Transport Activity Management Plan 2018-28

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EXECUTIVE SUMMARY

Hutt City occupies the plains of the Hutt River in a broad flat valley terminating at the Port Nicholson harbour with suburbs on the steep western hills above the Wellington Fault scarp, in the enclosed valleys at Wainuiomata and Stokes Valley, and along the eastern side of Port Nicholson harbour.

Hutt City is one of four adjacent medium sized cities in the urban area of the Wellington Region. As such, it contributes to and supports the economic wellbeing of the city and the surrounding urban and rural area by providing residential, retail, commercial and industrial services.

The city has an aspiration for economic and population growth and the strategies developed to support these goals are beginning to bear fruit. An aging demographic and social wellbeing objectives require the transport network to provide for alternatives modes of travel, as well as accommodating the demands imposed by growth.

The economic activities within the city rely heavily on customer access from within the city and beyond, while the industrial activities rely on access within the city to regional and national transport links. The Seaview/Gracefield industrial area is the largest industrial area within the region, with Hutt City accounting for 2.1% of the National GDP in 2016.

The urban area is elongated with outlying suburbs which results in just over 50% of the network being arterial and collector roads. The remainder is access and low volume roads. There are no unsealed roads and only 6% of the network is rural, predominantly secondary collector.

Effective, efficient and safe internal and external land transport is critical for an urban environment to function successfully and grow. The Hutt City transport system consists of multi modal networks linking the CBD, suburbs and surrounding cities.

HCC's Transport Activity supports the economic wellbeing of the city by responding to growth and development while promoting social and cultural wellbeing via our Road Safety Programme, Road Asset Maintenance and Renewal programme, and the Traffic Services Programme.

Hutt City has a transport network consisting of 453kms of urban road, 30kms of rural road, 71 bridge/structures, 162 retaining walls, 5.3kms of seawall and a variety of traffic assets to support the predominantly urban environment

The significant infrastructure issues identified for Hutt City are:

- Natural hazards
- Climate change
- Environmental Pressures
- Population and demographic changes
- Changing levels of service

There are several documents that form the strategic framework in which the Transport Activity operates from central, regional and local government including:

- Government Policy Statement 2015-2025,
- Wellington Regional Land Transport Plan 2015,
- Safer Journeys Strategy 2010-2020
- Hutt City Council Strategy Documents and Policies.

These documents provide direction for the Transport Activity, which must progress the priorities and goals identified.

HCC has adopted the One Network Road Classification (ONRC) system which aims to provide a customer-focused approach to network management and consistent customer levels of service across New Zealand, regardless of the differing Road Controlling Authorities. HCC's network has been classified into the ONRC hierarchy based on traffic volumes, whether they connect to key/strategic destinations, or are the sole route available.

Roads within the network will be maintained to the Customer Level of Service for roads of its type. The Customer Levels of Service come under the categories of; Mobility (travel time reliability, resilience of the route), Safety, Amenity (travel quality and aesthetics), and Accessibility (land access and road network connectivity).

To determine whether Customer Levels of Service are being achieved, ONRC Performance Measures have been created for each of the Customer Levels of Service. These have been categorised into three types; Customer Outcome, Technical Output and Cost Efficiency with a total of 27 performance measures covering; safety, resilience, accessibility, amenity, travel time reliability, and cost efficiency measures.

Historically HCC has used key performance indicators such as; NAASRA, Condition Index/Pavement Integrity Index, STE, Crash Statistics, Network inspection/audit results and asset condition assessments. These have continued to show the desired level of service has been consistently achieved, with the network in good condition.

Future performance monitoring will be based on the ONRC measures, (including the current HCC measures) and assessed against the yet to be determined targets and peer comparisons.

HCC has identified five problems that are being addressed by the transport activities through the 2018/21 period:

- **Cost Efficiency** – The whole of life asset cost will be compromised if timely and appropriate interventions and treatments are not made to the transport network.
- **Safety** – Serious Injury and Fatal accident frequency needs to be maintained at the current level.
- **Mobility** – Travel Time Reliability and Resilience are increasingly compromised across the network
- **Amenity** - Travel experience needs to be maintained at the current level.
- **Accessibility** - Connectivity and access for all travel modes is an increasing challenge.

HCC has tailored the Road Safety Programme, Road Asset Maintenance and Renewal programme, and the Traffic Services Programme, to address these problems. These programmes have been created through option and investment level analysis to determine the appropriate investment levels and options, industry best practice guidelines, local knowledge of the network, and economic analysis used to determine the appropriate responses.

The key objectives for achieving customer levels of service and delivering the programmes are:

1. Manage levels of service for all road users to support amenity, economic growth, and accessibility;
2. Provide a safe network;
3. Provide high quality, resilient connections;
4. Provide value for money for our Road Asset investment.

The work programmes developed directly respond to the strategic problems identified and are generally at a similar level of expenditure as in previous years. However, pavement surfacing expenditure has returned to the level of three years ago following a short period of lower investment.

This document will support Hutt City Council's funding submission for the 2018-21 National Land Transport Programme. This activity management plan will be reviewed every three years to stay relevant in supporting the current Government Policy Statement and future NLTP submissions.

1 OVERVIEW

This Activity Management Plan (AMP) is structured as follows:

1. **Overview:** sets out AMP policy, process, management structure, relationships, scope and legal authority.
2. **Strategic Framework**: sets out the direction the management of the roading network is required to take consistent with government, regional and local council policy.
3. **Levels of Service:** sets out targets and achievements towards the Customer Levels of Service set by the Council and the Performance Indicators set by NZTA.
4. **Demand:** sets out what is likely to change the demand for roading and land transport services.
5. **Risk Management:** identifies the risks to achieving the programme proposed by the AMP and what is done to mitigate the risk
6. **Programme Business Case:** links the proposed programme to the levels of service, strategic direction, demand and risks to the asset lifecycle management
7. **Asset Lifecycle Management**: sets out how the management is implemented, current condition of the asset and trends, maintenance options and justification for programme, renewal requirements.
8. **Financial:** sets out the financial forecasts, assumptions, asset valuations and funding.
9. **Improvement Programme:** set out what will be done before the next review of the AMP in 2020.

2 OBJECTIVE OF THE ACTIVITY MANAGEMENT PLAN

The purpose of this AMP is to outline and to summarise in a coordinated manner the Council's long-term management approach for the provision and maintenance of transportation activities throughout the city.
This AMP and associated long-term (20-year) expenditure forecast has been produced for the transport activity and road network assets owned and managed by Hutt City Council ('Council'). The management of the road network is focussed on achievement of the national, regional and local vision statements, goals, outcomes and objectives as set out in section 2.

In this context, the AMP sets out how Council delivers its asset-based services:

- To the standards expected by customers
- In the most cost effective manner for its customers
- Through management of assets in a way that is sustainable
- In the long term
- In compliance with legal requirements

The AMP comprises four key elements:

- Service standards which Council aims to achieve
- Asset system used to achieve the service standards
- Life cycle of asset management strategies which sets out how Council manages the assets
- Quality assurance processes

2.1 ASSET MANAGEMENT POLICY

Council has adopted an AM Policy, the intent of which is to set out a broad framework for the management of Council assets, such that Council services meet community expectations of time, quality and value for money now and in the future. The policy reflects Council's vision, community outcomes and performance targets as written in the Long Term Plan.

The AM Policy consists of two components:

a) Corporate Asset Management Policy

Asset Management will complement and build upon the LTP and through its continued implementation and more formalised approach to AM principles and methodology, Council will achieve the following:

- Clear direction and 'ownership' of asset management
- Better and more informed decision-making by Council, staff and the community
- Integration of resources and knowledge and the ability to plan for present and future generations, including a more comprehensive approach to risk management
- A framework to implement continuous improvement in AM practice
- Enhanced ability to understand and meet community needs and expectations
- Achievement of legislative and regulatory requirements

b) Lifecycle AM Policy

The AM Policy provides the framework for undertaking asset management, covering:

- Understanding customer expectations
- Asset planning and budgeting
- Asset operations and maintenance
- Risk assessment and management
- Asset accounting and costing
- Asset management plans
- Asset management Working Group
- Asset Management roles and responsibilities

The Asset Management policy states the overall intention and direction for AM Plans as follows:

- AM plans are driven by the levels of service as defined in the Code of Service. The Code of Service defines existing targets for the level of service.
- AM plans will be developed using a risk-based approach.
- The City's infrastructure will be managed in accordance with the AM plans, subject each year to the Annual Plan process.
- AM plans will be reviewed annually.
- AM plans will be submitted for the approval of Council.

2.2 ASSET MANAGEMENT PROCESS

The asset management process is intended to deliver the roading network outcomes required by the community as cost effectively as possible and in a way that is sustainable in the long term.

At the highest level the services to be delivered and the standards to be achieved, which contribute towards the achievement of the community outcomes, are defined in the Hutt City Long Term Plan. Gaps between the required standards and services and the ability of the roading network to deliver are identified, and processes put in place to manage these gaps within acceptable margins. In managing gaps between target standards and the performance of the roading network both asset solutions (such as road construction) and non-asset solutions (such as the promotion of alternative transportation modes) are considered. Decisions on programmes to be adopted are based on a range of factors such as risk assessments, legal requirements, customer approval ratings and the ability of the community to pay for system improvements.

The roading network service is delivered as efficiently and effectively as possible, by managing the balance between lifecycle costs, levels of service and risk. A number of key processes are utilised to address this balance, while seeking to match the demand for service through provision of assets – as illustrated in the matching process between asset need and asset capacity in Figure 2-1 below.

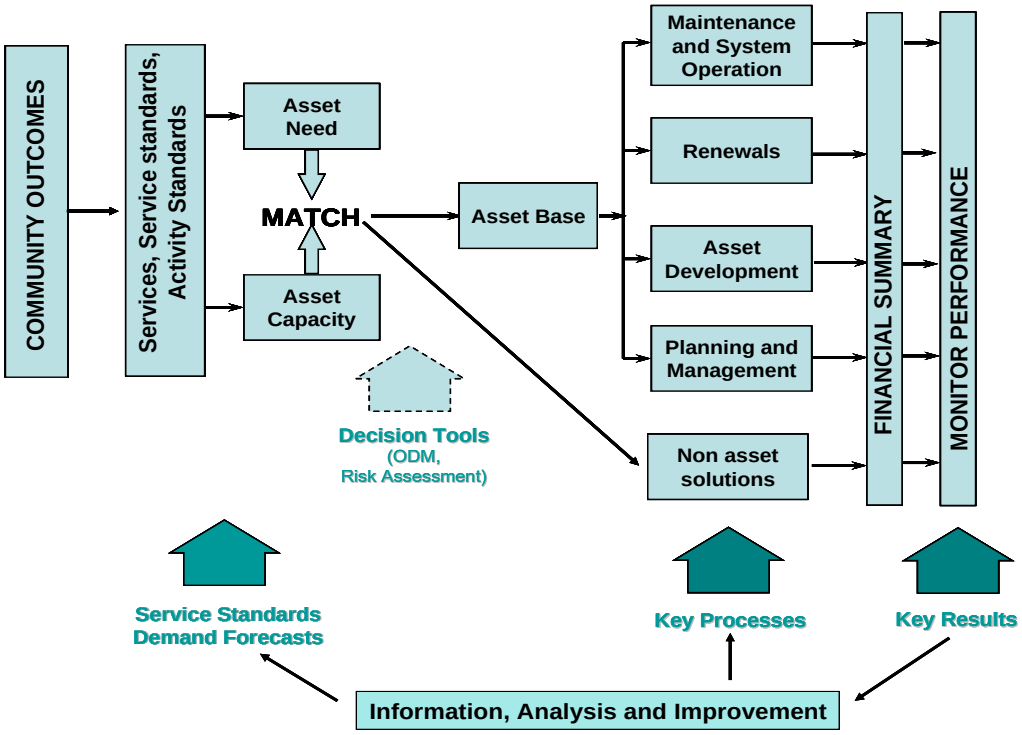


Figure 2-1: Asset management planning process

2.3 MANAGEMENT STRUCTURE

The Transport Division within the City Services Group manages roading, traffic and parking assets. There are currently three teams within the Division; Planning, Programme and Development. The organisational structure is illustrated in Figure 2-2.

The Division has an In-house Professional Services agreement with the General Manager of City Services. This agreement enables Council to claim professional services from NZTA on eligible components of the roading programme that staff are directly involved in.

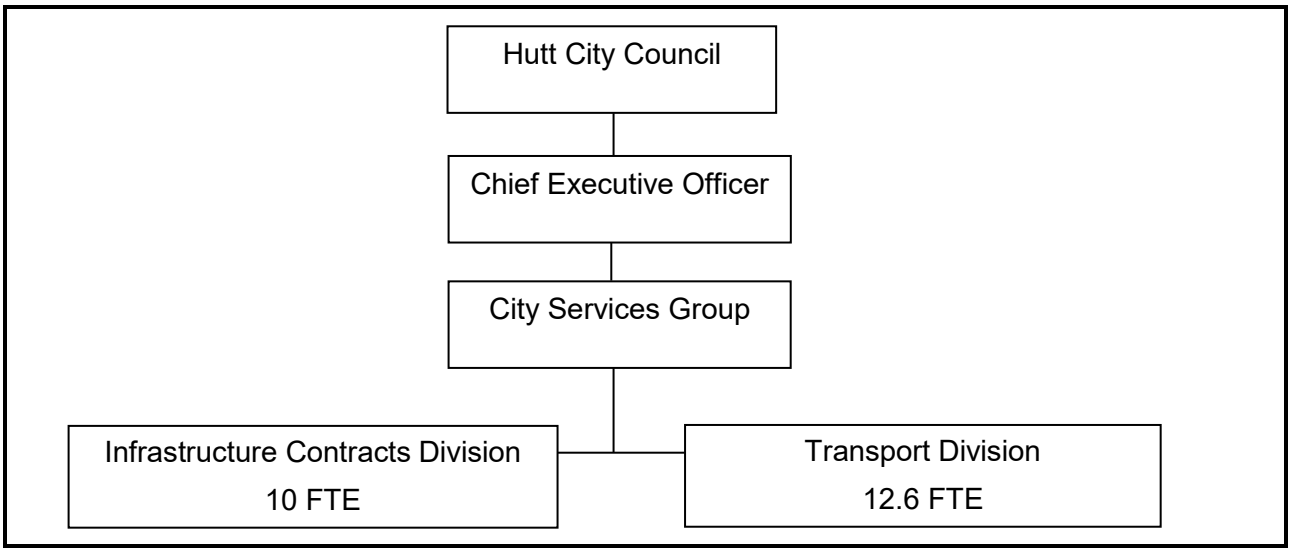


Figure 2-2: Management Structure

2.4 LEGAL AUTHORITY

The provision and management of roads is a function of local authorities in terms of the Local Government Act 1974, Local Government Act 2002, and Land Transport Management Act 2003. These Acts stipulate that Hutt City Council (the Council) is the owner and road controlling authority of all public roads other than State Highways in the city.

As such, the Council is required to control activities on roads e.g. parking and ensure the unhindered passage of the public along any road. While Council may choose the level at which it will maintain road assets and provide services, it must take sufficient precautions to protect the general safety of the public, traffic and workers on or near any road.

2.5 SIGNIFICANCE

In accordance with section 76AA (3) of the Local Government Act 2002 Hutt City Council considers the roading network to be a strategic asset.

The degree to which transfer of ownership or control, or the disposal or abandonment of a part of a Strategic Asset undermines the integrity and functioning of the asset as a whole or restricts the networking utility of the asset will also be considered.

Not all decisions made regarding these assets are regarded as significant nor do they affect the assets strategic nature. The roading network is strategic, but small parcels of land that make it up may not be, and the purchase or sale of such small pieces of land may not amount to significant decisions.

2.6 KEY RELATIONSHIPS

The Council has overall responsibility for providing public roading services in the City that forms, with the state highway, the land transport network within Hutt City and connecting to the adjoining City transport networks. Investment by the Hutt City Council is required to maintain, and improve the local road network infrastructure to fully realise the benefits identified in the strategic case.

This includes setting policy, defining service standards, ensuring the required outcomes are achieved as efficiently as possible, and quality assurance. In providing roading services the Council works with a number of key business partners including contractors, consulting engineers and specialist service providers.

