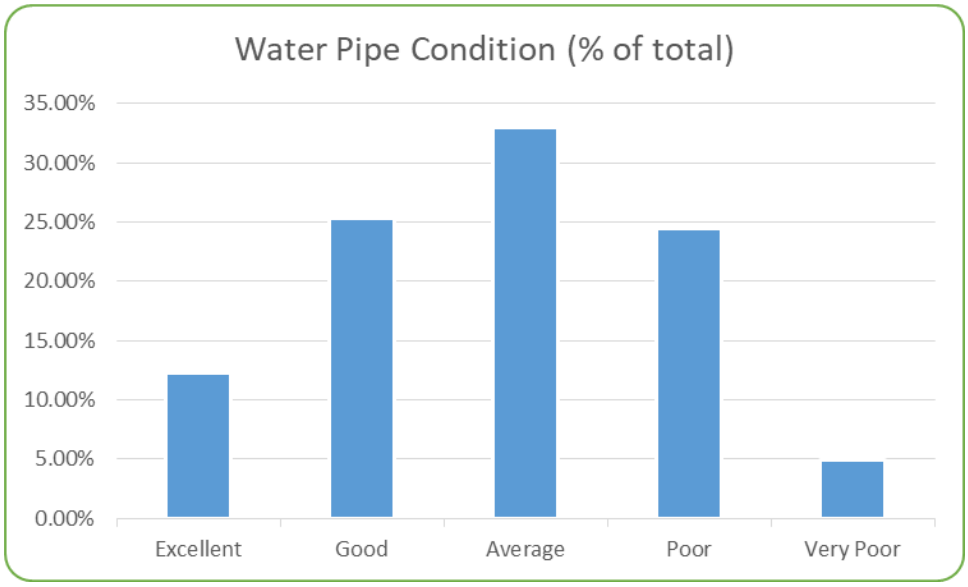


FIGURE 15: WATER PIPE CONDITION (ASSETFINDA DATA BASE)

Pipe sections in the poor category are prioritised for replacement to ensure levels of service are maintained. The combination of material type, age, condition, and diameter produces the following remaining useful life profile. This influences the need for an affordable, long-run pipe renewal programme due to the congestion of pipe length with an estimated remaining life greater than 70-80 years

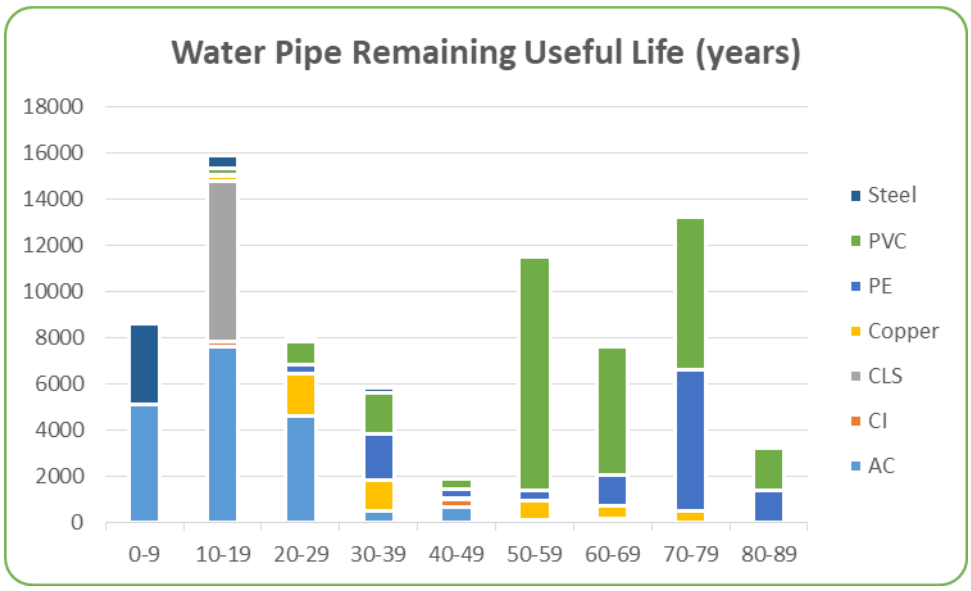


FIGURE 16: WATER PIPE REMAINING USEFUL LIFE (ASSETFINDA DATA BASE)

Asset data confidence

Asset data confidence for the Carterton water supply is reliable for all but asset condition. Inspection of pressurised water main condition is more difficult than for sewer and stormwater pipes because of access constraints while the water main is in operation. For that reason, the opportunity for assessing asset condition is limited to pipe repairs and maintenance history – pipe failure etc. Even so, the impact of that is relatively minor given the accumulated knowledge of pipe attributes and risk criticality that has been gathered over time.

TABLE 10: ASSET DATA CONFIDENCE

Attribute	Very uncertain	Uncertain	Reliable	Highly reliable
Physical Parameters			X	
Asset Capacity			X	
Asset Condition			X	
Valuations				X
Historical Expenditures				X
Design Standards			X	

Asset value

The optimised depreciated replacement value of the Carterton water supply assets in 2019 was $9,865,879, as summarised in Table 11 below.

TABLE 11: CARTERTON WATER SUPPLY ASSET VALUES 2019

Asset Type	Optimised Replacement Cost	Optimised Depreciated Replacement Cost
Pipe reticulation	$14,937,097	$6,186,396
Reticulation fittings	$4,585,174	$1,733,821
Kaip. Headworks	$1,138,529	$382,013
Kaip. Treatment Plant	$650,814	$150,013
Supplementary Supply	$3,126,860	$1,413,635
Total	$24,438,474	$9,865,879

Levels of service

Levels of service considerations delivered through CDC's water supply infrastructure include technical and customer considerations. Customer levels of service include water taste, odour, reliability of supply and responsiveness to customer service requests.

Higher technical levels of service driven by the Health (Drinking Water) Amendment Act 2007, the GWRC Natural Resources Plan, resource consents for the respective takes and security of supply, are the key level of service issues impacting on the Carterton urban water supply. The operative resource consents are as follows:

Scheme	Consent Expiry Date
Carterton – Kaipaitangata intake	2013 - consent renewal in progress[37]
Carterton – Lincoln Road bores	30 September 2034

Most recently (December 2017), the Havelock North Drinking Water Enquiry reported its findings and recommendations, included recommended changes to the principal legislation. A preliminary assessment of the recommendations in respect of CDC's water supply is that the impacts will be only minor. CDC does not operate untreated water supplies, and its current treatment processes are, or soon will be, in accordance with the Drinking-Water Standards for New Zealand 2005 (Revised 2018).

Carterton Council participates with other water suppliers in the Wellington region to improve the degree and effectiveness of the collaboration between parties in safeguarding the Wellington region's drinking water.

37 Application for renewal of the consent for the Kaipaitangata take was lodged with the regional council more than six months prior to the consent expiry date. The consent therefore remains operative in accordance with s.124 of the Resource Management Act 1991. The application awaits further stream flow and proofing investigations by CDC, scheduled for 2017/18 summer.

Water supply strategy

The current consent to take water from the Kaipaitangata Stream surface water allows up to 5,000m^3 per day and a minimum rate of abstraction of 60 L/s at any stream flow. The consent renewal application anticipates a reduced take under the Proposed Natural Resources Plan. A maximum take of 4,000m^3/day has been applied for, with no take below stream flows less than 100 L/s, and no more than 50% of stream flow at any other time. Further, GWRC's recent modelling of the Kaipaitangata and Waiohine surface water and groundwater catchments indicates there is already an over-allocation of these natural resources.

Recent monitoring of stream flow records show that stream flows can drop below 100 L/s for much of the January to March summer peak period, as occurred during January–March 2015, climate change may worsen those stream conditions.

The above scenario means that the total demand for Carterton, under dry summer conditions, will need to be met from the Lincoln Road bore-field supply. Under those circumstances, the role of the bore-field shifts from a supplementary supply to the principal (sole) supply.

The reliable bore-field yield now assessed at a maximum 4,000m^3/day.

Current average demand is 2,000m^3/day, with peaking at 3,500m^3/day. Forecast demand is for an average of approximately 4000m^3/day by the end of the 2021–2051 planning period with current peak summer demand exceeding supply capacity if total supply can't be met from the aquifer field (ie when surface take or stream flow is less than 100 L/s).