The New Zealand Transport Agency (NZTA) is a key investment partner and provides financial assistance towards the maintenance, renewal, and upgrade of the roading network in Hutt City. As a partner to this business case, the Transport Agency is fundamentally concerned with ensuring funding is used effectively, standards are maintained in quality and service delivery, and the roading network integrates seamlessly with the State Highway maintenance and capital development programmes.

The Greater Wellington Regional Council is responsible for coordinating Transport Planning in the Region, setting priorities for capital expenditure and for the public transport infrastructure that services the area.

Hutt City Council is one of four local authorities in the Wellington metropolitan area, the others being Wellington City Council, Upper Hutt City Council, and Porirua City Council. Hutt City shares common boundaries with Wellington City, Upper Hutt City and Porirua City. Council maintains relationships with roading staff of the other councils to facilitate the exchange of information, management practices and to facilitate a joint approach to roading and transportation management issues where this is beneficial.

Other stakeholders in the roading and traffic activity include:

- The Hutt City community, including citizens, ratepayers and individual users of the services
- New Zealand Transport Agency (as owners of the state highway network)
- Ministry of Transport
- Greater Wellington Regional Council
- Utilities who use the road reserve
- Iwi
- Community and cultural groups
- Local businesses
- Road users
- Police
- Road Transport Association and Heavy Haulage industry
- Automobile Association
- Public transport operators
- Cycle and walking organisations
- Schools
- Visitors to Hutt City
- The Council, senior managers and staff

All capital and renewal programmes are shared with all Utility Owners in Hutt City, such as Wellington Water, Chorus, Wellington Electricity, and PowerCo.

Hutt City's forward works programme is co-ordinated with the Utility Owner's forward works programmes to ensure opportunities to co-ordinate work in the same location are made, as well as ensuring that new capital and renewal work is not damaged or disturbed by their subsequent work.

2.7 PARTNERING

Hutt City Council believes strongly that maximum value and benefit will be delivered to all parties when a partnering philosophy is adopted.

This means that each party needs to understand the culture, values, and key business drivers of the other, and commit to working together to create a relationship that supports these imperatives, and is open, committed, proactive, and professional.

Some of the key partnerships that Hutt City Council foster are with:

Upper Hutt City Council (UHCC)

With UHCC being a neighbouring Council, efficiencies are gained through partnering opportunities which include shared resources, knowledge, strategic documents, contractual arrangements and assets.

Examples of partnering with UHCC are:

- Joint Procurement Plan
- Joint Local Conditions of the *National Code of Practice for Utility Operators' Access to Transport Corridors*
- Joint ownership of the Silverstream Bridge, with cost sharing arrangements for maintenance and renewal work on the bridge

This provides for a consistent approach to both networks which provides benefits to road users, contractors and the respective rate payers.

Contractors/Consultants

Hutt City Council's culture is about service. For the most part, that service is delivered through contracts and contractual arrangements with our suppliers and contractors. For many of our customers, the contractor is the face of Hutt City Council and we believe building and maintaining partnerships with contractors is key to improving customer service.

All Hutt City Council contracts have a very strong focus on partnering to maximise value and benefit for both parties. This partnering philosophy is a key element of all contract documents and outlines what partnering values Hutt City Council adopt:

Hutt City Council is looking for a contract partner who will:

- Recognise the importance of the customer and go the extra mile to provide excellent customer service.
- Be reliable, consistent and proactive in providing service.
- Adopt a positive can-do and pragmatic approach to providing solutions to issues facing Council.
- Strive for outcomes that are successful for customer, client and contractor.
- Be responsible and act with honesty and integrity at all times.
- Respect Hutt City's culture and values, and ensure services are provided in a manner that is consistent with, and supportive of, the same.

For its part, Hutt City Council will:

- Recognise and affirm the contractor's key business drivers and culture.
- To the extent reasonably possible, without compromising the parties obligations and accountabilities under the contract, work with the contractor to identify and implement strategies to facilitate the achievement by the contractor of its commercial objectives.
- Strive for outcomes that are successful for customer, client and contractor.
- Be responsible and act with honesty and integrity at all times.

Prior to and throughout the term of the contract ongoing partnering is enacted via formal and informal processes:

- Start-Up/Induction Meeting
- Daily contact at an operational level via phone, email, meetings, etc.
- Contract Management Teams to meet on a regular basis:
    - Project Management Team
    - Partnering Committee
    - Project Control Group

Hutt City Council also provides the industry with information about upcoming work and contracts to provide for a fair and competitive market, as well as information about changes to relevant Hutt City Council standards, policies and processes.

Examples of partnering with Contractors and Consultants include:

- Formal partnering agreement between Hutt City Council and GHD which includes regular partnership meetings to discuss upcoming projects and opportunities, and a formal annual assessment of GHD's performance against agreed objectives. This assessment includes a review of the partnership goals and performance of each party in achieving them.
- Maintenance Chipsealing and Asphalt Resurfacing and AWPT contracts involve weekly meetings (during construction season) between Hutt City Council, Higgins and Calibre Consulting to discuss and agree programming, specifications, requirements of residents/businesses, as well as monthly assessments of Higgins against KPI's with financial bonuses/penalties.

Utility Owners

With the so many utilities within the road corridor it is important for both Hutt City Council and the Utility Owners to foster a partnering philosophy.

When utility owners need to construct, renew or maintain their assets within the road corridor they need timely access and permission from Hutt City Council to undertake the work. In turn Hutt City Council needs to ensure that its own assets are not damaged or compromised in the process and any reinstatement required is carried out to the necessary standards to protect the life of the asset.

To ensure the process allows both parties to achieve their objectives, regular and open communication is needed, which includes:

- Quarterly meetings held jointly with all Utility Owners, Hutt City Council and UHCC to discuss forward works programmes, changes in standards, and issues or problems.
- Meetings to discuss and agree key/major projects
- Regular operational contact between Hutt City Council and Utility Owners
- Site visits/inspections

Forward works programmes of all capital work for both Hutt City Council and the Utility Owners are shared at least annually so that any work within the same location can be co-ordinated. This enables efficiencies to be made when contracting the construction work through shared services, as well as ensuring that new and renewed assets are not damaged or disturbed by any following work undertaken in the same location.

An example of partnering with Utility Owners includes:

Queen Street Projects – Wellington Water had a project to renew the main storm water and sewerage pipes under the carriageway. HCC had a project to renew the kerb and channel, storm water facilities, footpaths and vehicle crossings.

It was determined that the Wellington Water project should be completed first with the HCC project following behind. This timing ensured that neither project's work would be damaged or disrupted by the other.

Further efficiencies were gained through a joint agreement about the reinstatement requirement of the carriageway.

Community

With the community of Hutt City being Hutt City Council's largest stakeholder, partnering is an important factor in our decision making to ensure the least disruption and inconvenience to them as possible.

Examples of these considerations include;

Working hours:

- Times are restricted on residential roads in order not to cause noise disturbance and construction disruption outside of normal working hours.
- Times are restricted on Regional, Arterial and Primary Collector roads to outside of peak hours to not cause travel delays during times of high traffic volumes.
- Construction sites outside of schools, kindergartens and play centres are restricted to school holidays
- Where possible in industrial and retail areas work is undertaken at night to cause least disruption to businesses
- "Brown Outs" are in force during the month of December, where no non-emergency work is permitted in retail areas over this peak shopping period.
- Working hours are tailored for individual business/community requirements as needed.

Notifications:

- All emergency services are informed of all work which may cause travel delays
- Bus services are informed and consulted on all work which may cause travel delays
- Residents are informed of all work being undertaken on their street
- Businesses are notified of all work being undertaken in their vicinity, through a personal visit, as well as Hutt City Council's CBD Development Manager providing early communication to the businesses of the forward works programme

Hutt City Council

- The internal partnerships within Hutt City Council are key to the successful outcomes for the Hutt City transport network.
- These internal partnerships underpin the successful allocation of funds, resource and consideration to the various activities within council, including Transport.
- Examples of these internal partnerships include;
- Infrastructure Maintenance – maintaining the transport assets.
- Planning – transport considerations in the District Plan
- Consents – traffic and parking considerations in consenting new assets and activities
- Finance – funding management

2.8 SCOPE OF THIS PLAN

This AMP covers the services that are provided from the ownership and management of Hutt City's roading assets. The broad asset groups and their values (as at June 2014) are shown in Figure 2-3. These values will be updated in early 2018 when the results of the current revaluation are available.

This plan covers a period of 20 years commencing 1 July 2018. All expenditure is based on unit costs as at 1 July 2017. No allowance for inflation is incorporated in the AM forecasts, however for the purposes of the LTP an inflation adjusted programme is also presented in the Plan.

The AMP provides supporting information to the Council's Long Term Programme (LTP) development and decision-making processes, including 30 Year Infrastructure Strategies, and does not itself bind Council to a long-term financial programme. The draft financial programmes presented in the AMP assist with the Council's immediate and long-term financial management and planning. Where significant differences exist between the recommended AMP and the approved financial programmes, the AMP needs to be updated and the lifecycle consequences examined and reported.

The focus of the analysis in the AMP is the first 3 years and for this period most specific projects have been identified. Beyond this period, 20-year work programmes are generally based on trends or predictions and should be taken as indicative only.

Total replacement value
$835.4 million (excl. land) as at 30/6/2014

Urban roads	453.6 km
Rural roads	30.2 km
Footpaths	647.5 km
Walkways	38.2 km
Road bridges	50
Pedestrian bridges	17
Subways	4
Street lighting	13,957
Traffic signals	24 sites
Kerb & channel	830 km
Seawalls	5.3 km
Pay & Display meters	151
P & D car parks	1800
Guard/ sight rails	18.2km

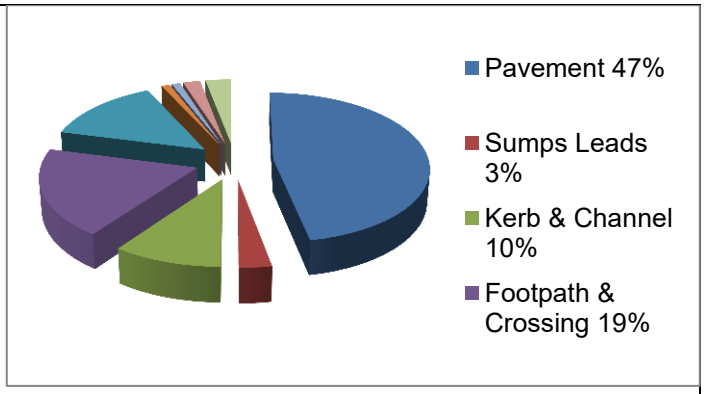


Figure 2-3: Roading assets as at September 2017

The references used in preparing this plan are listed in Appendix A. A glossary of the terms used in this plan is included as Appendix B.

2.9 THE ASSETS UTILISED

The schematic cross-section of a typical carriageway is shown in Figure 2-4.

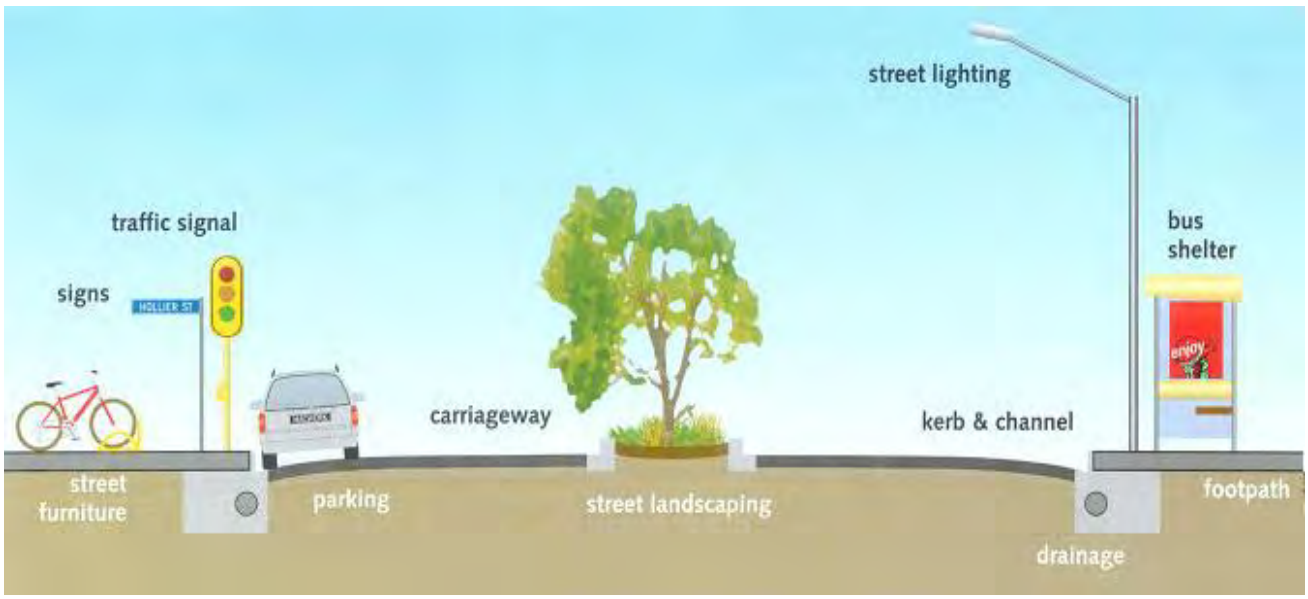


Figure 2-4: Schematic layout of the roading network

The range of assets, and their functions, covered in the AMP are:

- **Roads** provide a network that is suitable for the effective, efficient and comfortable movement of vehicles and people. They have a suitable all weather surface that is appropriate to its location and function in terms of skid resistance, noise reduction and smoothness, and has a structure suitable for legal traffic loading requirements.

- **Bridges** provide continuous all-weather roading and/or pedestrian access across roads, rivers, drains and railway lines.

- **Footpaths, walkways, pedestrian subways and cycleways** provide a safe and comfortable means for pedestrians (including the physically disabled) and cyclists to access properties, move around the city and promote active transport options.

- **Drainage control assets,** which include surface water channels, street sumps and drainage pipes, to protect the pavement structure and remove stormwater runoff from the carriageway, footpaths, berms and adjacent properties to an outfall point. Kerbs also provide delineation and a protective barrier for pedestrians from passing traffic.

- **Retaining walls and seawalls** are managed to maintain roadway stability.

- **Street lighting** is provided to ensure the safety and security of road and footpath users at night.

- **Traffic services** cover a range of assets which facilitate the safe and efficient movement of motor vehicles, cyclists, pedestrians and other forms of transport around the city, including;

    - road signs and road markings provided to facilitate the accessibility and efficiency of the network for users and to reduce the number and severity of accidents;
    - sight rails and pavement markers to define the road geometry;
    - guard rails to limit the severity of accidents at hazardous points in the road network;
    - road humps to calm traffic speeds;
    - traffic signals installed to optimise traffic flows at major road intersections and reduce the potential for collisions.

- **Parking** assets, which include on and off-street parking spaces and parking meters, are provided to manage the conflicting access requirements in residential, commercial, recreational and industrial areas.

- **Roadscape** assets (berms, landscaping, and street furniture) enhance the urban environment, mitigate adverse effects of the network and provide convenient facilities for pedestrians and cyclists. The Parks Division maintains these assets.

2.10 ONE NETWORK ROAD CLASSIFICATION

In 2011 the government established the Road Maintenance Task Force to identify opportunities to increase the effectiveness of road maintenance.

The Task Force identified four general areas for improvement:

- Adapting the business models used to deliver maintenance, renewals and operations.
- Improved procurement practices, also in support of new business models.
- Improved prioritisation and optimisation through level of service differentiation.
- Consistent introduction of enhanced asset management practices.

From these recommendations the One Network Road Classification (ONRC) system was introduced to enable operational and culture change in road activity management. It facilitates a customer-focused, business case approach to budget bids for the National Land Transport Programme. Classification of New Zealand's roads using the ONRC was completed in 2013.

ONRC divides New Zealand roads into six categories based on traffic volumes, whether they connect to key/strategic destinations, or are the sole route available.

ONRC Classification	Function
National	>25,000 AADT >800 Heavy Commercial Vehicles >40 buses/peak Linking places >100,000
Regional	>15,000 AADT >400 Heavy Commercial Vehicles >40 buses/peak Sole Connectivity for urban areas
Arterial	< 15,000 AADT > 5,000 AADT < 40 >15 buses/peak Linking > 10,000 population Critical connectivity Access to hospital > 1m tonnes freight
Primary Collector	> 3,000 AADT > 6 buses / peak Linking > 2,000 population
Secondary Collector	> 1,000 AADT Linking > 250 population
Access (Low Volume Access)	< 1,000 AADT Linking < 250 population < 200 AADT

Table 2-1: ONRC Road Hierarchy

Once a road has been classified under the ONRC, it should be maintained to the Customer Level of Service for roads of its type. The Customer Levels of Service come under the following categories:

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

To determine whether the Customer Levels of Service are being achieved, ONRC Performance Measures have been created for each of the Customer Levels of Service.

There are three types of ONRC performance measures:

- Customer Outcome
- Technical Output
- Cost Efficiency

Together, they measure an RCA's efficiency and effectiveness at meeting the Customer Levels of Service, and RCA's and NZTA can compare the state of roads across the country and direct investment where it is needed most to enable a consistent journey across New Zealand.

There are a total of 27 performance measures, which are further outlined in section 4.2.1.

The following table sets out the ONRC of roads in the Hutt City:

ONRC Classification	Urban (km)	Rural (km)	Total (km)	%
Regional	3.3	0	3.3	0.7
Arterial	50.9	0	50.9	10.5
Primary Collector	69.7	0.3	70.0	14.5
Secondary Collector	92.8	26.3	119.1	24.6
Access	152.5	1.0	153.5	31.7
Access (Low Volume)	84.4	2.6	87.0	18.0
Total	**453.6**	**30.2**	**483.8**	**100**

Table 2-2: Hutt City Road Types by ONRC Classification

A map showing the network roading hierarchy is shown in Figure 8-4.

To further benchmark a RCA's performance, each RCA has been included into a peer group which is determined through similar network attributes. HCC's peer group is currently Tauranga District Council, Kawerau District Council and Hastings District Council.

The ONRC Reporting Tool has been developed to enable RCA's to compare performance. This provides information for 26 of the performance measures, which has been derived from a number of sources including Crash Accident System, RAMM, NZTA Achievement Returns and a survey of 10% of each category to identify specified results.

2.11 THE LEGISLATIVE ENVIRONMENT

There is a wide range of legislation relating to road network management in New Zealand. Legislation relevant to the transport activity in Hutt City is listed below.

Local Government Act 1974 (including amendments and regulations)	• Section 319 of this act essentially empowers the Council to maintain its roads to the standard it sees fit • Requires Councils to take all sufficient precautions for the general safety of the public and traffic and workmen employed on or near any road
Local Government Act 2002 (including amendments and regulations)	• Provisions to maintain public ownership and control of the roading network. • Levels of Service and Performance Targets in LTP. • Consultation requirements. • Development Contributions. • 30 Year infrastructure Strategies. • Cost effectiveness of Service Delivery arrangements • Financial Reporting & Financial Prudence • Non-Financial Performance Measures
Land Transport Management Act 2003 (including amendments and regulations)	• The purpose of this Act is to contribute to the national aim of achieving an integrated, safe, responsive, and sustainable land transport system, an approach reflected in the Government Policy Statement on Transport (GPS). The Strategy's objectives are to: assist economic development assist safety and personal security improve access and mobility protect and promote public health ensure environmental sustainability. • Land Transport Programmes must take into account how they will give effect to the objectives of the GPS. • Long-term planning must support Land transport funding applications. Information on activities and activity classes to be funded, and financial forecasts covering a period of 10 years, need to be provided. Communities are able to use alternative funding sources, such as tolling and public private partnerships under a concession agreement, to fund the development of roads that might otherwise not be built.
Resource Management Act 1991 (including amendments and regulations)	• Promotes the sustainable management of natural and physical resources. • Regulates land use and sub-division activity. • Requires compliance with District and Regional Plans. • Requires recognition of the principles of the Treaty of Waitangi in exercising functions and powers under the Act relating to the use, development and protection of natural and physical resources.
Transport Act 1962 (including amendments and regulations)	• Controls aspects of road and traffic operations, including traffic regulations, bylaws and enforcement.
Building Act 2004 (including amendments and regulations)	• Sets minimum standards for buildings and facilities and requires Councils to produce Project Information Memoranda (PIM's). These may include details of access restrictions, approvals, leases, plans, relevant records, notices, correspondence, etc.
Public Works Act 1981 (including amendments)	• Provides for compulsory land acquisition.
Telecommunications Act, Electricity Act, Gas Act, Railway Safety and Utilities Access Act 2010 (including amendments and regulations)	• Provides utility operators and others with powers to use road corridors and sets out requirements for granting access.

Health and Safety at Work Act 2015 (including amendments and regulations)	• Requires the provision of safe work places for all activities by local authority staff and contractors, and the maintenance of an audit trail to demonstrate compliance.
Construction Contracts Act 2002 (including amendments and regulations)	• Sets out requirements relating to payment provisions for construction contracts and dispute resolution.
The Local Government Official Information and Meetings Act 1987	• Sets out requirements concerning disclosure of information.

The following Bylaws enacted by Council are relevant to the management of roading network assets.

- HCC Traffic Bylaw 2007, updated 2014 and currently being updated 2017; which covers:
    - Council powers to specify coupon or metered parking areas, resident's parking areas and reserved parking or no-stopping areas,
    - restrictions on parking, and
    - traffic restrictions.
- HCC Speed Limits Bylaw 2015; which covers Council powers to set speed limits and designate urban traffic areas.

2.12 STANDARDS, SPECIFICATIONS AND CODES OF PRACTICE

The quality, design, work practices etc. are determined by a number of standards, specifications, codes of practice and guides published by a number of organisations and authorities including:

- NZTA – material, procedure and testing specifications and guides;
- NZTA – Land Transport Rules which are a form of delegated legislation – setting speed limits, traffic control devices, vehicle design and operation;
- Standards New Zealand – streetlighting, materials, quality, subdivisions, noise, conditions of contract for civil engineering, structures, concrete;
- Austroads – Road design, traffic management, parking, cycleway design etc.

2.13 PROGRAMME CONTEXT

This section sets out the context that the operation of the road network and land transport is required to respond to.

2.13.1 GEOGRAPHIC AND ENVIRONMENTAL CONTEXT

Hutt City occupies the plains of the Hutt River in a broad flat valley terminating at the Port Nicholson harbour with suburbs on the steep western hills above the Wellington Fault scarp, in the enclosed valleys at Wainuiomata and Stokes Valley, and along the eastern side of Port Nicholson harbour.

The urban area has been progressively developed since the early settlers arrived in the Wellington region with most of the valley being horticultural. Post war state housing development in the horticultural areas resulted in a large percentage of the roads being constructed in the 1950s. Since the 60s and 70s development has progressed in the suburbs away from the plain.

There are a variety of soil types and terrains within the city that impact on the transport network. Many of the pavements are of uncertain construction and are now starting to show their age. The flat terrain of the plain and presence of the Hutt River, which drains from the Tararua Ranges, presents issues relating to high water tables and flooding. The valley floor has a variable low to high liquefaction potential.

2.13.2 SOCIAL CONTEXT

Hutt City has a broad spectrum of communities covering the full range of issues found in urban areas.
The current and future demand commentary and information in Section 5 provides more social context for Hutt City.

2.13.3 ECONOMIC CONTEXT

Hutt City is one of four adjacent medium sized cities in the urban area of the Wellington Region. As such, it contributes to and supports the economic wellbeing of the city and the surrounding urban and rural area by providing residential, retail, commercial and industrial services.

The economic activities within the city rely heavily on customer access from within the city and beyond, while the industrial activities rely on access within the city to regional and national transport links.

The Seaview/Gracefield area is the largest industrial area within the region.

Hutt City accounted for 2.1% of the National GDP in 2016.

2.13.4 TRANSPORT CONTEXT

Effective, efficient and safe internal and external land transport is critical for an urban environment to function successfully and grow. The Hutt City transport system consists of multi modal networks linking the CBD, suburbs and surrounding cities.

The urban area is elongated with outlying suburbs which results in just over 50% of the network being arterial and collector roads. The remainder is access and low volume roads. There are no unsealed roads and only 6% of the network is rural, predominantly secondary collector.

Major linkages run east west and north south but the Wellington to Wairarapa railway line and the Hutt River cut through the length of the city which impacts traffic flows, concentrating it to a few crossing points across these corridors.

3 STRATEGIC FRAMEWORK

There are several documents that form the strategic framework in which the Land Transport Activity operates from central, regional and local government including:

- Government Policy Statement 2015-2025,
- Wellington Regional Land Transport Plan 2015,
- Safer Journeys Strategy 2010-2020
- Hutt City Council Strategy Documents and Policies.

These documents provide direction for the Land Transport Activity, which must progress the priorities and goals identified.

3.1 GOVERNMENT POLICY STATEMENT ON LAND TRANSPORT 2015 – 2025

The Land Transport Management Act 2003 (LTMA) requires the Minister of Transport to issue a Government Policy Statement for Land Transport (GPS). The GPS outlines the Government's strategy to guide land transport investment over the next 10 years. It also provides guidance to decision-makers about where the Government will focus resources, consistent with the purpose of the Act, which is:

"To contribute to an effective, efficient, and safe land transport system in the public interest".
Without limiting the legal interpretation of these terms, for the purpose of GPS, a land transport system is:

- effective where it moves people and freight where they need to go in a timely manner,
- efficient where it delivers the right infrastructure and services to the right level at the best cost,
- safe where it reduces the harms from land transport,
- in the public interest where it supports economic, social, cultural and environmental wellbeing.

The overall strategic direction for land transport is to drive improved performance from the land transport system by focussing on:

- economic growth and productivity,
- road safety,
- value for money.

Table 3-1 sets out the National Land Transport priorities, objectives and the expected long term results.

All transport activities that receive financial assistance from the National Land Transport Fund must be consistent with the GPS.

Priorities	National Land Transport Objectives	Primary Long Term Results
Economic growth and productivity	A land transport system that addresses current and future demand for access to economic and social opportunities	Support economic growth and productivity through the provision of better access to markets, employment and business areas Support economic growth of regional New Zealand through provision of better access to markets
	A land transport system that provides appropriate transport choices	Provide appropriate travel choices, particularly for people with limited access to a private vehicle Increased safe cycling through improvement of cycle networks
	A land transport system that is resilient	Improved network resilience at the most critical points
Road safety	A land transport system that is a safe system, increasingly free of death and serious injury	Reduction in deaths and serious injuries
	A land transport system that mitigates the effects of land transport on the environment	Mitigation of adverse environmental effects
Value for money	A land transport system that delivers the right infrastructure and services to the right level at the best cost	Delivery of the right infrastructure and services to the right level Improved returns from road maintenance Improved returns from public transport

Table 3-1: National Land Transport priorities, objectives and the expected long-term results

3.2 WELLINGTON REGIONAL LAND TRANSPORT PLAN 2015

The Wellington Regional Land Transport Plan 2015 (RLTP) is a statutory document prepared every six years as required by the LTMA. It is prepared by the Regional Transport Committee (RTC), which is a joint committee comprised of two representatives from Greater Wellington Regional Council (GWRC), the mayors of the city and district councils in the region, and the regional director of NZ Transport Agency(NZTA).

The RLTP must contribute to the purpose of the LTMA and is required to be consistent with the GPS.

The RLTP provides the policy framework and strategic case for developing and investing in the region's land transport network. This includes the statutory objectives, policies and measures required by the LTMA.

The regional programme sets out the proposed land transport activities over a six-year period and includes a 10-year financial forecast.

The RLTP establishes the strategic context for the programme of proposed transport activities in the Wellington Region. This includes all maintenance and operational activities promoted by each council. Activities must be included in the RLTP in order to be eligible for National Land Transport Funding. Activities in the RLTP programme are expected to contribute to the delivery of the RLTP vision and RLTP strategic objectives.

The RLTP vision is:

'To deliver a safe, effective and efficient land transport network that supports the region's economic prosperity in a way that is environmentally and socially sustainable'

To achieve this, the regional transport network will provide a high level of access, reliability and safety for both people and freight travelling within and through the region to support economic development and improve productivity. The regional transport network will be developed in a way that recognises the vital national role of Wellington as the capital city and the region's geographical position on the northern side of Cook Strait.

The RLTP identifies transport network pressures and issues. Key trends affecting Wellington regional transport out to 2041 include:

- Population growth is steady and expected to continue, and strongest in Wellington City and Kapiti Coast.
- Steady economic growth is forecast throughout the region, with Wellington CBD expected to continue to dominate regional employment.
- Fuel prices are expected to continue to rise, and under a 'high oil price' scenario could outweigh future vehicle efficiency improvements and vehicle fleet composition changes.
- Active mode use is increasing, and is likely to continue, boosted by the growth of inner city living and other lifestyle changes.
- Public transport use and state highway Vehicle Kilometres Travelled (VKT) have been relatively flat over the past decade, but are likely to increase in line with growth in population and employment.
- Congestion on the road and rail network has been consistent over the last decade. Planned and ongoing capacity and efficiency improvements to the state highway network such as the Roads of National Significance (RoNS) and the public transport network, with low traffic growth, are expected to reduce congestion.
- An ageing population and people working later in life, which will have an effect on travel requirements, while the trend for younger people is away from reliance on travel by private car.
- The volume of freight moved nationally is expected to grow. Wellington will continue to be a major freight hub for movements between the North and South Islands.
- Road safety is improving. However, cyclist and motorcyclist casualty numbers are disproportionally high compared with other modes of transport and other parts of New Zealand.
- Transport-generated greenhouse gas emissions have been relatively static overall over the five-year period to 2013, despite growth in population, and the steadily decreasing trend in per capita emissions is expected to continue.

The RLTP identifies overarching regional transport problems and benefit statements, measures and outcomes. It also establishes the case for investment through corridor strategies, network plan and three other key action areas. The RLTP problem statements are summarised in Table 3-2.

Issue Theme	Problem Statement
Economic growth	Transport inefficiencies lead to suppressed regional economic growth and productivity.
Road safety	Transport infrastructure deficiencies and poor user behaviour leads to a sub-optimal regional road safety performance.
Resilience	Regional infrastructure that is vulnerable to disruption by unplanned events is potentially resulting in an unacceptable cost of severance and restricted ability to recover over time.
Liveability	Poor delivery of transport and land use can result in a deteriorating living environment and reduced transport choices for the region's population.

Table 3-2: RLTP problem statements

From these problems, and the resultant benefits the eight RLTP Strategic Objectives are derived as shown in Table 3-3.

Strategic Objectives	Outcomes Sought
A high quality, reliable public transport network	• Increased public transport use • Improved public transport accessibility for all • Improved quality of public transport • Improved public transport reliability and journey times
A reliable and effective strategic road network	• Reduced severe road congestion • Improved reliability of the strategic road network
An effective network for the movement of freight	• Improved freight efficiency • Increased proportion of freight moved by rail
A safe system for all users of the regional transport network	• Improved regional road safety • Increased safety for pedestrians and cyclists
An increasingly resilient transport network	• Improved transport infrastructure resilience to disruption from unplanned events • A transport network that supports the restoration of access and regional recovery after a major event • Reduced regional economic risk
A well planned, connected and integrated transport network	• Improved land use and transport integration • Improved integration between transport modes
An attractive and safe walking and cycling network	• Increased mode share for pedestrians and cyclists • Improved level of service for pedestrians and cyclists • Increased use of active modes for journeys to school and work
An efficient and optimised transport system that minimises the impact on the environment	• Increased private vehicle occupancy • Reduced harmful emissions from transport

Table 3-3: RLTP Strategic Objectives

The RLTP replaces and combines the previous Regional Land Transport Strategy, including all the corridor and implementation plans, and the Regional Land Transport Programme for Wellington. The RLTP can be varied from time to time to include matters of significance.

Local road maintenance and renewals (including demand management activities), low cost low risk works on local road roads (<$1,000,000) or existing public transport services (including minor public transport maintenance) are automatically included in the RLTP. The RTC has no discretion in relation to these activities. Additionally, there is a set of non-prioritised activities that cost less than $5.0 million. Whilst not subject to prioritisation all of these activities must still be seen to contribute to and deliver the RLTP regional strategic objectives. Significant transport activities with a total cost greater than $5 million must be included in priority order.