FIGURE 17: CARTERTON WATER SUPPLY VERSUS DEMAND

There are two other, deeper, bores comprising the CDC supplementary supply. One of those (Bore No.2) has not been used since 2015 due to the detection of e-coli, and the other (Bore No. 4) has been found to be unstable and of low yield. Arising from the above is a draft water supply strategy. The key elements of that include:

- Investigate impact of proposed consent conditions on Carterton demand over the 2017/18 summer period, but at a reduced minimum stream flow of 83 L/s, and measure effects on downstream ecology. Refine draft conditions following those investigations.
- Review CDC revenue and financing policy to reduce pricing elasticity through more effective use of universal metering to increase relationship between water use and price.
- Promote greater water use of water conservation measures to offset unnecessary consumption and reduce costs to users.
- Investigate alternative storage and supply options over years 2 and 3 of the IS.
- Add MoH approved filtration to the supplementary groundwater supply by 2021/22 to enable the use of Bore 2.
- Increase treated water storage to three days by 2024.
- Undertake construction of a supplementary supply, or 200,000m^3 raw water storage, over the period 2025–2028 of the IS.

Infrastructure management issues - Carterton water supply

TABLE 12: SUMMARY OF ISSUES—CARTERTON WATER SUPPLY SCHEME

Issue	Description	Options	Implications
Asset Renewal or Replacements	Parts of the reticulation are near the end of their theoretical useful life, increasing the risk of mains failure or leaks. Asbestos cement pipe makes up 24.6% of the reticulation, with its remaining, nominal, useful life expiring over the next 30 years	**Preferred option** Mains replacement programme based on pipe condition. A desktop assessment has analysed data in the asset management system and has identified the parts of the network that should be given priority for replacement. (30year projection) Also considered will be the Urban Growth Strategy. An optimised decision-making process has been applied, in accordance with NAMS, to finalise the replacement programme.	A continuing investigation and replacement programme is required to maintain current levels of service. A pipe replacement program is estimated for the following ten years at $3,732,000 (LTP 21-31)
		Other options Reduce planned replacements and extend timeframes increasing the maintenance of existing utility services. Continue current approach of reactive, ad hoc renewals as issues arise.	A reduced replacement programme extending over a longer period could result in reduced levels of service and increase in maintenance cost due to increased mains failure, loss of water and supply interruptions. Being unplanned and ad hoc is likely to be at a higher unit cost. Failures will be likely, which will result in an unacceptable level of service, including increased water loss.
Response to Demand	The Carterton water supply is designed for residential and commercial/industrial demand. Potentially, demand could exceed consented supply and recommended storage capacity during peak summer periods. Additional demand beyond current supply capacity is anticipated due to the urban population growth projection and effects of climate change, subject to available capacity of residential zone. It is expected that future consents will restrict water take from the Kaipaitangata	**Preferred option** Continue two-yearly programme of water mains leak detection, reducing the period to three years in the next cycle. At the same time develop more extensive demand management techniques including water conservation (in conjunction with stormwater and wastewater demand management), low volume water fittings, water use pricing. In the short-medium term (starting in 2020) investigate	Leak detection program increased to three yearly intervals with a forecast expenditure of $81,000 over the following ten years (21-31 LTP) Growth-related implications for the Carterton water supply scheme are dependent on sufficient residential zone capacity to meet projected demand beyond 2030. An additional trunk main and new reticulation is proposed in the draft Urban Growth Strategy area at an estimate of $2,429,000

Issue	Description	Options	Implications
	Stream during low flow/high demand periods, placing increased demand on bore water source and storage.	options for augmentation of supply and additional storage.	Water distribution modelling to be continued at $73,000 over the following 10 years. (21-31 LTP). Investigate an additional water supply source and any other possible options budgeted at $581,000 (21-31 LTP) Implement restricted water supply measures in consenting conditions to those water connections that are not within the defined water supply areas.
		Other options Continue with demand management and not investigate additional supply	A healthy and safe urban community needs a reliable water supply. Demand management alone is very unlikely to guarantee the supply required for the growing number of households in the near future.
Public Health and Environment	There is a risk of bacteriological or protozoal contamination. Increased standards or structural changes to water management may be an outcome of the Havelock North water supply contamination inquiry. The resource consent for the Kaipaitangata Stream take expired on 25 March 2013 with the renewal application still under review (2017). The Lincoln Road bore field consent expires in 2034.	**Preferred option** Develop evidence of the level of compliance with NZ Drinking Water Standards, including a catchment assessment, and from that investigate options for upgrading the treatment plants, as necessary. Install protozoa micro filtration at Lincoln Road bore field in 2021/22. Comply with resource consent conditions to avoid adverse effects on the environment.	Enhanced treatment and storage will improve public health and environmental protection but at greater cost. Treatment plant projected expenditure including the protozoa micro filtration at Lincoln Road bore field $1,388,000 (2021/22 LTP).
		Other options There are no other viable options given the risks to human health.	
Risk and Resilience Issues	Continuity of supply is identified as a risk during sustained drought periods due to the effects of climate change. Low flows in the Kaipaitangata Stream during peak summer demand periods will limit the ability to extract water from this source. The water storage reservoirs are critical assets. The smaller, 500m^3, reservoir at the	**Preferred option** Develop more extensive demand management techniques (see above). Assess susceptibility of soil structures to liquefaction during a major seismic event and implement further resilience measures for critical assets as required over the next 10 years.	Current risk mitigation measures will be maintained through the strategy period. Not completing the work risks the water supply being severely restricted during extended drought conditions. The probability of the risk occurring is considered to be moderate, with the severity of

Issue	Description	Options	Implications
	Kaipaitangata take is the oldest—approximately 40-years old. The 1,000m^3 Kaipaitangata reservoir was constructed in 2008, with the two bore reservoirs constructed in 2003. Resilience of these reservoirs to a major seismic event is key to the integrity of the supply. Internal baffles were installed inside the Kaipaitangata storage reservoirs during 2014/15 and the bore reservoirs in 2012 to reduce the impacts of water 'surge' during a large seismic event. The brittle pipe materials and jointing systems of older pipes, particularly the trunk mains, makes these assets more vulnerable to failure during seismic events.	Include the use of flexible pipe materials and jointing systems in future annual pipe replacement programmes. Provide resilient solutions for the riskiest sections of the trunk main feed from the Kaipaitangata supply. Install seismic valves on the reservoirs and fusible linkages. Increase storage of treated water at Lincoln Road wellfield and Kaipaitangata over the period 2020–2024 to 72 hours or 6000m^3.	consequences being high to critical Seismic protection of the reticulation trunk mains is critical to the resilience of the water supply. The probability of this risk occurring is considered to be low to moderate within the term of this strategy but the severity of the consequences are expected to be high. Resilient works is included in the pipe renewal program. Increased storage will provide an emergency supply of up to two days if treatment were interrupted. The cost of Increased storage over 2021–2024 is $525,000
		Other options Continue to rely on our ability to quickly fix any damaged pipe work following a major event and retain current storage capacity and rely on households to store their own emergency supplies.	These are high risk options. Based on the experience of other communities the risks of this option outweigh the costs of the preferred option.

Water race assets

The Taratahi and Carrington water races supply non-potable water to rural properties. The assets comprise surface intakes and 278km and 39km of open channel races respectively.
Consents to take water are critical to maintaining adequate, all year supply quantities for domestic and commercial/industrial use. Table 13 summarises current consent expiry dates:

TABLE 13: WATER SUPPLY RESOURCE CONSENTS EXPIRY DATES

Scheme	Consent Expiry Date
Carrington Water Race	28 June 2023
Taratahi Water Race	28 June 2023

The Water Wairarapa Project is currently under investigation led by Wellington Regional Council. While principally targeted at rural water use, the potential exists for the project to be extended to include urban water supply needs, either supplementary to or in substitution of current supply arrangements for Carterton. This could include supplementing the water races during river low flow periods. There are uncertainties over the viability of this project, although these are expected to be clarified in 2018/19the near future. The Council will continue to work with Greater Wellington

Regional Council, the other Wairarapa District Councils and the Water Wairarapa Establishment Board to understand the viability of the project over the course of this strategy period.