3.3 SAFER JOURNEYS STRATEGY 2010-2020

Safer Journeys is a strategy to guide improvements in road safety over the period 2010–2020. The long-term goal for road safety in New Zealand is set out in its vision:

"A safe road system increasingly free of death and serious injury"

To support the vision, Safer Journeys takes a Safe System approach to road safety. This approach means working across all elements of the road system (roads, speeds, vehicles and road use) and recognises that everybody has responsibility for road safety. The strategy identifies the issues that are of most concern. These are the priorities for road safety in New Zealand.

Areas of high concern:

- Reducing alcohol/drug impaired driving
- Increasing the safety of young drivers
- Safe roads and roadsides
- Safe speeds
- Increasing the safety of motorcycling

Areas of medium concern:

- Improving the safety of the light vehicle fleet
- Safe walking and cycling
- Improving the safety of heavy vehicle
- Reducing the impact of fatigue
- Addressing distraction
- Reducing the impact of high risk drivers

Areas of continued and emerging focus:

- Increasing the level of restraint use
- Increasing the safety of older New Zealanders

Safer Journeys describes the actions to be taken to address these issues, and will be implemented through a series of action plans. These plans will set out the actions to be taken, timelines for actions and responsibility for implementing them. They will also detail how progress will be monitored and actions evaluated.

The 2016 - 2020 Action Plan sets out four key actions:

- enable smart and safe choices on the road
- make motorcycling safer
- ensure roads and roadsides support safer travel which involves local government directly
- encourage safe vehicles

3.4 HUTT CITY COUNCIL STRATEGY DOCUMENTS AND POLICIES

The Hutt City Council has a number of strategy documents and statements that guide land transport. These include:

- City Vision
- Shaping our City - Long Term Plan 2015-2025
- An Integrated Vision for Hutt City
- Infrastructure Strategy 2015 -2045
- Environmental Sustainability 2015 – 2045
- Urban Growth Strategy 2012-2032
- Leisure and Wellbeing 2012-2032

The Economic Development Plan 2015 – 2020 and the Walk and Cycle the Hutt 2014-2019 Plan, support these

3.4.1 CITY VISION

"Making our city a great place to live, work and play"

Community Outcomes:

- A safe community
- A strong and diverse economy
- An accessible and connected city
- Healthy people
- A healthy natural environment
- Actively engaged in community activities
- Strong and inclusive communities
- A healthy and attractive built environment

3.4.2 SHAPING OUR CITY - LONG TERM PLAN 2015 -2025

The Local Government Act 2002 requires every territorial authority to produce a Long Term Plan. This plan provides a platform for future strategy, investment, and development over the period. It also provides a platform for community engagement and ensures that the decisions and activities included continue to create a community that the people of Hutt City want, now and in the future.

The Long Term plan does not set out strategic priorities, referring these to the strategy documents produced around the same time.

3.4.3 AN INTEGRATED VISION FOR HUTT CITY

The purpose of the document is to show how each of the communities contribute to the Vision, and outlines how the council will address the specific needs of each community through a series of action plans under the four strategies.

The strategy identifies what makes each area unique and sets out a number of specific tasks to be achieved. These include:

- In Petone - connect Jackson Street to the sea with an attractive Sea Walkway and resolve traffic issues on the Esplanade

- In CBD – develop a parking model for the CBD, south CBD traffic precinct, improved cycle and pedestrian connections, and Witako Woburn intersection improvements
- In Eastbourne - develop walkway opportunities to exploit the natural attraction, improve transport and pedestrian flows and way finding.
- In Residential Areas - improve connections across the railway line, improve the walking environment along key streets and alleyways, increase parking facilities around Waterloo station.
- Avalon, Boulcott, Epuni – improve access from High St to the tennis club area, better pedestrian and traffic flows, improve alleyway connections in Epuni, enhance streetlight and maintenance of trees along streets, make roads safer for walking and cycling and encourage people to use the off roads.
- Western Hills - improve walking and cycling from homes to playgrounds and nearby schools, improve physical connections between neighbourhoods, support the analysis of options for access from SH2 when interchanges are upgraded.

3.4.4 INFRASTRUCTURE STRATEGY 2015 -2045

Every local authority must, as part of its long-term plan, prepare and adopt an infrastructure strategy for a period of at least 30 consecutive financial years to identify significant infrastructure issues for the local authority over the period covered by the strategy and identify the principal options for managing those issues and the implications of those options.

The infrastructure strategy must outline how the local authority intends to manage its infrastructure assets, taking into account the need to renew or replace existing assets, respond to growth or decline in the demand for services reliant on those assets, allow for planned increases or decreases in levels of service provided through those assets, maintain or improve public health and environmental outcomes or mitigate adverse effects on them, and provide for the resilience of infrastructure assets by identifying and managing risks relating to natural hazards and by making appropriate financial provision for those risks.

HCC Infrastructure Strategy Vision
Infrastructure is resilient, fit for purpose, affordable and meets the needs of today without compromising the needs of tomorrow.

The significant infrastructure issues identified for Hutt City, together with the principal options for managing those issues and the implications of those options are outlined in the following section.

- **Natural hazards.** Current practices include strengthening at-risk infrastructure, robust emergency preparedness and responses and insurance provisions. Insurance options include market cover, or self-insurance (setting aside funds for covering foreseeable events). Council aims to maintain appropriate levels of insurance to safeguard against significant losses. To deal with the highest risk areas – such as those exposed to large subsidence in an earthquake, Council Asset Management Plans identify critical and at-risk assets, and the means for mitigating risk or providing redundancy.

  Bridge seismic strengthening: $780k has been used to strengthen three bridges in 2015 – 2017 with $820k planned for the strengthening of the final bridge identified in the assessment study in 2020/21.
  Network resilience: $2.9m is allocated to increasing the ability of the roading network to withstand shocks. Construction is planned for 2020/21.

- **Climate change.** Increased storm intensity and associated flood risk is being managed by replacing pipes with larger diameter ones with greater capacity in appropriate locations. Increasing the number of pump stations to handle greater water volumes is also an option, as is investment in peak flow storage.

  For sea level rise, there is the option of building protective or mitigating structures such as sea walls, which may deliver added benefits such as footpaths or cycleways. Other options include dune restoration, planning restrictions and planning for a managed retreat in areas where there is no economically viable solution. Council could also invest in education, collaboration and communication to enhance community engagement and increase understanding and acceptance of risk.

- **Environmental Pressures.** For roads and footpaths, minimising greenhouse gas emissions is a key element of project efficiency and effectiveness (as considered by the New Zealand Transport Authority). Council's 'Environmental Sustainability Strategy' outlines goals for leadership, protection and enhancement of the environment, and these concepts are adopted in this 'Infrastructure Strategy.'

- **Population and demographic changes**. Further work is proposed to ensure that Council is as well prepared as possible to deal with the potential effects of population changes on our infrastructure.

- **Changing levels of service.** For roading and footpaths there are a number of projects that will deliver increased levels of service, including the proposed Cross Valley Link (CVL) and the potential Petone-Grenada road – delivering improved travel times between Lower Hutt and Porirua, Kapiti and Wellington City. The potential for a replacement Melling Bridge as part of the RiverLink project will also improve levels of service for the Lower Hutt CBD

Key funding decisions include:

PROJECT	SCALE OF COSTS	DECISION / DESCRIPTION	TIMING
Cross Valley Link (CVL)	$1.0m (Business Case assessment) $65m estimated for construction.	The project assessment process will inform full cost estimates and options for development.	Investigation and design study in 2017/18. Decision in 2018/19
CBD Riverbank replacement parking	$1.6m	Compensating for lost carparks due to the RiverLink project	Decision required by 2017/18.
Additional funding for city walkways and cycleways	$10.9m??	Development of Eastern Bays, Beltway and Wainuiomata Hill shared paths providing increased level of service. Also includes a $1m contribution to the Ngauranga/Melling cycleway. This has result in an accelerated cycleway programme.	Construction of Hutt Valley Beltway (2018-19), Eastern Bay's (2018-21), and Wainuiomata (2017-18).
Replacement Melling Bridge	$30-40m	To alleviate congestion and reduce flooding risk a replacement bridge is being considered as part of the RiverLink project.	Decisions considered as part of the RiverLink Project. Replacement aligned with RiverLink objectives.

Table 3-4: Infrastructure Strategy Funding Decisions

3.4.5 ENVIRONMENTAL SUSTAINABILITY 2015 – 2045

The Environmental Sustainability Strategy focuses on opportunities and risks the community faces concerning our environment. It addresses potential issues, and provides short-term, mid-term and long-term solutions for change. This Strategy guides all future decision-making for Council including:

- Taking leadership as an ambassador for environmental best practise
- Enhancing community engagement and collaboration
- Working in partnership with local businesses and organisations
- Managing our own response to environmental issues

HCC Environmental Sustainability Strategy Vision

"A thriving environment, now and into the future".

The strategy has three aspirational goals:

- Immediate - Council demonstrates leadership in environmental stewardship and sustainability
- Medium Term - The city embraces environmental protection and community resilience
- Long term - The city continuously adapts and enhances its environment and community resilience

Under the transport focus area the strategy identifies two issues:

ENVIRONMENTAL GOALS	Council Demonstrates Leadership In Environmental Stewardship And Sustainability	The City Embraces Environmental Protection And Community Resilience	The City Continuously Adapts And Enhances Its Environment
Emissions	Council selects and promotes low emission transport options	Emissions are reduced by the increased use of active modes and public transport	The environmental impact of emissions is understood and managed
Network optimisation	Council plans for improved multi modal networks – vehicles, pedestrians, cyclists	Existing and proposed development designed with effective networks which favour active and low impact modes	Ongoing adaptive network design and management

Table 3-5: Environmental Sustainability Strategy Goals

3.4.6 URBAN GROWTH STRATEGY 2012-2032

The Urban Growth Strategy is Council's approach to managing growth and development in Hutt City to 2032. It focuses on how much the community want the city to grow, where new homes and businesses will be accommodated, and what will be done to support and encourage this development.

HCC Urban Growth Strategy Vision

"Hutt City is the home of choice for families and innovative enterprise".

The Urban Growth Strategy sets out a number of strategic objectives covering:

- Population growth and residential property development

- Provide for greenfield development including undertaking further investigatory work on the roading options available in Kelson and Wise Street, Wainuiomata, including costings and partnering with developers to provide key infrastructure for greenfield development including roading infrastructure in Upper Kelson and extending and upgrading Wise Street in Wainuiomata
- Provide for intensification and infill
- Investigation of State Highway 2 / Korokoro entrance way and the southern portion of Manor Park to further facilitate discussions between Council and NZTA on possible uses/development of these areas
- Investigate financial incentives
- Preparatory work on an Integrated Transport Plan as part of the Infrastructure Strategy, and continue working with NZTA on the Cross Valley Link

3.4.7 LEISURE AND WELLBEING 2012-2032

The 'Leisure and Wellbeing Strategy' sets out Council's long-term approach to achieving an improvement in the wellbeing of Hutt City's people and the city.

HCC Leisure and Wellbeing Strategy Vision

"Make a better city everyday by providing integrated community services, which make a world class difference to the people of our city".

The 'WALK AND CYCLE THE HUTT 2014-2019' document sits under the Leisure and Wellbeing Strategy. This is to provide a safe and integrated transport system that prioritises active modes and is central to Council's vision for Hutt City as 'a great place to live, work and play'.

The principal aim is to encourage more people to cycle and walk more often and further, for commuting and recreational purposes. Achieving this aim requires a paradigm shift in thinking about and resourcing walking and cycling in order to create a network that is safe, easy, convenient, attractive and pleasurable, both for leisure and as transport to workplaces, schools, and other key destinations. In terms of cycling in particular, the design and delivery of routes both on and off-road will need to cater for a range of user needs, including commuter and leisure cyclists.

Outcome 2 of the Strategy is to: Work to renew and revitalise Hutt City's network of community facilities and for cycling and walking opportunities to be greatly improved.

3.5 STRATEGIC CONTEXT SUMMARY

GPS 2015 Priorities	National Land Transport Objectives	2015/21 Regional Land Transport Programme Strategic Objectives	Safer Journeys	Hutt City Council Vision, Community Outcomes, Long Term Plan and Strategies 2015-2025
Economic growth and productivity	A land transport system that addresses current and future demand for access to economic and social opportunities	A well planned, connected and integrated transport network An effective network for movement of freight A reliable and effective strategic road network		A strong and diverse economy An accessible and connected city Infrastructure meets the needs of today without compromising the needs of tomorrow Hutt City is the home of choice for innovative enterprise
	A land transport system that provides appropriate transport choices	A high quality, reliable public transport network An attractive and safe walking and cycling network		Network optimisation - Council plans for improved networks for multiple uses – vehicles, pedestrians, cyclists Cycling and walking opportunities greatly improved
	A land transport system that is resilient	An increasingly resilient transport network		Infrastructure is resilient
Road safety	A land transport system that is a safe system, increasingly free of death and serious injury	A safe system for all users of the regional transport network	Enable smart and safe choices on the road Ensure roads and roadsides support safer travel which involves local government directly	A safe community
	A land transport system that mitigates the effects of land transport on the environment	An efficient and optimised transport system that minimises the impact on the environment		A healthy and attractive built environment A healthy natural environment Thriving environment now and in the future Emissions – Council selects and promotes low emission transport options
Value for money	A land transport system that delivers the right infrastructure and services to the right level at the best cost			Infrastructure is affordable

Table 3-6: Strategic Context Summary

4 LEVELS OF SERVICE

The purpose of the roading network is to provide safe, efficient, convenient and orderly transportation throughout the city. Transportation systems enable people in communities to interact and achieve social, educational and other goals. They also support and enable economic growth and, designed appropriately, can enhance living environments. Transportation assets, and in particular roads, represent a major community investment managed by road controlling authorities.

The focus of this Activity Management Plan is mainly on those assets within the road reserve, including carriageways, corridor assets, structures, footpaths and cycleways. The needs of all road users, including pedestrians and cyclists, are recognised. Some elements of a total transportation system, such as public transport services, the rail system, the passenger vehicle fleet, and inter-modal transfer facilities are not included in the scope of this plan as they are delivered by other agencies although the council advocates on behalf of the residents for improved services.

Levels of service are the key driver and influence all asset management decisions. The level of service statements describe the outputs the Transport Division intends to deliver to customers and residents. Levels of service need to relate to quality, reliability, responsiveness, sustainability, timeliness, accessibility and cost.

Levels of service provide the link between the organisations requirements, strategic direction and customer requirements, and the technical and operation activities.

Defining services and the associated service standards enables:

- The community to understand the road network services they can expect Council to provide and the standards that the Council is working to achieve.
- The community to assess the value (being a combination of quality and cost) of the roading services they receive.
- Service standards that are more responsive to customer needs, and more closely aligned with customer expectations to be identified.
- Asset management strategies to deliver the required service standards to be planned.
- The effectiveness of management strategies in closing service gaps to be monitored and requirements for new strategies to be identified.
- The performance of Council contractors involved in the delivery of roading services to be monitored.

This section sets out the levels of service standards that the road network and activity are required to provide to meet residents expectations.

The service standards are derived from:

- The services and standards required to support the community expectations for Hutt City and the Council's strategic goals and the other strategic documents. These are included in the LTP and Annual Plan consultation and are therefore available for community input and discussion.
- Section 261A of the Local Government Act sets a number of measures to be reported on. These have replaced some very similar measures previously used by the Council.
- The ONRC performance measures which are set on a national basis and benchmarked against other road controlling authorities to determine relative performance

4.1 CUSTOMER NEEDS AND EXPECTATIONS

The Council's understanding of customer expectations and preferences has been based on the following sources of information:

- Customer Surveys
  - Surveys of customer satisfaction (Formerly the Communitrak Survey and now the Key Research survey).
  - Surveys of customers who have made a request for service.
- Feedback from consultative processes such as the LTP and the Annual Plan.
- Feedback from Council staff and the operations and maintenance contractor.
- The 2002 Peter Glen Research – Customer Satisfaction Survey (this work drilled more deeply than the Communitrak survey, and subsequent work is now more targeted)
- Management knowledge of existing asset performance.
- Direct operational feedback from customers, community groups, industry and Councillors.
- NZTA's 'Maintenance Guidelines for Local Roads' document.
- Cycleway consultation group.
- Pedestrian consultation group.
- Eastern Bays walkway consultation group.
- Disabled persons consultation group.