Infrastructure management issues – Carterton water races

TABLE 14: SUMMARY OF ISSUES—CARRINGTON AND TARATAHI WATER RACES

Issue	Description	Options	Implications
Asset Renewal or Replacements	Intake weirs will require replacement in 10 plus years' time, complete with a new screen for the Carrington intake. Need for Taipo rock protection of intakes to be monitored and programmed. Progressive replacement programme for culverts, from 300mm diameter to 500mm diameter, to improve maintenance access.	**Preferred option** Current maintenance and replacement programmes to be reviewed to investigate more cost-effective options for proactively managing the water races, including asset renewals and maintenance. Monitor need for and timing of replacement screen for Carrington water race and erosion protection for both intakes.	The move towards more proactive, rather than reactive, management, including maintenance, is expected to enable replacements to be funded from the existing operational budget.
		Other options Continue reactive water race management.	This option would not deliver the most cost-effective water race services resulting in additional funding required for replacements.
Response to Demand	Current capacity is not always adequate for primary use of water races—stock water supply.	**Preferred option** Implement water quantity monitoring programme, including water budget audit to investigate use, efficiency, and measures to reduce water loss. Install flow gauges at tail races. Continue with installation of weirs where water races join streams Develop a new bylaw to control water race use. Develop a demand management strategy.	Responding to demand will be met from within existing operational budgets. Improving the management of the water races through improved monitoring and controls will enable future demand to be met within current water allocations, and reduce the risks of insufficient water to meet the demands of current and future users.
		Other options There are no other viable options	
Public Health and Environment	Both water races are non-potable supplies suitable for stock watering purposes and domestic use. Persons using the water for drinking purposes do so at their own	**Preferred option** Ensure users are informed of unsuitability of water race as a potable supply. Resource consents provide the legal mandate to take	Monitoring water race use so that it is consistent with their purpose and consents is fundamental to CDC's supplier and compliance

Issue	Description	Options	Implications
	risk contrary to relevant legislation and CDC regulations relating to the use of the supply.	water for stock at an environmentally sustainable rate.	accountabilities. This option will not increase the costs of managing the water races, but it will improve the management of the races and the Council's compliance with its resource consents.
		Other options There are no other viable options	
Risk and Resilience Issues	Low flows in the stream during droughts limit the ability to extract water from the stream. Conversely, flood conditions impose risk of damage to the intake structures. Cross-overs across streams are vulnerable to earthquake damage.	**Preferred option** Develop a plan to progressively install boundary gates to improve water race accessibility and responsiveness. Investigate options and risks for seismic protection of cross-overs.	Current risk mitigation measures will be maintained through the strategy period within operational budgets. The progressive installation will mean costs can be spread over time with no financial impact on water race ratepayers.
		Other options There are no other viable options	

Funding mechanisms

CDC's urban water supply activity is funded through a combination of rates and user charges (universal water metering). Water meters provide a more direct linkage between consumption and cost to users, and can be used as an effective method to reduce demand.
The Carterton water supply rate is a combination of a targeted rate (90%) and the general rate (10%).
Water by meter is charged for water consumption in excess of 225m^3 per year per connected rating unit. Currently, residential water meters are read every six months and commercial every three months. That means that residential user consumption at the end of the first round of meter reading is likely to be well within the annual volume allocation. The economic incentive to reduce unnecessary consumption is unlikely to be realised until after the second round of meter reading has been completed and invoiced—well after the period of peak summer consumption.
CDC intends to introduce smart meters in 2019/20, which will allow more options around reading, pricing, and billing, and will form part of a wider demand management plan.
Water race services are funded using a combination of the general rate (10%) and separate targeted rates (90%) for each scheme calculated on land area on a differential basis.

Disposal of water supply infrastructure

There no disposal issues in respect of CDC's water supply assets.

Stormwater Drainage

Stormwater assets

CDC's stormwater infrastructure is comprised of two components, the first is the piped and open earth channels. Of the piped 19.5km stormwater drainage assets, 73.2% of the materials used are concrete and next prominent material is PVC at 24% to the total piped stormwater. Earthen open channels equate to 10.8km of drainage network system.

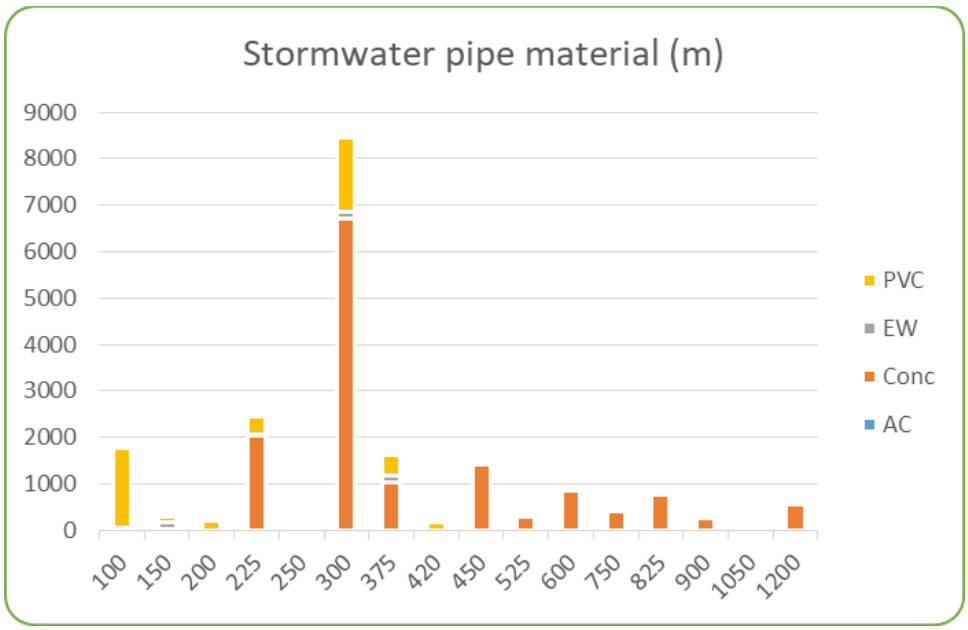


FIGURE 18: STORMWATER PIPE MATERIAL (ASSETFINDA DATA BASE)

Pipe sizes range in diameter from 100mm to 1,200mm, with 12.4% 225mm of diameter and 43.1% (8.4km) of 300mm diameter.

In addition, the primary stormwater assets include 485 street sumps (catch-pits) 216 manholes, 84 Soakpits plus 10.8km of open drains in the urban area and approximately 20km of open drain in the rural area (referred to as the "eastside" diversion), linked in places to the rural water race network, complete with some discharge structures.

The secondary component consists of overland flow paths, including the roading network. The multiple Carterton stormwater discharges were consented through a district wide comprehensive consent that expired on 30 May 2016. The outcome of Wellington Regional Council's Proposed Natural Resources Plan will determine the requirements for any consenting requirements to come for stormwater discharges.

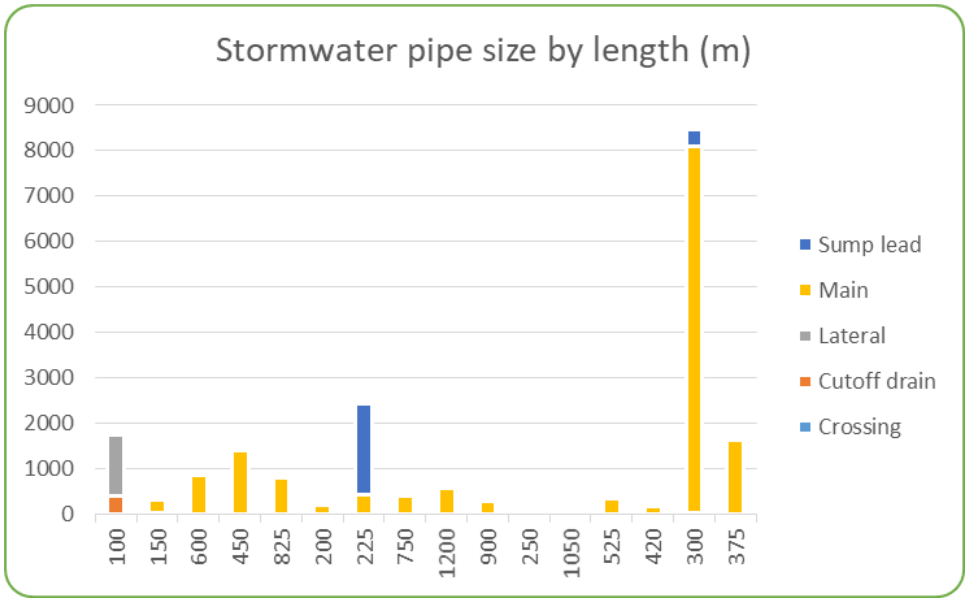


FIGURE 19: STORMWATER PIPE SIZE (ASSETFINDA DATA BASE)

The stormwater pipe network varies in age, with the earliest pipes laid in the 1950s, and most recently installed pipes laid as part of subdivision development. The pipe age profile shows that approximately 2.59km (13%) of pipe is 60-70 years old and 12km (61.4%) is under 30 years old.

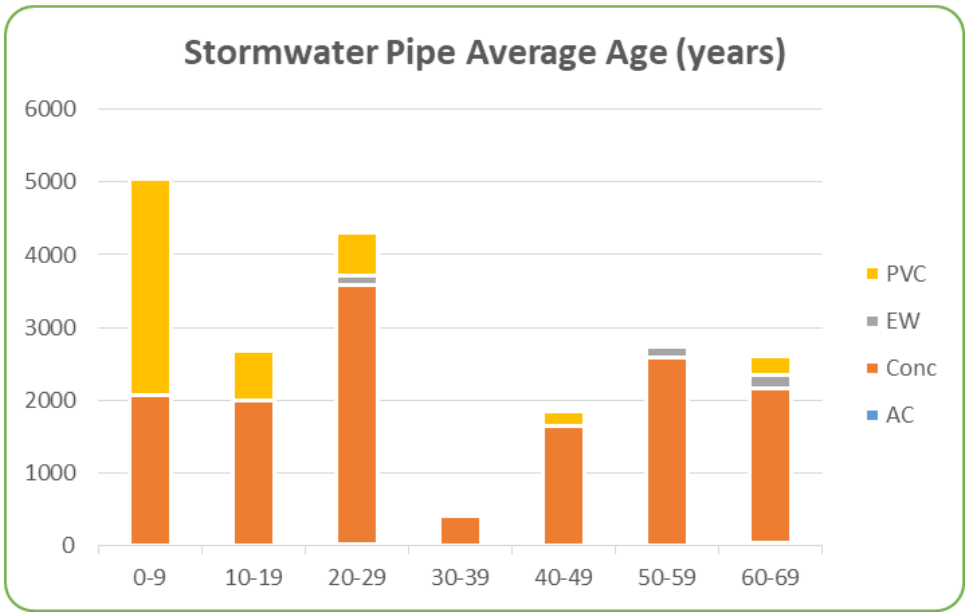


FIGURE 20: STORMWATER AVERAGE AGE (ASSETFINDA DATA BASE)

The condition rating of the network is positive, with only 3.9% of the piped network rated as poor, noting though the uncertainty rating attached to that condition assessment (refer to Figure 21).

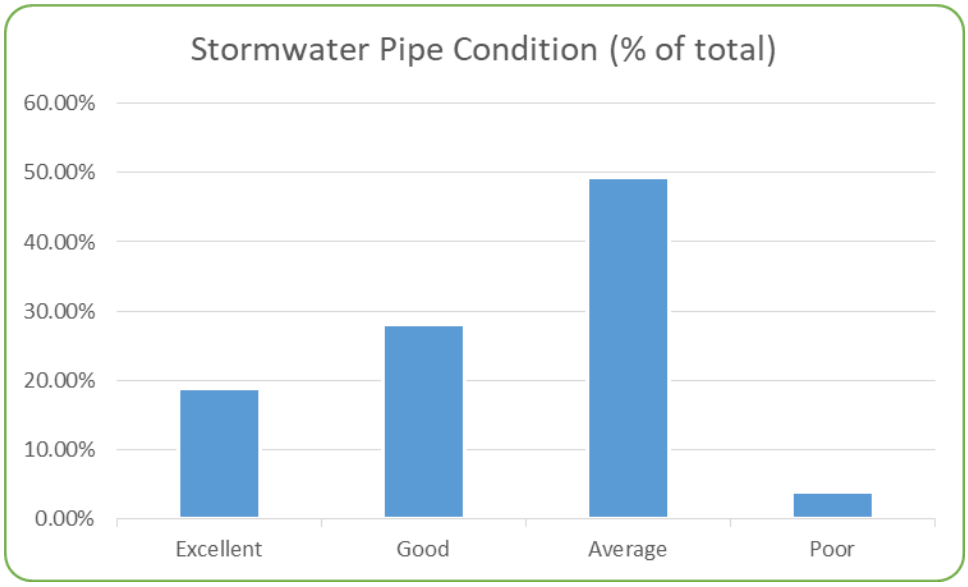


FIGURE 21: STORMWATER CONDITION RATING (ASSETFINDA DATA BASE)

The combination of pipe material type, age, and condition produces the following remaining life profile:

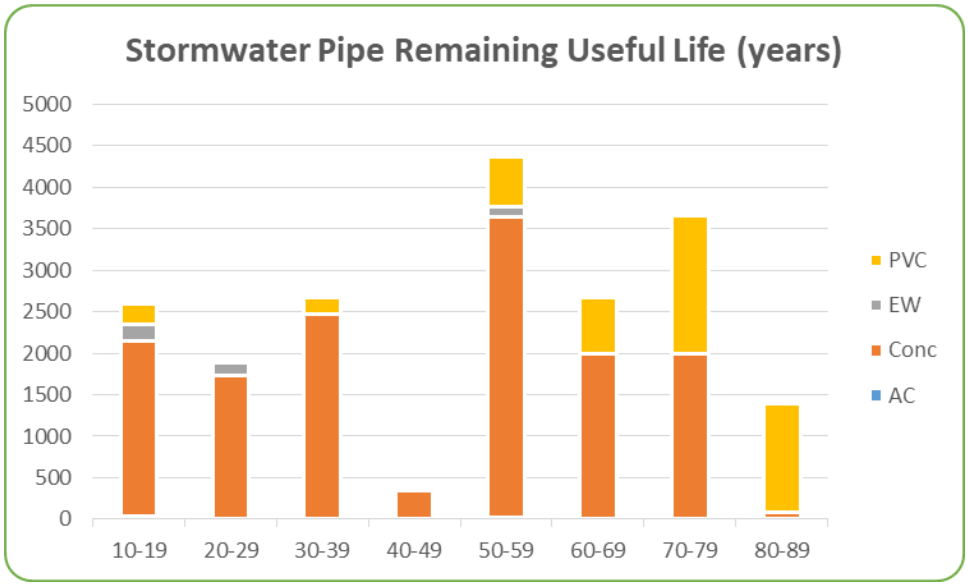


FIGURE 22: STORMWATER REMAINING USEFUL LIFE (ASSETFINDA DATA BASE)

Asset data confidence

Asset data confidence is reliable for stormwater inventory, capacity, and historical expenditure, but is low for data condition as summarised in Table 15. Part of CDC's asset management improvement programme involves progressive capture of asset condition data using CCTV pipe surveys and data logging during repair work.

TABLE 15: STORMWATER ASSET DATA CONFIDENCE

Attribute	Very uncertain	Uncertain	Reliable	Highly reliable
Physical Parameters			X	
Asset Capacity			X	
Asset Condition		X		
Valuations			X	
Historical Expenditures				X
Design Standards			X	

Asset value

CDC's stormwater infrastructure had an optimised depreciated replacement value of $7,439,808 in 2019 as summarised in Table 16 below:

TABLE 16: STORMWATER ASSET VALUATION

Asset Type	Optimised Replacement Cost	Optimised Depreciated Replacement Cost
Reticulation	$8,410,511	$5,641,109
Open Drains	$447,433	$324,798
Manholes	$1,039,942	$794,871
Sumps	$564,612	$394,542
Soak Pit Chambers	$314,519	$284,488
Total	$10,777,017	$7,439,808

Levels of service

Levels of service (LoS) for the stormwater activity are based on technical and customer requirements. Until recently, customer levels of service had dictated service levels, with technical levels of service expected to be more dominant consequent on adoption of the regional council's Natural Resources Plan.

Customer levels of service relate to effective drainage of surface water from land and buildings, response times, etc. Technical LoS relate to stormwater quality and impact on receiving waters.

A project involving the construction of a bypass channel on the western side of Carterton is aimed at restoring stormwater drainage capacity of the Waikākāriki Stream during storm events.

Land use development along the Waikākāriki Stream has impacted on levels of service. The bypass channel would divert peak stream flows to avoid surface flooding in the adjoining urban area.

Consent application and project implementation was scheduled to be completed in 2015/16, but this project was deferred pending the outcomes from the GWRC natural resources plan.