The annual resident satisfaction surveys, which measures satisfaction with the overall roading service, give a broad understanding of current customer satisfaction but do not attempt to determine levels of service desired by customers or reasons behind various satisfaction levels.

The following have been considered to be significant issues which residents have formally commented on:

- Lack of connected, protected cycleways throughout the city.
- Cracked, broken and uneven footpaths,
- Poor traffic flow / congestion
- Streetlight outages

Based on this understanding from all sources of input, the high level attributes valued by customers of Hutt City Council's roading services have been defined as:

- Quality - Comfort, easy to use, convenient, minimal delays, attractive and clean
- Cost effectiveness
- Accessibility
- Responsiveness
- Safety – Safe, Well lit

The Council monitors level of service being provided using seven measures:

- Resident satisfaction with seven aspects of the road assets and service –street lighting, litter, graffiti, traffic control, footpaths, roads, and parking
- Road condition index - measures quality of the road surface
- Smooth travel index – measure the quality of the ride
- Accident trend – for fatal and serious injury accidents measures safety
- Response to service requests – measures service delivery and promptness of reply
- Resurfacing achieved – shows whether the Council is doing adequate maintenance work to protect the assets
- Quality of footpaths – shows whether the footpaths are safe and meet the service standard for footpaths

4.1.1 RESULTS ACHIEVED AND TARGET

Measure	Achieved 2012-13	Achieved 2013-14	Achieved 2014-15	Achieved 2015-16	Achieved 2016-17	Target 2017-18	Target 2018-21
Resident Satisfaction (Communitrak and Key Research Surveys)							
Street lighting	91%	90%	89%	90%	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures
Roads and gutters being free of litter	89%	89%	90%	88%	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures
City free of graffiti	89%	88%	92%	91%	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures
Traffic control	90%	89%	88%	89%	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures	Better than historical average or the average of our peers whichever is the higher, for each of these measures
Footpaths	86%	81%	85%	80%			
Roads	86%	83%	87%	84%			
Parking	81%	83%	85%	84%			

Road Condition Index (which measures the condition of the road surface (data from RAMM system). A lower number indicates improved rating. Half the city is surveyed each year so alternate years are comparable	1.5	1.2	1.7	1.5	1.6	Hold or improve rating	Hold or improve rating
Smooth Travel Exposure (which measures the quantity of travel in the city on roads smoother than 150 NAASRA roughness – data from RAMM system) This represents the average quality of the ride. A higher number indicates improved rating. Half the city is surveyed each year so alternate years are comparable	76%	77%	79%	78%	82%	Hold or improve rating	Hold or improve rating
Accident trend the change from the previous financial year in the number of fatal, serious and minor injury accidents (measured over calendar years)	147	118	127	136	139	Contribute to reducing trend over 10 years	Contribute to reducing trend over 10 years
Response to service requests percentage of customer service requests relating to roads and footpaths which are responded to within the timeframe specified in the Long Term Plan(measured by management reports)	91.04%	93 .76%	94.83%	92.08%	>94%	>94%	>94%
Resurfacing Percentage of sealed roads that are resurfaced annually*	Not measured for this year	Not measured for this year	Not measured for this year	5.3%	4.3%	8%	8%
Footpath Quality Percentage of footpaths that fall within the service standard for foot path condition	Not measured for this year	Not measured for this year	Not measured for this year	97.90%	98%	98%	98%

Table 4-1: HCC Levels of Service for Land Transport

*Note 1: Pavement maintenance includes the maintenance of sub-base, basecourse and the seal coat. Available funding is directed to where repair works are required as determined by the condition and what is causing the pavement failure. This can result in the resurfacing achievement varying significantly from year to year.

4.2 ONE NETWORK ROAD CLASSIFICATION PERFORMANCE MEASURES

Not all roads can be reasonably expected to provide the same levels of service, so the ONRC road hierarchy is used to assist in defining target levels of service for each road category. This hierarchy reflects the significance and importance of all roads in the City's road network, and typically the higher a road's status in the network hierarchy the more traffic that it will carry.

All roads in New Zealand have been classified as one of 6 categories under the One Network Road Classification (ONRC) scheme. The class of each road depends on its function in the network, which includes traffic volume, number of heavy vehicles, freight volumes, airport, and hospital and tourism links. These are National, Regional, Arterial, Collector, Secondary Collector, Access and Low Volume.

This will enable the comparison of the condition of roads across the country and direct investment to where it is needed most. There will be an increase in quality of some roads and a decrease in others that have been over specified in the past. This will result in the right level of road infrastructure where it is needed.

A roading hierarchy is defined in the Hutt City District Plan, a step that ensures that the Council's Environmental Management procedures, processes and decisions consider all effects on the road network and all effects of the road network on environmental matters. This hierarchy is being amended to adopt the ONRC classification.

It is important to note ONRC has a focus on the carriageway; however, the roading system includes a number of other components each of which delivers different "services". These assets include footpaths and cycleways, kerb and channel, drainage, bridges and structures, street lighting, road marking and delineation, signs, and off-road carparks.

Not all the data has been collected or uploaded for the performance measures as noted below.

NZTA have established peer groups against which Road Controlling Authorities and NZTA can compare performance. These have been based on an analysis of cost drivers, which indicate a strong correlation between cost per kilometre and percentage of urban network. Hutt City is in a group of councils that have greater than 90% urban roads. These include Tauranga City, Hamilton City, Wellington City and Kawerau District.

4.2.1 ONRC CUSTOMER OUTCOMES

The table below sets out the ONRC Performance Measures. These are split into six groups, which have customer outcome and/or technical output measures. The six groups include:

- Safety
- Resilience
- Accessibility
- Amenity
- Travel time reliability
- Cost efficiency measures

HCC is currently gathering information and data against the performance measures to enable reporting and comparison, however it is important to note that the target levels have yet to set, and there have been data validation errors in RAMM identified. Until the target levels have been set and the RAMM validation errors corrected, HCC is still using its own measurements in addition to ONRC's to ensure appropriate Customer Levels of Service are being met.

Further details around the Customer Levels of Service and performance measures for each work activity can be found in section 7, Programme Business Case.

Safety – Customer Outcome Performance Measures
Customer Outcome 1: the number of fatal and serious injuries on the network
Customer Outcome 2: collective risk (fatal and serious injury rate per kilometre)
Customer Outcome 3: personal risk (fatal and serious injury rate by traffic volume)
Safety – Technical Output Performance Measures
Technical Output 1: permanent hazards
Technical Output 2: temporary hazards
Technical Output 3: sight distances
Technical Output 4: loss of control on wet roads
Technical Output 5: loss of driver control at night
Technical Output 6: intersections
Technical Output 7: hazardous faults
Technical Output 8: cycle path faults
Technical Output 9: vulnerable users
Technical Output 10: roadside obstructions
Resilience – Customer Outcome Performance Measures
Customer Outcome 1: the number of journeys impacted by unplanned events
Customer Outcome 2: the number of instances where road access is lost
Amenity – Customer Outcome Performance Measures
Customer Outcome 1: Smooth Travel Exposure (STE) - roughness of the road (% of travel on sealed roads which are smoother than a defined threshold)
Customer Outcome 2: peak roughness
Amenity – Technical Output Performance Measures
Technical Output 1: roughness of the road (median and average)
Technical Output 2: aesthetic faults
Accessibility – Customer Outcome Performance Measures
Customer Outcome 1: proportion of network not available to Class 1 heavy vehicles and 50MAX vehicles

Accessibility – Technical Output Performance Measures
Technical Output 1: accessibility
Travel Time Reliability – Customer Outcome Performance Measures
Customer Outcome 1: throughput at indicator sites
Cost Efficiency Performance Measures
Cost Efficiency 1: pavement rehabilitation
Cost Efficiency 2: chipseal resurfacing
Cost Efficiency 3: asphalt resurfacing
Cost Efficiency 4: unsealed road metalling
Cost Efficiency 5: Overall network cost, and cost by work category

Table 4-2: ONRC Performance Measures

5 PLANNING FOR THE FUTURE – DEMAND FORECAST

5.1 DRIVERS OF DEMAND

The future demand for roading network services in Hutt City will be driven by:

- Social – future demographic trends and the need to service population growth in the city.
- Changing customer expectations and the need to upgrade services in the parts of the network where gaps exist between existing and specified level of service.
- Changes in travel preferences.
- Environmental trends and changing expectations about how the adverse effects of roading and parking activity are mitigated.
- Technological changes.
- Economic changes, considering growth and the economic strength of the city.
- Commercial trends.

Increasing standards and community expectations will have an influence on the nature and design of future transport facilities. Furthermore, environmental issues can be expected to be increasingly important in decisions about the mode and form of future transport infrastructure. These environmental and social issues are identified and addressed in the Network Operating Framework from which the Network Operating Plan will be developed.

5.1.1 SOCIAL TRENDS

Population growth

Hutt City currently has a population of approximately 103,000. Much of the land area of the city is urbanised, or in reserves, although there are significant areas of rural land on the Western Hills and on the outskirts of Wainuiomata where new residential development has occurred in recent years.

While the rate of growth is driven by the general state of the local economy, the limiting factors on entirely new subdivisional activity will be the reducing amount of land suitable for development and the cost of developing this land. There is an increased demand for properties in the central city area and in higher value parts of the city and this is leading to an increase in housing densities with record levels of development in 2016 and 2017. The Hutt City District Plan contains measures intended to maintain the quality of life in areas of Hutt City where there is pressure for more intense development. However, a proposed change to the District Plan will facilitate residential intensification in defined areas of the city.
The Urban Growth Strategy also includes a number of initiatives that will encourage population growth.

New residential dwellings have continued to increase in Hutt City since 2013.

Progress to date:

New Residential Dwellings Completed (net after demolitions/removals):

- Year to 30 June 2013 179
- Year to 30 June 2014 198 Cumulative 377 Average p.a. 187
- Year to 30 June 2015 258 Cumulative 635 Average p.a. 212
- Year to 30 June 2016 232 Cumulative 867 Average p.a. 217
- Year to 30 June 2017 325 Cumulative 1,192 Average p.a. 238
- Year to 30 June 2018 6

No. of new dwellings consented:

- 12 Months to 30 June 2015 338 (Dept. of Stats) Average p.a. 338
- 12 Months to 30 June 2016 445 (Dept. of Stats) Average p.a. 391
- 12 Months to 30 June 2017 213 (Dept. of Stats) Average p.a. 332
- 1 Month to 31 July 2017 34 (Dept. of Stats)

Population 2013: 101,200 2016: 103,400

Statistics population medium projection for Lower Hutt in 2033 is now 108,100 (revised from 102,100)

Projected population of territorial authority areas

2013(base)–2043 update

Territorial authority area[1]	Projection[2]	Population at 30 June							Population change 2013–43	
		2013[3]	2018	2023	2028	2033	2038	2043	Number	Average annual[4] (percent)
Lower Hutt city	High		107,400	111,900	115,800	119,300	122,200	124,600	23,500	0.7
	Medium	101,200	105,000	106,800	107,800	108,100	107,700	106,700	5,600	0.2
	Low		102,500	101,700	99,700	96,900	93,400	89,000	-12,100	-0.4

Figure 5-1: Population Projection – Hutt City

Demographic changes

Housing growth

The predicted population growth is accompanied by housing growth. This increase in the number of houses will tend to increase traffic volumes across the city.

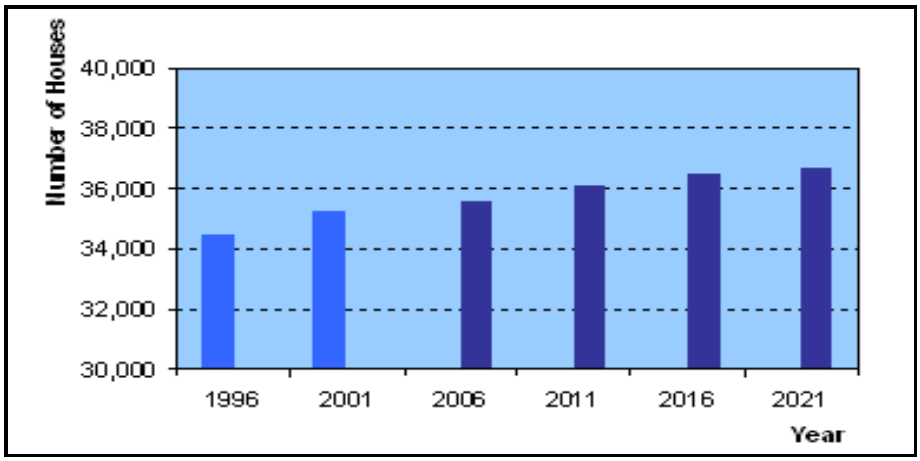


Figure 5-2 – House number projection – Hutt City

5.1.2 CHANGING CUSTOMER EXPECTATIONS

As identified earlier in Section 2, changing community expectations relating to the roading network activity as identified in community surveys include:

- Higher maintenance standards for roads and footpaths
- More pedestrian crossings and ramps required.(particularly provision for 'wheel chair friendly' routes)
- Need for more street lighting and quicker response to lantern failures.

The national goal to improve safety is leading to a greater emphasis on improved skid resistance of pavements. In turn, this leads to shorter lifecycles for seal renewals and greater resurfacing costs.

5.1.3 CHANGING TRAVEL PREFERENCES – ALTERNATIVE TRANSPORT MODES

Mode of travel surveys show that reliance on motor travel for the journey to work has increased, with fewer people cycling and walking. Council has recognised the need to stabilise or reverse this trend by implementing a number of initiatives to increase the use of public transport and the number of pedestrians and cyclists. These initiatives were described in Section 2. Strategies for improved services for pedestrians and cyclists are covered in reports such as "Cycling in Hutt City" and "Eastern Bays Marine Drive Cycleway / Footpath Concept".

Over time, an outcome of reducing private travel demand by car on congested networks could be expected.

Although the private car continues to be the dominant mode of transport the key points of the 2015 Regional Land Transport Plan relating to current trends are:

- Exceptional growth in public transport patronage in 2005/06 (1.9 million additional peak period trips and 0.7m additional off-peak trips)
- Regional fuel consumption up by 1.2% (a lower rate of increase than in previous years)
- Wellington Regional economic growth 0.5% (cf. national average of 1.0%).

5.1.4 ENVIRONMENTAL TRENDS

The effects of growing transport demand on the environment are considered in planning and developing the transport system. The most significant environmental impacts are:

- Intensifications of water runoff due to road construction
- Water run-off pollution from road traffic
- Particulates from heavy road vehicles
- Air emissions from road transport
- Land take for transport infrastructure
- Traffic noise and vibration

5.1.5 TECHNOLOGY TRENDS

New technology can provide Council with the opportunity to improve service and / or reduce lifecycle costs in several ways.

For example, the continued development of pavement assessment and economic analysis techniques generates savings through more effective optimisation of maintenance and renewal programmes.

Technology for recycling roading materials is continuing to develop and is likely to offer savings in maintenance, renewal and new roading works.

Electric and hybrid vehicles (cars and public transport) will reduce environmental impact.

5.1.6 ECONOMIC TRENDS

Hutt City has experienced the same economic growth seen nationally in recent years.

Historically, Lower Hutt's economy had a run of high growth until the economic reforms of the 1990s, when many large industrial employers closed. The global financial crisis in 2008 also put the brakes on economic performance, resulting in a long period of low growth.

However, recent economic data shows the number of businesses in Lower Hutt rose from 9627 in 2013, when council introduced economic development incentives, to 9990 in 2016.

Between the 2015 and 2016 financial years, Lower Hutt's average household income jumped 15.2 per cent from $88,775 to $102,257, according to Statistics New Zealand In the financial year to June, unemployment fell from 7.6 per cent to 5.6 per cent and electronic card retail spending in the June 2017 quarter rose 6.5 per cent compared to the same period in 2016.

Hutt City is the second largest population and employment centre in the region. 35% of people that work in Hutt City live outside the City, with the majority travelling from Wellington City and Upper Hutt City.

Increasing number of businesses have re-located to Hutt City following the November 2016 earthquake.