Infrastructure management issues

The current infrastructure management issues are relevant to CDC's stormwater activity:

TABLE 17: SUMMARY OF ISSUES—STORMWATER DRAINAGE

Issue	Description	Options	Implications
Asset Renewal or Replacements	Ageing pipe assets may fail. Current records indicate that the majority of pipe assets are relatively young, with oldest pipes laid in the 1950s.	**Preferred option** Develop and implement an ongoing stormwater pipe condition assessment programme. Additional capacity will be incorporated in pipe replacements, as required, based on actual and forecast growth.	A pipe replacement program is estimated for the following ten years at $688,000 (LTP 21-31) with $7,609,000 estimated for the following 30 year period. Priority repairs and renewals will be assessed using the Pipe Repair Manual and following the optimised decision making process codified in NAMS. Budget provision has been made of $417,000 for years 22-24 for design and treatment conditional on the requirements of the PNRP.
		Other options There are no other viable options. leaving the asset run to failure would result in surface flooding during high rainfall events, which are likely to become more frequent as a result of climate change.	
Response to Demand	Demand will increase with residential growth.	**Preferred option** The stormwater drain on the east side of town will be progressively replaced to accommodate projected residential growth in the north-east of town in line with the Urban Growth Strategy.	Additional catchment and new reticulation is proposed in the draft Urban Growth Strategy area at an estimated of $2,703,000 This will encompass the eastern drain reducing the risk of surface flooding in the area.
		Other options There are no other viable options that would avoid the risks to property.	
Levels of Service	Current reticulation capacity copes with most rainfall events or surface flooding of short duration. Beyond that, drainage of excess surface water relies on secondary flow paths. More intense rainstorms due to the effects of climate change could erode current levels of service.	**Preferred option** Maintenance and progressive pipe replacements of damaged pipes over the term of the strategy will improve performance of the current network.	Planned renewals will include capacity increases to compensate for predicted climate change effects.
		Other options Do nothing.	Not responding to the risk of flooding will result in a risk to

Issue	Description	Options	Implications
			the community that is unacceptable, especially as the risks will be elevated over time due to the impacts of climate change.
Public Health and Environment	Stormwater from the Carterton network discharges to the Mangatārere and Waikākāriki streams. There are no litter traps or treatment systems in place but higher environmental standards are signalled in GWRC's Proposed Natural Resources Plan. The Wellington Regional Council's Proposed Natural Resources Plan includes a requirement for preparation of stormwater management plans to improve planning, control, and mitigation of adverse effects from stormwater discharges.	**Preferred option** Once the Natural Resources Plan is finalised, we will respond to any new standards required. Seek a general ("global") consent for stormwater discharges. This is likely to need a stormwater management plan.	Resource consent will provide legal mandate for current stormwater discharge activity and will include guidance on future requirements for quantifying and mitigating any adverse effects of the activity on the receiving environment. The preliminary estimated capital cost of measures to mitigate the adverse effects of stormwater discharges is $417,000, which is provided for over two years, in 2022/23 and 2023/24.
		Other options There are no other reasonable options.	
Risk and Resilience Issues	Current risks include pipe failure, flooding of property due to impaired stormwater capacity and blocked secondary flow paths. A major flood event could overtop the banks of Mangatārere or Kaipaitangata Streams with consequential flooding of property. Flood control is currently the responsibility of Wellington Regional Council.	**Preferred option** Identification and protection of secondary flow paths through catchment management plans. Repair and replacement of damaged stormwater pipes.	Current risk mitigation measures will be maintained through the strategy period. Failure to complete this work will increase the risk of flooding and damage to property.
		Other options Do nothing.	Not responding to the risk of flooding will result in a risk to the community that is unacceptable, especially as the risks will be elevated over time due to the impacts of climate change.

Funding mechanism

The stormwater activity is funded through a targeted rate (90%) on all rating units within the urban area, calculated on land value, plus the general rate (10%).

Disposal of stormwater infrastructure

There are no disposal issues in respect of CDC's stormwater assets.

Roads and Footpaths

Roading assets

CDC's road and footpath infrastructure assets comprise the following:

TABLE 18: ROAD AND FOOTPATH ASSETS[38]

Asset Component	Quantity	Units	Comments
Pavement – Sealed	Urban 37.5	Km	Sealed Pavement area 367,534 m^2
	Rural 273.5	Km	Sealed pavement area 1,601,310 m^2
Pavement - Unsealed	Urban 0.15	Km	Unsealed pavement area 636 m^2
	Rural 158.3	Km	Unsealed pavement area 613,762 m^2
Total carriageway	469.6	Km	
Bridges	49	No	
Culverts > 3.4m²	95	No	Total clear opening (waterway area) greater than 3.4m^2
Culverts < 3.4m²	1,810	No	
Kerb & Channel	49.5	Km	Includes dished and mountable kerbs
Underpasses	17	No	Privately owned – listed only for reference
Catch-pits	431	No	Included with 'stormwater' data
Stormwater Channel	194.8	Km	
Guard Rails	601	M	
Sight Rails	240	M	
Footpaths	48.1	Km	Pavement area 99,561 m^2
Street Lighting	1,114	No	Includes 377 on State Highway 2
Signs	1,937	No	

Associated assets include car parks and retaining structures.

The maintenance strategy for CDC's roads and footpaths is to achieve current target levels of service through effective intervention strategies and fit for purpose material selections, consistent with One Network Roading Classification (ONRC). The latter instils a national and consistent approach to roading standards for each classification.

The majority of the Carterton road network consists of access roads because of the low traffic volumes.

[38] Exported RAMM data - Nov2019

TABLE 19: ROADING CLASSIFICATION[39]

Hierarchy	Length (m)	Description
Primary collector	25,173	These are locally important roads that provide a primary distributor/collector function, linking significant local economic areas or population areas.
Secondary collector	157,076	These roads link local areas of population and economic sites. They may be the only route available to some places within this local area.
Access	155,919	This is often where your journey starts and ends. These roads provide access and connectivity to many of your daily journeys (home, school, farm, forestry etc). They also provide access to the wider network.
Low volume	131,434	Low volume roads are a subset of the 'Access' class listed above.

Renewal strategies for unsealed roads is based on an average assumed depth loss of 10mm over the entire pavement, accepting that metal loss varies site by site. A 5–7 year return cycle is programmed, where a minimum 50mm layer will be placed on each return. This achieves an average of 30–35km per annum maintenance treatment. Full rebuilding of unsealed pavements is resulting in improvements to the unsealed network. The positive effect of this improvement is the ability to now reduce the overall annual target length. This will be continually monitored and revised as required. The target length for resealing the network is 17km per annum. This includes chip seals and thin asphaltic surfacing.

As a result of recent culvert inspections, road drainage culverts identified as being dangerous or having inadequate capacity due to regular flooding, have been identified and prioritised. A programme to extend and/or replace the affected parts of the current drainage system is planned over the next 5 to 10 years starting with the highest priorities.

CDC's indicative bridge renewal profile demonstrates a relatively modest replacement programme through to 2034, with significant expenditure forecast for 2069. A detailed study of the ageing bridge asset within the network is to be carried out in 2025 ahead of intervention and replacement if required. The study will encompass actual risk, projected life, traffic impacts etc. An assessment of bridge usage versus bridge condition and anticipated failure timeframes will be included, together with an assessment of the impacts, if any, of using alternatives routes. The purpose of the study is to make best use of the existing infrastructure by understanding the travel demand on roads with bridges and provide possible alternatives to bridge renewal. If bridge renewal is still considered the best option, the study will identify a more accurate timeframe for renewal.
The two yearly, routine bridge inspections will continue to be carried out to identify any required maintenance and minor component renewal. These routine inspections do not address likely timeframes for whole of bridge replacements.

The growth and probable resultant increase in demand on the network is not expected to require any significant new roading, or additional capacity on the existing network. The increase in forestry related traffic will have an impact on maintenance and safety on outlying rural roads, and priorities for works may be adjusted to meet that demand. Access to any new residential/retirement

[39] Exported RAMM data - Nov2019

developments will be provided by the developers. The need for any major upgrades is not seen at this stage, but the network will continue to be monitored to ensure improvements such as urban by-passes are provided in a timely manner.

CDC intends to review demand forecasts for the district roading network. The study will encompass an assessment of future demand due to increased use originating from proposed subdivision development and logging operations, and the actual and potential impact it will have on the roading network. This will enable the Council to better plan its road renewal and maintenance requirements. Minor safety projects will be introduced to target the dominant contributing factors to roads accidents, namely:

- too fast for conditions
- poor handling
- alcohol and other impairments
- lack of attentiveness
- loss of control on bends on rural roads.

Asset data confidence

Asset data confidence is reliable for roading and footpaths inventory, capacity and historical expenditure, but is low for data condition as summarised in Table 20. Part of CDC's asset management improvement programme involves progressive capture of asset condition data using RAMM surveys and data logging during repair work.