Hutt City is the second largest contributor to regional GDP (14%).

5.2 TRAFFIC GROWTH PROJECTIONS

As noted in the 2015 Regional Land Transport Plan, nationally, growth in vehicle traffic volumes (car and HCVs) on state highways began to slow around 2000, despite the HCV component of this growth continuing at a fast rate. Since 2005, total traffic volumes on the state highway network have decreased by around 1%.

In the Wellington region, VKT on all roads has remained broadly static over the past decade to 2011/12 with 3.4 billion km travelled on the regions roads in 2001 and 2013. A similar trend can be observed for travel volumes on local roads.
Approximately 1.15 million vehicle based trips are made every day across the region, 50% of daily public transport and 40% of car trips occur during morning and evening peaks. Looking at where trips originate 16% from Lower Hutt are by public transport.

Travel by active modes (Walking / Cycling) is increasing. HCC, along with GWRC are progressively installing pedestrian and cycle counting stations to quantify the demand for our cycling and shared path facilities.

The net result is a static trend in overall vehicle kilometres travelled within Hutt City.

Traffic growth can be quite independent of population growth but is influenced by local development. In this regard the car trips on the local network are reflective of the aging demographic along with the uptake of active modes being balanced by local economic development. However, on freight transportation routes volumes correlate well with GDP growth.

Hutt City's District Plan, sets a framework for the control and management of traffic generating land use proposals.

Generally growth rates are expected to remain relatively low however there has been an increase in residential building consents over the recent years with dwelling consents more than doubling from 100 in 2010/11 to over 200 per year. In addition to this increasing trend Council has adopted an Urban Growth Strategy to promote both in-fill and greenfield housing. As a consequence it is anticipated new construction will continue at a rate of around 250 dwellings p.a.

Subdivision development is adding less than 1km to the roading network each year. This very low level of development, generally located on the periphery of the city, is considered insignificant in the context of this plan.

Regional traffic growth forecasts for Hutt City (medium growth scenario) prepared by the Greater Wellington Regional Council are shown in Table 5-1.

Vehicle type	Period	2006 trips (2 hr)	2016 trips (2 hr)	Growth over 10 years	Compounding annual growth
Cars	AM peak	30779	31,790	3.3%	0.32%
	Interpeak	27,715	29,070	4.9%	0.48%
	PM peak	35,441	36,940	4.2%	0.42%
HCVs	AM peak	3,302	4,146	25.6%	2.3%
	Interpeak	3,500	4,395	25.6%	2.3%
	PM peak	3,078	3,865	25.6%	2.3%

Table 5-1: Traffic growth forecast

With a stronger emphasis being placed on alternative transport modes better data relating to cycling and public transport use is required. Actions are being taken to obtain appropriate data to improve multi-modal transport planning in future years.

5.3 IMPACT OF GROWTH ON THE ROADING NETWORK INFRASTRUCTURE

Over time, traffic growth typically increases congestion and delays, increases crash numbers and places additional capacity demands onto the roading network. These issues are typically addressed through capacity expansion and making improvements to the efficiency and safety of intersections, such as changes to traffic controls.

The State Highway network which passes through the City and the associated interchanges with HCC's own network are very important to the overall efficiency and are included in the discussion below. State highway improvements need to be closely coordinated with the Council's own capital development programme.

In addition to capital projects required to address growth, changes in levels of service can also result in capital investment. Each of the capital projects and programmes listed in the AMP are defined in terms of growth, level of service, or a combination. Other than the long desired Cross Valley Link (CVL) route that would ease congestion on The Esplanade there are few specific growth driven projects identified in this AMP. Although, to date, Council has been unable to gain NZ Transport Agency funding approval for this CVL project, in anticipation of gaining such approval, budget provision of $65m has been allowed for between 2024 and 2027. NZTA's proposed Petone to Grenada route will lend weight to the CVL proposal as it is anticipated this new route would stimulate growth in the Seaview / Gracefield area. Modelling shows the P2G route may increase traffic flows on The Esplanade by around 10% over ten years.

Under the existing LTP $29.0M is budgeted over the 10 year planning period for the development of the cycleway network city wide:

- Extensions to the distribution network will be funded by developers.
- Maintenance and renewals linked to network growth will be negligible within the planning period.
- Legislative changes and changing consumer expectations may require some investment to upgrade the roading network infrastructure.

Significant NZTA and HCC capital works projects and programmes, covering all travel modes, are identified below.

5.3.1 REGIONAL ROADS

Greater Wellington Regional Council is responsible for carrying out consultation on the Regional Land Transport Programme for the Wellington Region. This establishes the regional priority for many of our transport activities including state highway activities, local road improvements, walking and cycling and community road safety activities.
Work is almost complete on the SH2/SH58 (Haywards Hill) interchange.

The remaining project linking the city to SH2 is the Melling Interchange Improvement project which is part of the RiverLink project and should include a new 4-lane Melling Bridge. This project will address safety and capacity issues at the Melling Interchange and facilitate the delivery of the RiverLink objectives relating to flood protection and the rejuvenation of the Hutt City CBD.

5.3.2 HCC PROJECTS AND PROGRAMMES

In addition to Council's commitment to the regional roads projects listed above, the following projects and programmes are proposed:

- Cross Valley Link
- Cycleway Development Programme including:
  - Wainuiomata Hill Shared Path (Pukeatua Bridge completed in 2015))
  - Eastern Bays Shared Path
  - The Beltway
  - Hutt River Trail
  - Petone to Melling Shared Path (funding contribution to NZTA project).
- East (Cornwall St) Access Route
- Sub-standard Road Upgrade Programme
- Safety improvement projects and road network improvements

5.4 DEMAND MANAGEMENT

Demand management strategies provide alternatives to the creation of new assets in order to meet demand and look at ways of modifying customer demands in order that the utilisation of existing assets is maximised and the need for new assets is deferred or reduced.
The Council has a comprehensive range of strategies intended to manage the growth in traffic and defer or negate the requirement to invest in upgrading the roading network.

Demand forecasting	Demand forecasts are periodically reviewed based on: • Growth projections 5 yearly in conjunction with the latest census data. The following factors are taken into account; Statistics NZ population and economic growth projections. Planning policies. Hutt City Council demographic data. • Traffic monitoring - vehicle traffic data is collected at selected sites annually. • Cycle monitoring – cycle data is collected at selected sites annually • Travel Time Surveys on selected routes
District planning strategies	Hutt City's District Plan, sets a framework for the control and management of traffic generating land use proposals. Generally growth rates are expected to remain low. Development has been provided for by: • Encouraging in fill housing along developed transport corridors, thereby supporting public transport alternatives to private vehicle trip generation; and • Increasing the size of the central commercial area by allowing more intense land uses in a larger area to the north of the CBD. The in-fill housing policies are not expected to require further roading development.
Traffic Bylaws	Council reviews and develops bylaws to assist in the management of the road network. For example, Bylaws may be required to restrict traffic use and speeds on certain roads to satisfy the ONRC requirements. These bylaws will be linked to the transportation strategies to ensure the development of an adequate transport network.
Traffic controls:	The increased development of urban areas may create the need to implement traffic control strategies. Traffic control strategies in the Transportation Management Plan include Local Area Traffic Management to manage traffic on link roads and intersection traffic control such as traffic signals and roundabouts to manage flows within urban areas.
Public education	The use of public education programmes to encourage the use of alternative transportation methods.

6 RISK MANAGEMENT

6.1 CORPORATE RISK MANAGEMENT FRAMEWORK

6.1.1 AM POLICY – RISK ASSESSMENT AND MANAGEMENT

A risk management strategy is a necessary part of the activity management plan for each group of assets and must be specific to the assets in question. Each manager responsible for an asset group will annually assess their overall business risks and determine the most appropriate strategies to manage these.

All staff responsible for and involved in activities associated with the management of the City's assets will be trained to an appropriate level to ensure that risk assessment practices are applied.

6.1.2 RISK MANAGEMENT HIERARCHY

The following diagram illustrates the various sources of risk which are considered in this AM plan. Risk management must be aligned at different levels within the organisation. There is a close relationship between Civil Defence Emergency Management (CDEM) and the roading and traffic activity given the importance of transport functions should a major disaster event occur.

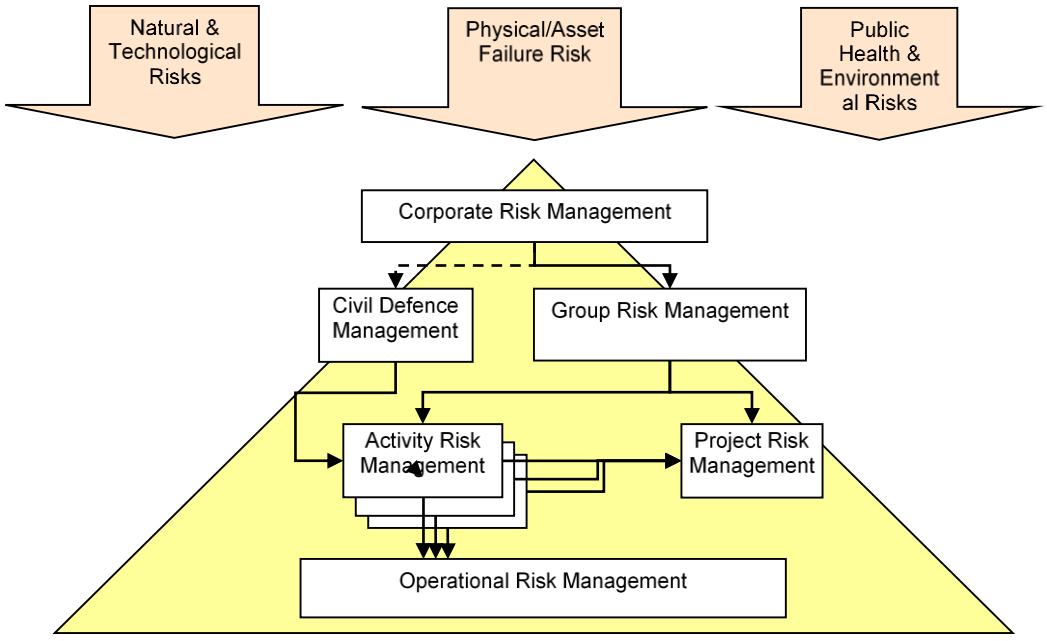


Figure 6-1: Components of risk management

Hutt City Council has corporate risk management processes in place to address organisational risk, which are cascaded to the individual activity level. The purpose is to manage the likelihood of non-achievement of critical business objectives within defined and acceptable limits.

6.1.3 ASSET CRITICALITY

Critical assets are "those which have a high consequence of failure, but not necessarily a high probability of failure". This is an important distinction as it draws attention to those assets which are the most important to the activity and its customers, irrespective of the likelihood of a failure of the asset. Critical assets typically require more proactive management to minimise or eliminate the risk of asset failure.

Criteria for determining asset criticality therefore relate to factors such as:

- Importance to City
- Importance to service
- Consequences of failure

6.1.4 RESILIENCE

Resilience has become a much more significant expectation nationally following the recent earthquake sequence affecting the Canterbury region. Resilience has multiple dimensions and can be summarised as:

"The concept of resilience is wider than natural disasters and covers the capacity of public, private and civic sectors to withstand disruption, absorb disturbance, act effectively in a crisis, adapt to changing conditions, including climate change, and grow over time" (Treasury, 2011).

It is useful to consider resilience in two dimensions:

- **Physical / technical**– e.g. robustness, redundancy, safe-to-fail
- **Organisational** – e.g. change readiness, networks, leadership, resources

Desired resilience relates to the importance of the asset or service, with a close relationship between asset criticality and the desired level of resilience. It is important to understand the current level of resilience, both of the physical asset network and organisational arrangements, in order to determine whether improvements may be needed.

6.1.5 RISK MANAGEMENT PROCESS

HCC's risk management process has been developed from a range of international methodologies and standards, including the International Standard on Risk Management ISO 31000. The process is shown below:

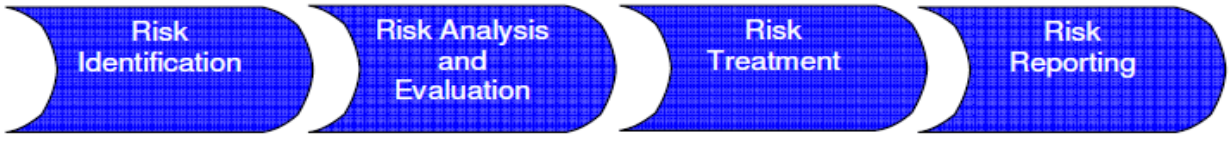


Figure 6-2: Risk management process

Identified risks are assessed and relative risk exposure levels determined using the standard risk tables:

- Consequences table
- Likelihood table
- Combined consequence and likelihood risk matrix = risk exposure levels

The risk management process is used in determining priorities for mitigation and forward investment programmes, which is consistent with recommended practice in the IIMM and aligns with the requirements of ISO 55001. Asset criticality and the risk assessment process are used together:

- Criticality acts as a filter for where to focus risk management attention
- Criticality and risk exposure are considered together

The more serious the risk, and the more critical the asset, the greater is the need to proactively manage it. Risks are documented and assessed both before and after controls.

All significant risks are recorded in the Hutt City Council Risk Register and the Transport risks generally relate to infrastructure performance, appropriate levels of service, third party performance, data integrity and funding.

Generic risk treatment strategies and controls are described Table 6-1.

Avoid the risk	Not to proceed with the activity or choose an alternative approach to achieve the same outcome.
Mitigate	Reduce the likelihood – Improve management controls and procedures.
	Reduce the consequence – Put in place strategies to minimise adverse consequences, e.g. contingency planning, Business Continuity Plan, liability cover in contracts.
Transfer or share the risk	Shift responsibility for a risk to another party by contract or insurance. Can be transferred as a whole or shared.
Accept the risk	Controls are deemed appropriate.

Table 6-1: Risk treatment strategies and controls

6.2 RISK EVALUATION

Risk management is undertaken at two levels:

- **Activity level**: The outcome of the activity risk assessment included as Table6-2, showing;
    - the identified risk,
    - inherent likelihood and classification,
    - controls,
    - residual likelihood and classification after implementation of the control, and
    - reference to where the residual risk is addressed in the plan.

Roading network level: A Road Network Activity Risk Management Plan and the Seismic screening of bridges have been completed in order to identify and manage the risks associated with the provision of roading network services in Hutt City.

The Roading Network Activity Risk Management Plan is designed to ensure that:

- All significant risks associated with the roading network activity are identified, understood and managed.
- The highest risks that should be addressed within a 10 year planning horizon are identified.
- Risk reduction treatments which best meet business needs are applied.

Responsibilities for managing risks are allocated and reporting regimes specified.

The register will be extended in the future to ensure specific critical risk assets are identified and monitored. A risk study of the physical network has been undertaken to identify vulnerabilities to flood or earthquake and to identify potential mitigating measures.

The following high or significant risks have been identified on the road network:

- Parts of the network with dangerous geometry (black spots) and / or substandard skid resistance, with the potential to result in fatal or injury accident. The current strategy for managing this risk is to identify, prioritise and remedy black spots using the NZTA accident records, the NZTA Project Evaluation Manual and to utilise the SCRIM surveys in the reseal treatment selection programme.

- Lack of funds for maintenance / renewal resulting in reduced pavement effective life. The current strategy to manage this risk is to monitor condition annually and implement dTIMS to improve understanding of pavement performance. Ongoing development of the dTIMS model is included in the improvement programme.

- Pavements that have insufficient capacity to carry traffic loading, resulting in reduced pavement effective life. A Specific area of concern is The Esplanade. The current strategy is to monitor traffic trends and use dTIMS to assess the impact of increased loading on the network condition and expenditure. Unexpected traffic loadings can also have a negative impact on the network. For example revised bus routes in Naenae shifted from arterial roads to access roads, along with increased bus axle loads, compounded by 3 years of extremely wet weather impacting on the soft subgrades in this area resulted in the need for significant (unprogrammed) area wide pavement treatment.

- Reinstatement after utility installation resulting in deteriorating network pavement condition and reduced pavement effective life. It is intended to adopt the NZ Code of Practice for Working In the Road however, it is acknowledged that ongoing auditing by Council staff is the key method for managing this risk.

6.3 RISK MITIGATION

Road network risk management study

The priority mitigation measures to be implemented to address unacceptable risks identified are:

- The utilisation of the Road network Prioritisation Map as the basis for emergency response action along with routine operational management practices and the programming of capital improvement projects.
- The assessment of tolerable outage states in consultation with other 'life-lines' stakeholders to adopt target service levels for the road network in emergency events.
- The assessment of possible mitigation measures at critical sites.

6.3.1 INVESTMENT IN RISK MITIGATION

A risk based approach has been adopted to the prioritisation of roading network capital works. This process involves determining the level of risk associated with not carrying out each capital works project using the risk process. The cost/benefit of each project can be assessed by considering the level of risk reduction assessment that will be achieved relative to the project cost.

The following sites were identified where an initial assessment indicated the benefit cost ratio for mitigation measures were greater than 3.0 and further investigations are justified:

- Eastern Hutt Road
- Manor Drive
- Park Road
- Harbourview Road
- Wainuiomata Hill Road (Wainuiomata side)
- Wainuiomata Hill Road (Lower Hutt side)
- Parkway
- Moores Valley Road

6.3.2 RISK TREATMENT OPTIONS

Options considered to reduce risk involve reducing the likelihood or the consequences of the risk or a combination of both. These options may include:

- Acceptance of risk - Do nothing- accept the risk.
- Management strategies- implement enhanced strategies for demand management, contingency planning, quality processes, staff training, RAMM systems, data analysis and reporting or reduce the target service standard
- Operational strategies - actions to reduce peak demand or stresses on the asset, operator training, documentation of operational procedures.
- Maintenance strategies- modify the maintenance regime to improve reliability or extend asset life.
- Asset renewal strategies- rehabilitate or replace assets to maintain service levels.
- Development strategies- investment to create a new asset or augment an existing asset:
- Asset Disposal / Rationalisation- divestment of assets surplus to needs.

A review and further development of the process for prioritising capital works has been identified as a project in the improvement plan.

6.4 RESILIENCE OF TRANSPORT ASSETS TO NATURAL DISASTER

6.4.1 HAZARDS

The Wellington region has one of the most physically diverse environments in New Zealand. It is also one the most populous regions and, consequently, transport networks are affected by a wide range of natural hazards.

6.4.1.1 EARTHQUAKES

The Wellington region is located within an area of high seismicity near the boundary of the Pacific and Australian tectonic plates. Stresses in the earth's crust produced by the subduction margin have produced a number of faults, both on land and on the seafloor, around the Wellington region. Many of these faults are still active and present a significant hazard. The five faults that could potentially cause the most damage in the region are shown in the table below together with their recurrence intervals and maximum magnitudes.

Fault	Recurrence interval (yrs)	Elapsed time since last event (yrs)	Maximum Magnitude (Richter Scale)
Wellington	900	300	7.6
Ohariu	2200	1000	7.6
Ohariu North	1500-3500	1000	7.3-7.7
Wairarapa	1200	160	8.3
Carterton	700-1000	unknown	7.0
Masterton	1000	unknown	6.7

Table 6-2: GWRC Wellington Regional Hazard Strategy 2016

Recent experience outside of the Wellington Region has shown that fault lines can cause significant damage to structures e.g. the 2016 Kaikoura earthquake which ruptured 200km across several faults and into the Cook Strait.

Surface fault ruptures occur particularly in sufficiently large (magnitude 7.0+) and shallow (< 40 m) earthquakes where the fault movement may cause vertical uplift / downthrust or horizontal / lateral movements that deform the ground surface.

Ground shaking is the most widespread effect of an earthquake and is usually most severe closest to the fault. On release, waves of energy travel through the ground and produce a shaking effect. When the waves reach ground level, they slow down and are transformed into surface waves that produce either a vertical or lateral movement. The ground shaking is influenced by surface geology. In loose unconsolidated sediments such as gravels, sands and silts, ground shaking effects can be amplified. Areas likely to experience the highest amplification include Petone, Lower Hutt and Wainuiomata.

Liquefaction occurs when unconsolidated soils, particularly silty and sandy soils, become saturated with water in a shaking event and behave more as a liquid than a solid. Liquefaction has a range of associated effects such as ground subsidence, lateral spreading, landslides, foundation failures, flotation of buried structures and water fountaining. Areas at risk include reclaimed and around Hutt River mouth and lower floodplain (Petone, Seaview, Gracefield).

6.4.1.2 COASTAL HAZARDS

Coastal hazards encompass coastal erosion and inundation, sea-level rise and tsunami.

Coastal erosion and inundation, often associated with storm surges and wave overtopping, have the capacity to cause significant damage to infrastructure and flooding in low-lying coastal areas.

A storm surge is the short term elevation of the local sea level due to meteorological conditions of wind set-up and barometric lift (inverse barometer effect from relaxation of sea surface during low atmospheric pressure). Waves cause an additional wave setup through the surf zone and then run-up on the beach or seawall.

Storm-tide, wave run-up and associated coastal erosion can also cause inundation. Places particularly susceptible to coastal flooding and overtopping include areas in Wellington Harbour (Eastbourne, SH2, Lambton Quay).

Wellington has experienced an average rise in sea level of about 2 mm per year over the past 100 years. Most of this rise is due to climate change but it is being exacerbated by subsidence of the region (lower North Island) over the past decade, caused by slow-slip seismic events from deep tectonic plate movements. Projections for the end of this century indicate that the sea level in Wellington region could rise by 0.8 m by the 2090's or 1.0 m by 2115 (Greater Wellington Regional Council, 2012), in line with the Ministry for the Environment guidance for coastal hazards and climate change (Ministry for the Environment, 2008).

A tsunami is a series of waves generated by the sudden displacement of a water surface. The three main generating mechanisms are submarine fault ruptures, underwater or aerial landslides or volcanic activity. The Wellington region is at risk from tsunami generated from both distant (far-field > 3 hr travel time) and local sources (near-field < 1 hour travel time). Regionally-generated tsunamis with 1–3 hr travel time (e.g. Solomon Islands or northern Kermadec area) are considered to pose less threat. Earthquakes off the coast of Chile present the largest far-field tsunami risk for the Central New Zealand region, while there are three potential sources of near-field tsunamis: the Hikurangi Subduction Margin of Pacific/Australia Plate boundary off the southeast coast, local faults in Cook Strait and submarine landslides off Cook Strait Canyon (Power, 2013).

6.4.1.3 FLOODING

A flood occurs when an area of land, usually low-lying, is inundated with water from river flooding, flash floods or ponding. Frequent heavy rainstorms, the steep gradients of many river catchments and human occupation of floodplains combine to make flooding the most frequently occurring natural hazard event in the Wellington region. A heavy rainfall event is defined as 100 mm over a 24-hour period. The classic mechanism in the region for localised severe rainfall is a southerly front meeting a northwest front. The areas of greatest flood risk in the region are those catchments and floodplains that drain both west and east of the Tararua Range, where the highest rainfall occurs.

Flood risk also arises from high-intensity short-duration events over, for example 30 minutes to a few hours i.e. flash flooding.

River flooding from bank overtopping onto flood plains from prolonged rainfall is a particular risk for the Lower Hutt valley. A credible event is a 500 year flooding event on the Hutt River exceeding the design standard of the stop banks. In order for this to occur, heavy intense rainfall from a stationary front bringing over 500 mm of rain over a 36-48 hour period to the Hutt River Catchment is needed. This would flood the Hutt Valley floodplain.

Serious flooding can also occur should flood defences fail before their supposed design capacity is reached. This can occur, for example, due to “piping” through or under banks, debris jams, out-flanking, bank scouring, bank slumping, landslide induced “tsunami” and channel capacity loss through in channel deposition.

Sedimentation and erosion of rivers and streams, river mouths and tidal inlets, can be sudden (during an event) or develop gradually over time and can further exacerbate the flood risk by raising bed levels and undermining banks.
Surface flooding or ponding is due to the capacity of stormwater systems being exceeded, impeded drainage (drains being blocked) or antecedent conditions of the water table being high when the ground is waterlogged. This can occur around localised areas in part of Hutt City.

6.4.1.4 LANDSLIDES

The geology, tectonic setting and climate make the Wellington region particularly prone to landslides. These factors make landslides second only to flooding, in terms of the economic costs from damages (Wellington Region Civil Defence Emergency Management Group, 2007).

The two main types of antecedent conditions that lead to slips in the region are i) a wet winter with susceptibility increasing towards the end of the period, and ii) a dry summer with a major rainstorm event producing falls of over 200 mm.

6.4.1.5 WIND

High winds can occur throughout the region and can cause widespread damage to buildings, infrastructure and forestry. These winds may impact on power and telecommunication lines. The windiest areas are generally along

Wellington's coasts. Westerly winds, turned south by the Tararua Range, are funnelled through the gap of Cook Strait to produce strong north or north-westerly winds in the western Wellington region. Southerly winds flow parallel to the main Wellington ranges and are not as strong or as characteristically gusty as the north-westerly, however, they have higher average sustained wind speeds. The return period for a severe wind gust (sustained over 3 seconds) of 200 kph is roughly 140 yr (Wellington Region Civil Defence Emergency Management Group, 2007).

6.4.1.6 SNOW

Snowfalls occur in the region in winter and early spring each year. These falls are generated from southerly storms, and are particularly located in the Hutt Valley and elevated areas above 500 metres. Heavy snowfall is regarded as more than 25 cm falling in a 24 hr period or 10 cm in 6 hrs. Falls below 200m above sea level are infrequent but 1 per year may be expected at between 200-500 m and 5 per year at 600-1000 m (Wellington Region Civil Defence Emergency Management Group, 2007).

6.4.2 INVESTIGATIONS AND REPORTS

6.4.2.1 SEISMIC HAZARD

A seismic screening study of all bridges was carried out in 2001. Refer to Phillips and Wood Report – Seismic Screening of Bridges – Project Report 21 March 2001. From this study a prioritised bridge seismic strengthening programme was developed and implemented with the last of the bridges to be strengthened in 2020/21.

6.5 CIVIL DEFENCE PREPAREDNESS

6.5.1 EMERGENCY RESPONSE PLAN

The Transport Division has an Emergency Response Plan (part of an overall ERP framework within HCC) to help guide response during major events. This plan has been given rigorous 'tests' with 5 flood events since February 2004 and the November 2016 earthquake and flooding events that have warranted full implementation of the plan and corresponding application to NZTA for emergency funding.

Arrangements in place for responding to emergency events include:

- Situation assessment
- Response priorities
- Response arrangements – resourcing, responsibilities, reporting, etc.
- Event escalation – self-managed to declared City / Regional events
- Linkage to the CDEM Group Plan and relevant Council response plans

6.5.2 BUSINESS CONTINUITY PLAN

Reference to documents and summary of arrangements in place for continuing to provide the service in the event of some form of disruption, including:

- Service priorities
- Alternatives to service provision
- Back up contingencies – information systems, records, data, location of premises, etc.

6.5.3 RECOVERY

To cover the impact of a major event on the long term recovery needs of the City:

- Longer term recovery priorities for the activity
- Consideration of changes in the way the assets could be configured if a significant replacement program was required following an event, or materials use
- Potential funding needs / issues
- Relationships between the assets and other utilities' assets – e.g. co-location in road corridors

6.5.4 LIFELINE UTILITIES COORDINATION

Reference to protocols or arrangements in place with other utilities in the event of a major event affecting multiple agencies, including:

- Internal to Council
- Other lifeline utilities operating within the City, including power, telecommunications, gas, transportation, fuel, broadcasting, etc.
- Regional council and neighbouring TLAs
- Mutual aid arrangements for response and recovery

7 PROGRAMME BUSINESS CASE

7.1 STRATEGIC CASE

7.1.1 INTRODUCTION

This Programme Business Case has been prepared by the Hutt City Council Transport and Maintenance Divisions for incorporation into the Transport Activity Management Plan 2018 -28 that supports Council's application for funding from the 2018-21 National Land Transport Programme.

This business case generally requests a similar level of funding to previous years with no substantive changes to the programme although pavement surfacing has returned to the expenditure level of three years ago following a short period of lower investment.

The Transport Activity supports the economic wellbeing of the city by responding to growth and development while promoting social and cultural wellbeing via our Road Safety Programme and active transport strategies.

7.1.2 STRATEGIC ASSESSMENT

7.1.2.1 DEFINING THE PROBLEM

Problem One

Cost Efficiency – The whole of life asset cost will be compromised if timely and appropriate interventions and treatments are not made to the transport network.

The balance between maintenance and renewal is critical in optimising the whole of life asset cost while still providing an acceptable level of service across all the relevant performance measures.

The varied topography and weak sub-grades across our network provide additional challenges in addressing this problem.

Problem Two

Safety – The number of Serious Injury and Fatal crashes needs to be maintained below the current level.

The number of serious injury and fatal crashes has risen slightly over the last three years in line with the national trend. This trend needs to be arrested and the accident frequency maintained below the current level.

The condition and performance of our road and traffic assets are fundamental to meeting this objective.

Problem Three

Mobility – Travel Time Reliability and Resilience are increasingly compromised across the network

Population growth and an increased frequency of natural events are compromising mobility across the city.

Travel time reliability has reduced on Primary Collector roads and resilience has been increasingly challenged on the roads subject to natural hazards.

Unacceptable levels of mobility have the potential to inhibit economic growth and social wellbeing.

Problem Four

Amenity - Travel experience needs to be maintained to at least the current level.

There is a customer expectation to maintain the travel experience across our network to at least the current level. This experience is influenced by the road condition and functionality of traffic assets. Based on our current performance measures we are only just achieving an acceptable level of service for amenity.

Problem Five

Accessibility - Connectivity and access for all travel modes is an increasing challenge.

There is an increasing demand for our network to support larger vehicles and alternative travel modes.

Larger vehicles, public transport and active modes need to be accommodated to support economic growth and the social wellbeing of the city.

Benefits

The benefits of addressing these problems include:

- Achieving the strategic goals of the city.
- Sustaining a safe road network.
- Cost Efficiency for stakeholders.
- Improving network resilience to natural hazards and population growth.
- Economic growth for Hutt City and the Wellington Region.
- Greater accessibility for all travel modes.

7.2 ROAD ASSETS

7.2.1 BACKGROUND

Hutt City's road carriageway (pavement and surfacing), drainage and structures form part of the network that enables the safe and efficient movement of people and goods around the Hutt Valley as well as connecting to the wider Wellington Region.

When considering investment decisions for the city's roads, the most important concept is that the customer is at the heart of every investment decision. This concept is achieved through the implementation of the NZTA's One Network Roading Classification (ONRC) system.

The customer levels of service that we seek to maintain are:

- Mobility (travel time reliability and resilience);
- Safety;
- Amenity (travel quality and aesthetics); and
- Accessibility (land access and road network connectivity).

The performance measures used to compare effectiveness against the customer levels of service are:

- Customer Outcome;
- Technical Output; and
- Cost Efficiency.

The Road Assets which form this part of the system include:

- Road surfacing
- Road pavement
- Bridges
- Subways
- Seawalls
- Retaining Walls
- Barriers
- Guardrails
- Bollards
- Debris fences
- Kerb and Channel
- Sumps/cess pits
- Soak pits
- Water tables
- Road culverts and headwalls
- Subsoil drains

The roading network is made up of 483.4 km of sealed roads, with the primary objective being to provide safe accessibility for people and freight within Lower Hutt and connectivity to the wider Wellington region.

Higher levels of investment are required to mitigate unique features of the network such as weak subgrades, and Wainuiomata Hill Road, which has a history of high numbers of loss of control crashes.

To further enable accessibility to the network, HCC owns and maintains numerous structures (including bridges, subways, seawalls and retaining walls) which provide safe key connections over Hutt City's rivers, streams and

railway lines. Assets including barriers, guardrails and bollards are also used across the network to provide safety for road users and pedestrians/cyclists.

Priority has been put into economic growth and resilience with the network's structures playing a large role in this. All bridges have been assessed for heavy vehicle capability to enable increased freight movement and alternative transport choices to key destinations. All bridges have also been assessed for their seismic vulnerability, with a programme implemented to seismically strengthen key bridges, of which only one bridge remains to be strengthened.

With the network being constructed on predominantly weak subgrades, drainage is additionally important in maintaining the life of the roading assets, as well as providing a safer network for road users and pedestrians/cyclists.