TABLE 20: ROADING AND FOOTPATHS ASSET DATA CONFIDENCE

Attribute	Very uncertain	Uncertain	Reliable	Highly reliable
Physical Parameters			X	
Asset Capacity			X	
Asset Condition				X
Valuations			X	
Historical Expenditures				X
Design Standards			X	

Asset value

CDC's roading and footpath infrastructure had an optimised depreciated replacement value of $144 million as at 30 June 2020 [40] as summarised in Table 21.

TABLE 21: ROADING AND FOOTPATH VALUATION 2020

Asset Component	Optimised Replacement Cost	Optimised Depreciated Replacement Cost
Formation	$66,173,627	$66,173,627
Pavement	$65,551,252	$49,655,861
Drainage	$21,357,730	$12,075,209

40 CDC's roading and footpath infrastructure is revalued every three years. The previous valuation was in 2017.

Footpaths	$8,887,898	$4,443,949
Signs and Road Markings	$756,072	$378,036
Traffic Facilities	$1,096,463	$548,232
Bridges Culverts	$50,367,842	$20,680,203
Retaining Walls	$125,317	$117,076
Street Lighting	$1,388,558	$749,468
TOTAL	$215,704,759	$154,821,660

Levels of service

Customer levels of service are shaped by three key considerations developed under the ONRC framework. They are:

- Mobility (travel time reliability, resilience of the route)
- Safety
- Amenity (travel quality, aesthetics)
- Accessibility (land access and road network connectivity)
- Responsiveness.

Technical levels of service include asset condition ratings, pavement strength, surface roughness, geometry, cost efficiency.

Infrastructure management issues

TABLE 22: SUMMARY OF ISSUES—ROADS AND FOOTPATHS

Issue	Description	Options	Implications
Levels of Service	Levels of service include road safety, reliability and accessibility, responsiveness, and smoothness of ride. The maximum allowable weight and dimension limits for heavy commercial vehicles have been increased (known as 50Max). There is a portion of the bridge stock that is either known to be unable to cater for this increased loading, or insufficient details of the bridges is known to be able to confirm acceptability of the loading. This limits the routes available for these HPMV vehicles.	**Preferred option** Key bridges will be strengthened as part of the renewal of structure components.	50Max vehicles are affecting the LOS of unsealed roads to forestry areas, and structures. Increased maintenance in the short-term and renewal funding long term may impact on funding requirements for both Council and NZTA. If NZTA will not subsidise this work, ratepayers may have to fund the shortfall.
		Other options Retain current levels of service.	Retaining the current bridge strengths will result in a chance of failure, risking people's safety.
Public Health and Environment	Road maintenance and construction operations will be carried out to ensure	**Preferred option** The current length of unsealed road is not planned to be reduced during the strategy	Current public health and environmental protection measures will be adhered to.

Issue	Description	Options	Implications
	protection of public health and the environment. Transport related greenhouse gas emissions are monitored by GWRC.	period, except for safety or other compelling reasons. Current roading operations will be monitored to ensure public safety and environmental impacts are managed appropriately. Resource consents for road construction will be obtained where needed.	
		Other options Adopt a seal extension programme.	The costs of extending the length of sealed roads would not outweigh the benefits and would unlikely attract NZTA subsidy.
Risk and Resilience	The district is subject to earthquakes and severe weather events causing flooding, slips, and washouts. Reliable access to all areas of the district can be affected. Critical assets include bridges, large culverts, and bluff areas, where natural hazards could trigger failure and isolation of communities.	**Preferred option** Alternative routes are maintained for collector roads. There will be regular road inspections and remedial work where required.	Current risk mitigation measures will be maintained through the strategy period. A level of risk related to isolation of communities is deemed acceptable.
		Other options There are no other viable options.	

Funding mechanism

The roads and footpaths activity is funded from NZTA's subsidy and the general rate, the latter calculated from the capital value of each rating unit in the district.

Disposal of road and footpath infrastructure

There no disposal issues in respect of CDC's wastewater assets.

Infrastructure Investment Programme

The Most Likely Scenario

The following tables summarise the most likely scenario for managing CDC's infrastructure assets, taking account of the above issues. The 30-year term of the strategy provides a high-level insight as to the significant decisions that might need to be taken beyond the relatively short-term, 10-year planning horizon of the 2021–2031 Ten Year Plan.

The principal options shown are, in many cases, the only options available other than 'do nothing'. The variable is timing. As noted above, current and proposed levels of service are a minimum, dominated by regulatory and technical considerations. Customer levels of service are more discretionary and need to be considered in the context of projected population changes and ability to pay. Options such as demand management have some practicable relevance for Carterton District, namely in respect of the three waters infrastructure. Overall, the small ratepayer base of the District is sensitive to relatively modest increases in expenditure, with water and wastewater services predominantly funded by Carterton urban ratepayers. Any increases in the capacity of CDC's core infrastructure needs to be well researched, evaluated, and sustainable.

The tables below show the indicative estimates of operational and capital expenditure up to 2051, by infrastructure asset type, for the most likely scenario. The estimates are shown on an annual basis for the first 10 years, followed by 5-yearly sub-totals covering the remaining 20 years of the strategy. The graphs shown average the remaining 20 year forecasts per year.

FIGURE 23: OPERATING AND MAINTENANCE EXPENDITURE FORECASTS BY INFRASTRUCTURE ASSET TYPE 2021–2051 (AVERAGED FOR YEARS 30-51)

Year	1	2	3	4	5	6	7	8	9	10	11-15	16-20	21-25	26-30
	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31	Avg 2031/36	Avg 2037/41	Avg 2042/46	Avg 2047/51
Roading	4,894,207.79	5,085,681.66	5,416,343.39	5,521,847.03	5,695,119.00	6,180,085.73	6,326,627.94	6,565,243.23	7,109,741.30	7,281,003.74	6,790,441.32	7,545,276.57	8,411,683.50	9,419,121.53
Water	2,626,059.37	2,876,324.22	2,985,890.70	3,073,090.47	3,246,045.66	3,337,253.69	3,579,256.17	4,101,734.75	4,023,786.72	4,104,020.27	4,268,231.73	4,818,958.02	5,382,607.20	5,941,976.52
Wastewater	3,055,495.05	3,454,065.57	3,614,205.21	3,777,665.53	3,874,738.14	3,913,761.71	3,974,588.53	4,130,043.07	4,204,516.41	4,269,139.58	4,359,148.96	5,030,645.44	5,367,801.92	6,054,468.17
Stormwater	299,831.91	319,633.24	329,940.55	347,985.93	380,384.88	393,766.24	424,604.43	460,539.34	467,340.61	483,598.85	488,347.49	548,553.88	586,653.02	654,311.84
Rural water	868,567.64	914,902.55	1,054,197.18	1,060,924.89	1,086,569.62	1,117,838.79	1,141,123.24	1,179,285.86	1,204,092.70	1,228,305.61	1,327,114.36	1,477,760.94	1,639,351.69	1,852,593.87

FIGURE 24: OPERATING AND MAINTENANCE EXPENDITURE FORECASTS BY ASSET TYPE 2021-2051 (AVERAGED 30-51 AMOUNTS)

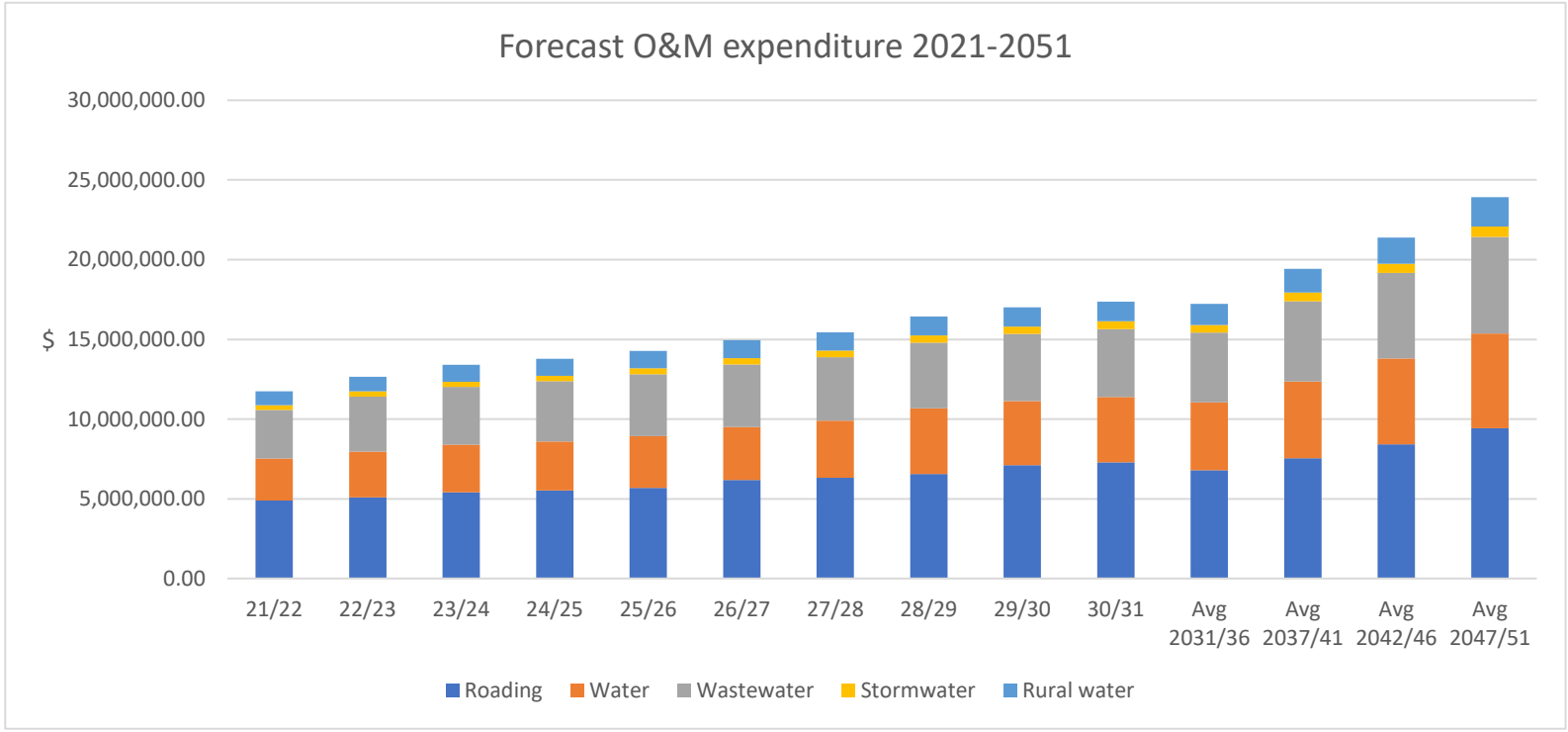
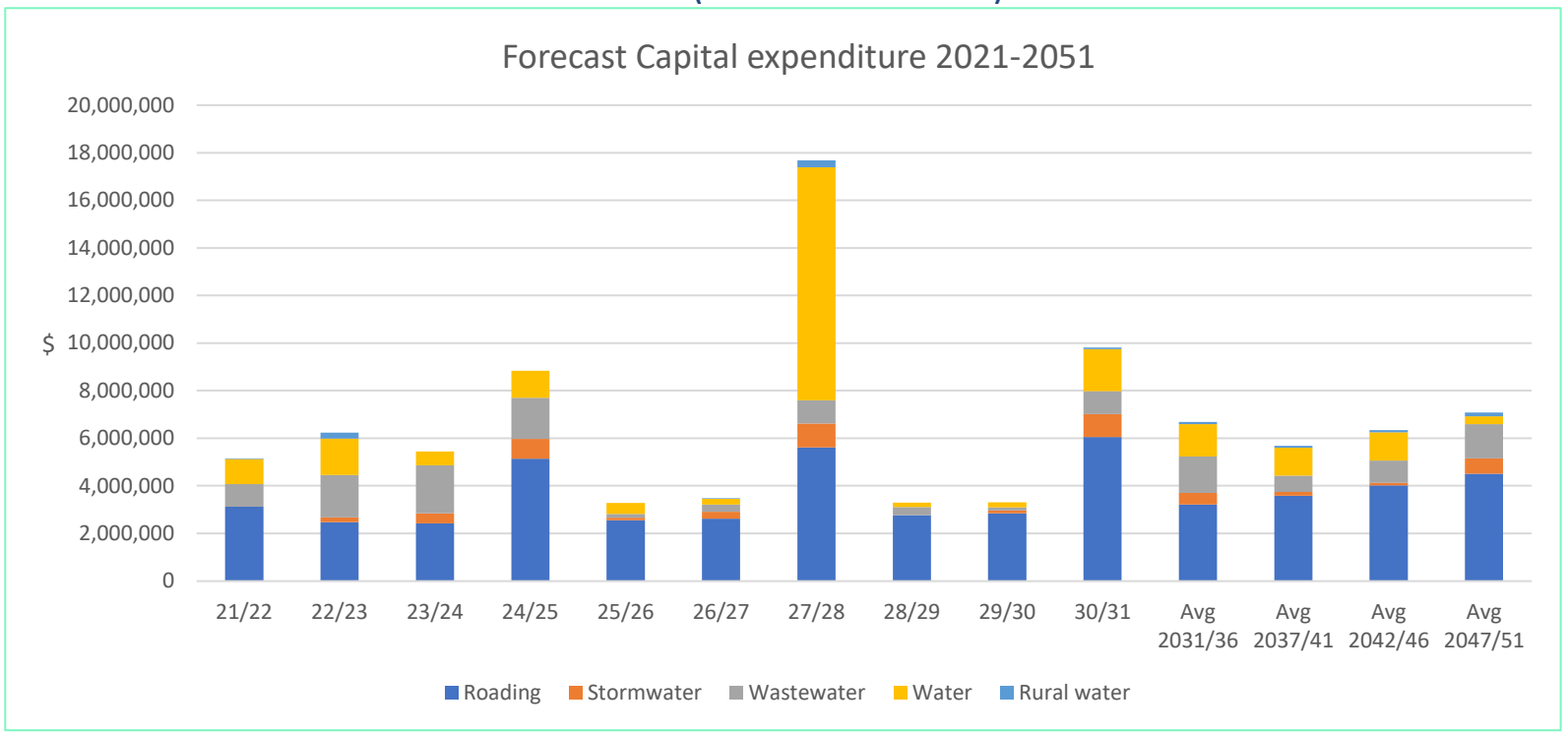


FIGURE 25: CDC INFRASTRUCTURE CAPITAL EXPENDITURE FORECASTS BY INFRASTRUCTURE ASSET TYPE 2021–2051 (AVERAGED FOR YEARS 30-51)

YEAR	1	2	3	4	5	6	7	8	9	10	11-15	16-20	21-25	26-30
	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31	Avg 2031/36	Avg 2037/41	Avg 2042/46	Avg 2047/51
Roading	3,122,094	2,470,636	2,425,256	5,146,065	2,552,067	2,620,002	5,610,158	2,762,664	2,841,921	6,045,104	3,212,448	3,583,991	4,015,560	4,503,731
Stormwater	0	204,000	420,566	830,330	110,639	283,961	1,014,199	0	123,205	975,392	494,199	152,898	112,711	650,408
Wastewater	951,652	1,779,189	2,023,946	1,729,797	151,576	309,517	970,000	350,777	133,061	962,814	1,527,279	689,850	936,977	1,433,085
Water	1,058,000	1,528,246	574,196	1,125,020	466,897	240,799	9,792,585	174,863	209,449	1,758,398	1,352,547	1,174,818	1,188,103	338,527
Rural water	20,000	255,000	0	0	0	22,717	291,569	0	0	76,044	92,500	79,800	89,480	151,880

FIGURE 26: CAPITAL EXPENDITURE FORECAST BY ACTIVITY 2021-51 (AVERAGED 30-51 AMOUNTS)



Total Expenditure Summary – Most Likely Scenario

In addressing the issues identified in the previous sections of this strategy, CDC expects to spend $194.3 million on new or replacement infrastructure between 2021 and 2051. Over the same period, $543.7 million is expected to be spent on operating costs, including direct labour, depreciation, materials, and maintenance.
Operating expenditure relates to day-to-day administration, financing, and maintenance of the respective infrastructure assets.
Capital works comprise two categories—renewal/replacements and new.
The above forecast totals are distributed across the four infrastructures asset activity areas as follows (totals for 2021–2051):

TABLE 23: FORECAST EXPENDITURE 2021-51

Infrastructure activity	Operating expenditure ($m)	Capital expenditure (replace / renew $m)	Capital expenditure (new $m)
Wastewater	$142.33	$25.35	$6.95
Water supply	$136.01	$20.47	$16.72
Rural water (Races)	$42.34	$2.73	$0
Stormwater drainage	$15.30	$7.89	$3.12
Roads and footpaths	$220.91	$103.23	$8.95

The table above shows that expenditure across the four infrastructure activity areas will continue to be dominated by operational requirements (operating costs, labour, depreciation, materials, and maintenance) between 2021 and 2051
Total operating expenditure is expected to average $18.6 million per year for the period covered by this strategy.

Significant Capital Works Programme Summary

Significant decisions to be made regarding new infrastructure projects (defined, for the purpose of this strategy, as being $0.5 million or more of capital expenditure) that are expected to be required during the 2021–2051 period are shown in the tables below. The estimated capital costs and timing are based on forecast amounts included in the above tables.

Wastewater

TABLE 24: SIGNIFICANT CAPITAL EXPENDITURE ITEMS – WASTEWATER ACTIVITY

Significant decision and principal option	Estimated Cost	Estimated Timing
Mains renewals	21,553,437	2021-2051
Eastern Growth Strategy Area	2,429,578	2024-2031
Duplicate primary SED tank	695,000	2034-2035

Full disposal to land	3,266,000	2035-2036
Mains renewal - High Street South (3.2km)	2,357,446	2021-2024
Renewal of pump station components	1,451,381	2021-2051

Water Supply

TABLE 25: SIGNIFICANT CAPITAL EXPENDITURE ITEMS – WATER SUPPLY ACTIVITY

Significant decision and principal option	Cost	Timing
Mains renewals	19,878,515	2021-2051
Investigate other water supplies	581,288	2021-22
Increase water storage capacity	500,000	2021-2023
Construction of water supply treatment plant	8,747,064	2027-2028
Eastern Growth Strategy Area	2,313,887	2024-2031
Additional potable water storage	3,480,000	2044-45

Stormwater Drainage

TABLE 26: SIGNIFICANT CAPITAL EXPENDITURE ITEMS – STORMWATER ACTIVITY

Significant decision and principal option	Cost	Timing
Renewals	7,475,235	2021–2051
Eastern Growth Strategy Area	2,703,293	2024-2031
Stormwater treatment : design and construction	417,424	2022-2024

Roading and Footpaths

TABLE 27: SIGNIFICANT CAPITAL EXPENDITURE DECISIONS – ROADING & FOOTPATHS ACTIVITY

Significant decision and principal option	Cost	Timing
Renewals	103,227,631	2021-2051
New Levels of Service	295,000	2021-2051
Eastern Growth Strategy Area	8,651,971	2024-2031

Assumptions

The above strategy for managing CDC's infrastructure assets is based on the following assumptions:

TABLE 28: SUMMARY OF ASSUMPTIONS

Assumption	Level of Uncertainty	Potential Effects of Uncertainty
Depreciation Average asset lives at a project level for new works have been used to calculate depreciation.	Medium	Depreciation is an annual expense to reflect the reduced economic potential of an asset. Because revenue (cash) covers this expense (non-cash) a cash reserve builds up over an asset's life to help fund the asset's replacement at the end of its life. This depreciation reserve is the principal funding mechanism for asset renewals. If the depreciation is inadequate, renewal projects may have to be reprioritised, or scaled down, or they may be funded through a different source such as increased borrowing or rates.
Natural disasters That there are no major natural disasters requiring additional funding for reinstatement of assets.	Medium	There is medium risk of a natural disaster occurring during the 30-year period requiring additional funds to repair or reinstate assets. Some further provision for increasing the resilience of the assets has been built into this plan but there is still further work to be undertaken to determine the desired level of resilience and the further asset improvements to achieve this.
Service potential Service potential of the asset is maintained by the renewal programme.	Pipe networks—Medium Roading and Footpaths—Low	There is medium risk that the service potential of the pipe network assets will not be maintained by the implementation of the renewal programme.
Asset lives Asset lives are accurately stated.	Pipe networks—Medium Roads and Footpaths—Low	The risk that pipe network asset lives are inaccurate is medium. Lives are based on generally accepted industry values, modified by local knowledge and condition assessment. The condition of sections of pipe networks has been confirmed by condition assessment. There is a potential effect that, the useful lives of pipe assets might be overstated, with a consequential impact on depreciation funding and the respective renewals programme.
Changes to levels of service It is assumed that no significant changes to levels of service are required other than those specifically identified in this strategy.	Wastewater assets Low	Levels of service due to increased regulatory requirements for the Carterton wastewater discharge have been accommodated in the strategy. Uncertainty regarding new levels of service is low for CDC's wastewater scheme because of the new 35-year consents effective from 19 January 2018. Different levels of service from that assumed could mean higher or lower capital expenditure and associated financing, depreciation, operating, and maintenance costs, or it could impact operating costs and resource requirements. Different technology may be needed.

Assumption	Level of Uncertainty	Potential Effects of Uncertainty
	Roading assets Low	NZTA's nation-wide move towards a common roading classification, and review of roading subsidy rates, has resulted in reduced NZTA funding towards CDC's road maintenance and renewal programmes. The consequence could be either an increased local contribution or a reduction in levels of service. The strategic assessment of the likelihood of that occurring is low. Different levels of service from that assumed could mean higher or lower capital expenditure and associated financing, depreciation, operating, and maintenance costs, or it could impact operating costs and resource requirements. Different technology may be needed.
	Stormwater assets Medium	In order to meet increased environmental demands, stormwater asset development may be required in conjunction with the GWRC Proposed Natural Resources Plan. The likelihood of asset development to meet these requirements is unknown, and will not be predicted without some knowledge of actual stormwater effects. Council carries out sampling of selected stormwater outlets to ascertain the potential effects and identify catchment capacities and the relevance of the data collected for future structure planning input. Different levels of service from that assumed could mean higher or lower capital expenditure and associated financing, depreciation, operating, and maintenance costs, or it could impact operating costs and resource requirements. Different technology may be needed.
	Water supply assets Medium	Changes to technical levels of service for the Carterton water supply take from the Kaipaitangata Stream are expected due to the current consent renewal process and changes mooted in the Wellington Regional Council Proposed Natural Resources Plan. Provision has been made to address the potential impacts of those changes in the water supply strategy (refer to chapter 0.) Amendments to NZ Drinking Water Standards as a result of the Report of the Havelock North Drinking Water Enquiry – Stage 2, are likely, including a new mandatory requirement to treat all water sources, including groundwater, regardless of the assessed catchment security. Groundwater previously assessed as secure will no longer be exempt from water treatment requirements, including disinfection. The CDC supplementary bore supply is already treated with chlorine and UV. The scope and scale of filtration treatment is currently under investigation, with the results of that work to inform CDC's water supply strategy, and the required budget. Ultimately, the actual timing of implementation may be controlled through new legislative requirements. The CDC surface take at Kaipaitangata Stream is already fully treated. Different levels of service from that assumed could mean higher or lower capital expenditure and associated financing, depreciation, operating, and maintenance costs, or it could impact operating costs and resource requirements. Different technology may be needed.

Assumption	Level of Uncertainty	Potential Effects of Uncertainty
Maintenance and operational costs These are largely based on historical rates and assume similar contract rates throughout the planning period.	Low	BERL inflation factors have been applied to the programmes and budgets over the first ten years of this IS. Budgets for the remaining years of the IS are based on Year 10 budget estimates. No further inflation is applied beyond Year 10. Where the actual inflation rate is different from that forecast, the cost of projects and expenditure will be different from that forecast. Higher than forecast inflation would likely mean higher operating and capital costs and higher revenue; higher capital expenditure could mean greater borrowing; and there would be pressure on rates to increase to cover these costs.
Construction Costs No major changes relative to current cost structure.	Low	It is possible that the price of some components will change relative to others. Budgets are reassessed each year for the AP process to mitigate this risk. BERL inflation factors applied to the 10YP also incorporate an element of price changes in different activity sectors.
National Land Transport Fund (NLTF) Subsidies. NZTA has announced that the FAR subsidies for Carterton will decline from the current rate of 53% to 51%.	Low	If the rate or dollar level of subsidy decreases, roading projects may be reprioritised, or scaled down, or they may be funded through a different source such as increased borrowing or rates.
Council policy No significant change to Council policy that impacts on assets and services.	Low	Any significant change will require a full review of asset management plans and implications identified at the time.
Vested assets No assets are gifted to the council as a result of subdivision.	Low	The Council's preference is receive infrastructure or development contributions by way of cash, rather than land or other assets. If assets are vested as a result of subdivision, this will replace cash revenue.