Hutt City's network has been well managed and maintained over the years so that the network's condition has remained stable. Its continued performance provides cost efficiency and achieves the targeted levels of service. Any reduction in condition would see a reduction in cost efficiency and customer satisfaction, which would be unacceptable to both Council and ratepayers.

HCC's maintenance and timely renewals of the road assets is a vital part of the network which provides the desired customer levels of service for mobility, safety, amenity, accessibility and cost efficiency.

Objectives of the Programme

Objective 1: Manage levels of service for all road users to support amenity, economic growth, and accessibility.

Objective 2: Provide a safe network;

Objective 3: Provide high quality, resilient connections;

Objective 4: Provide value for money for our Road Asset investment.

Strategic Alignment

Relevant Government, regional, organisational policies, strategies and goals that influence this programme of works, are shown below:

Links to Strategies	Goal
Government Policy Statement/Investment Assessment Framework	• Economic growth and productivity • Value for money – provide the right infrastructure, to the right level at the best cost • Road Safety
Regional Land Transport Plan	• An effective network for the movement of freight • A safer system for all users of our regional transport network • An increasingly resilient transport network • A well planned, connected and integrated transport network • An attractive and safe walking and cycling network • An efficient and optimised transport system that minimises the impact on the environment

Links to Strategies	Goal
National Land Transport Programme	• Economic growth • Safety • Value for money
Hutt City Council Infrastructure Strategy	• Protect people, property and the environment; • Contribute to creating liveable communities that allow for a wide range of activities to take place; • Ensure infrastructure is resilient for the long term and adaptable to changing circumstances.
ONRC Customer Levels of Service	• Mobility (travel time reliability and resilience); • Safety; • Amenity (travel quality and aesthetics); and • Accessibility (land access and road network connectivity).

NZTA Investment

Council undertakes this programme with financial assistance from the NZTA. This assistance for the 2018–21 NLTP is set at 51% of the total eligible programme. The NZTA work categories that this assistance funded from are:

Work Category	Name	Description
111	Sealed Pavement maintenance	Small localised repairs to the pavement and surface
121	Environmental maintenance	Storm damage clean up, slip repairs, mowing, vegetation control, road graffiti removal and after hours services
114	Structures maintenance	Remedial repairs on bridges, retaining walls, and seawalls, barriers, guardrail, bollards, and debris fences.
215	Structures component replacement	Replacement/renewal of structure components
113	Drainage maintenance	Remedial repairs on drainage assets, street sweeping and sump cleaning
213	Drainage Renewals	Replacement/renewal of storm water facilities
212	Sealed road resurfacing	Chipseals, Thin Asphalt and High Friction Surfacing
214	Sealed road pavement rehabilitation	Granular overlays, pavement stabilisation, pavement replacement and structural asphaltic concrete rehabilitation

7.2.2 SEALED PAVEMENTS & SURFACING

The network is constructed on a variety of topography types ranging from the steep eastern and western hills to the flat areas of the valley floor and Wainuiomata. Marked differences exist throughout the city with respect to types of pavements, foundation strengths, and road widths.

The majority of the network is constructed on weak subgrades that are moisture susceptible and loose strength when saturated. Approx. 300 kms of the 483.8 km network is constructed on a weak subgrade so is a major factor in decision making and achieving cost efficiency. As a result great emphasis has been placed on maintaining the waterproofing seal (chipseal) to protect the pavement, handle the high deflections and prevent the need for more expensive pavement rehabilitation work.

Another feature of the network is the Wainuiomata Hill Road. This is HCC's only "Regional" road, classified as such because of the high AADT (approx. 19,000 vpd), and that the road is a sole connector between two main urban areas.

Historically this road had a very high crash rate (approx. one a week) which was in part attributable to inadequate skid resistance and texture. In 2000 a Safety Resurfacing Programme specific to Wainuiomata Hill Road was introduced which included the use of high friction surfacing in the most critical areas to increase skid resistance and texture. This proved very effective, with crash reductions in the order of 80%, which has been sustained since 2000 through to today.

The use of high friction surfacing on high risk areas has also been extended over the wider network, to include roads prone to ice and areas that have a history of loss of control crashes. This has further reduced the number of crashes on the network.

Increasingly heavier vehicles are being introduced onto the network. 50MAX, HPMV, 45/46 tonne vehicles and the new overweight double decker buses have access to the majority of the network which provides economic growth through accessibility for both freight and public transport, within Hutt City and the wider Wellington region. Heavy vehicles cause significant damage to the network's surfacing and pavements, and to continue to provide this access, significantly more maintenance intervention is required than in the past.

To determine the best level of investment required to maintain the network without creating a backlog of resurfacing or pavement rehabilitation, investigations using dTIMS have been carried out to model the expected investment requirements for the next 30 years. These investigations test the sensitivities of the different budget scenarios as to the differing effects on the Levels of Service and the associated risks.

Hutt City Council is now at the end of a three year period (2015 – 2017) where the predicted and resulting required level of investment was lower than previous years, and lower than what is predicted to be required for future years. This was due to both dTIMS modelling which indicated this low before a subsequent peak, as well as very competitive contract rates for the three major resurfacing and pavement rehabilitation contracts. It is important to note that these contracts are no longer in place, with one of the Contractors finding their competitive rates financially unviable for them. Subsequent contracts have been awarded, with the rates significantly higher than during the three year low period.

The Resurfacing and Pavement Rehabilitation programme undertakes the renewal of the surfacing on the roads (chipseal, asphalt and high friction surfacing) as well as the rehabilitation of the pavements.

Levels of Service Measures

The ONRC customer levels of service relevant to Pavement Rehabilitation and Resurfacing are:

- Safety;
- Amenity;
- Accessibility; and,
- Cost Efficiency.

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	ONRC Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Technical Output 4	Loss of control on wet roads
	Technical Output 5	Loss of driver control at night
Amenity	Customer Outcome 1	Smooth Travel Exposure
	Customer Outcome 2	Peak roughness
	Technical Output 1	Roughness of the road
Accessibility	Customer Outcome 1	Proportion of the network not available to Class 1 and 50MAX vehicles
Cost Efficiency	Cost Efficiency 1	Pavement rehabilitation
	Cost Efficiency 2	Chipseal resurfacing
	Cost Efficiency 3	Asphalt resurfacing
	Cost Efficiency 5	Overall network cost

Currently there are no targets set by ONRC for each Customer Level of Service and HCC has previously benchmarked its levels against other targets, such as the NZTA Maintenance Guidelines which are demonstrated below, as well as other measures which show the current condition of the network:

Accessibility

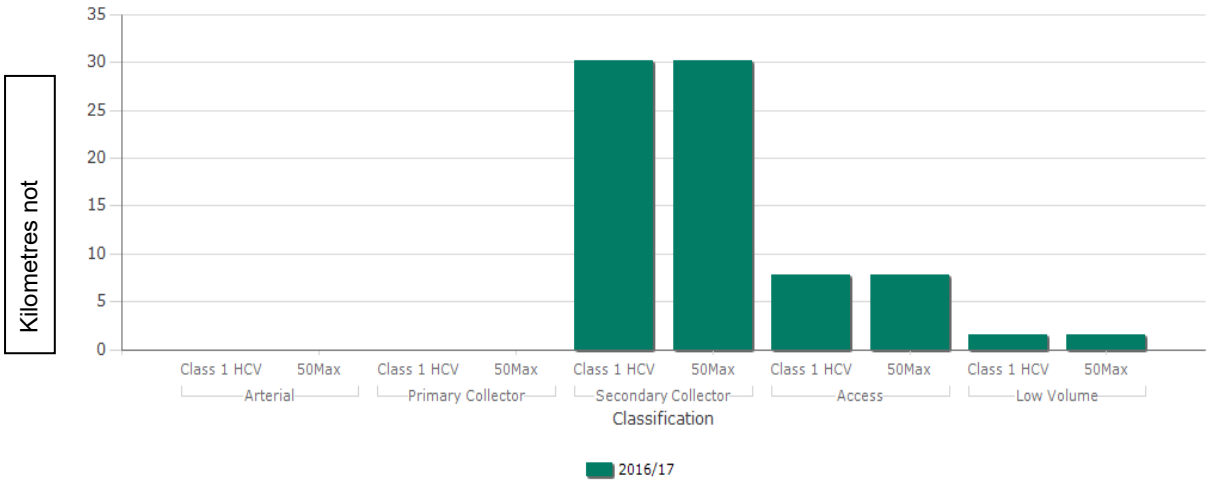
Network available to Class 1 and 50MAX vehicles (Customer outcome 1)

A total of 92% of network is available to Class 1 and 50MAX vehicles. All key destinations such as the Seaview Industrial area, Lower Hutt CBD, Petone CBD and Wainuiomata CBD are accessible to these vehicles, which enables economic growth and alternative transport choices within Hutt City and the wider Wellington region.

Of the 8% of the network that is not available to these vehicles, the restrictions are limited to Secondary Collector, Access and Low Volume Roads, which are in areas that are not considered to impede economic growth or reduce alternative transport options.

All Regional, Arterial and Primary Collector roads are accessible to these vehicles.

Network (kms) not accessible to HCV or 50 MAX



Amenity

Average Pavement Roughness (Technical Output 1)

Road roughness, as defined in terms of NAASRA (National Association of Australian State Roading Authority) counts, is an indicator of road condition and performance. NAASRA counts are measured by laser equipment in specifically modified vehicles. The higher the NAASRA counts the rougher the road. The sealed road surfaces in Hutt City are rated through the annual Condition Rating survey, as to surface condition as follows:

- All roads in the network bi-annually
- All roads with a traffic volume of 500 vehicles per day or more, annually.

HCC has previously benchmarked its levels against the NZTA Maintenance Guidelines, which set out various roughness thresholds depending on the traffic loading of various road categories.

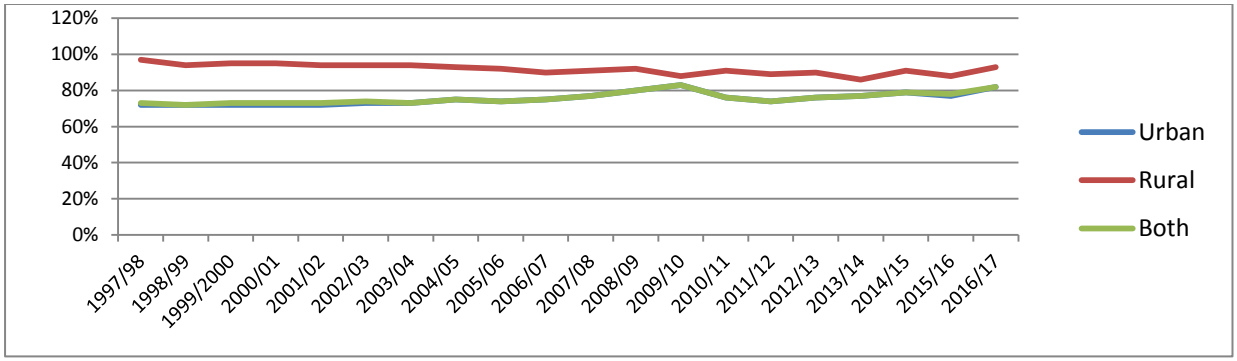
The table below shows the current actual level of roughness in Hutt City vs. the target level as set out in the NZTA Maintenance Guidelines. All road categories are within 10% of the target level, except for the Low Volume roads which shows a lower roughness level than the target.

This demonstrates that the network is being maintained to acceptable roughness levels, except for the Low Volume roads (84 kms) for which future levels of interventions (such as shape correction) can be reduced.

Urban Roads	Arterial	Primary Collector	Secondary Collector	Access	Low Volume
Kilometres	54.2	69.7	92.8	149.1	84.4
Roughness Rating (average)	93	105	115	120	100
NZTA Maintenance Guide	100	100	110	120	140
Rural Roads	**Arterial**	**Primary Collector**	**Secondary Collector**	**Access**	**Low Volume**
Kilometres	0	0	26.3	0	0
Roughness Rating (average)			111		
NZTA Maintenance Guide			110		

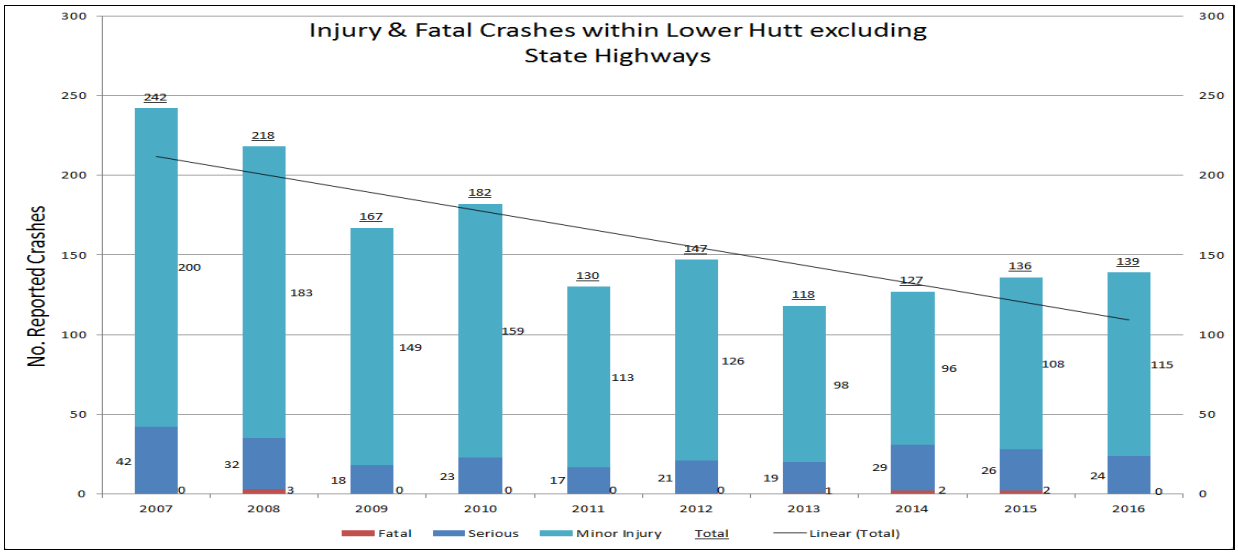
Smooth Travel Exposure (Customer Outcome 1)

Another global measure of network roughness is the "Smooth Travel Exposure" (STE) index. This measure takes account of the total vehicle kilometres travelled on roads that meet the NZTA roughness guidelines. The overall trend in recent years has been static as shown below:



This measure demonstrates that the network's roughness condition is being held, with no notable deterioration, or improvement which would indicate unnecessary levels of intervention.

Safety (Customer Outcome 1)



The trend over the past ten years shows a favourable downward trend overall, but with a slight increase over the past three years which reflects the nationwide trend.

Investment Level

Hutt City Council uses dTIMS modelling to determine the best level of investment required to maintain the network for the next 30 years without creating a backlog of resurfacing or pavement rehabilitation. These investigations test the sensitivities of the different budget scenarios as to the differing effects on the Levels of Service and the associated risks. dTIMS is further explained in section 8.2.2 (g).

DTIM's modelling was undertaken using five budget scenarios ($3.7 million (very low) to $5.8 million (high) and an unconstrained Trigger scenario), to test the sensitivity of predicted network conditions and work quantities to the different investment levels. This sensitivity analysis was used to find the most appropriate investment level.

The recommended budget scenario is the investment level that satisfies the following criteria:

- Affordable to the Council,
- Reducing the budget below this level will result in a noticeable deterioration of network condition,
- The change in network condition, treatment cost and quantities is negligible if the budget is increased above this level, and;
- Increasing the budget above this level will not result in an increase in the average expenditure over the analysis period.

The budgets considered were an unconstrained Trigger scenario, a High budget of $5.8M, a Normal budget of $5.2M, a Low budget $4.5M, a Very Low budget of $3.7M.

Findings included:

- Normal budget scenario ($5.2M) is able to maintain the current average surface age. The average remaining lives will also be maintained by this scenario.
- All budget scenarios showed that the rutting will slightly increase over time; however roughness can be maintained at the current level.
- The pavement age will increase slowly over time. None of the budget scenarios are able to maintain the pavement age distribution during the analysis period. The required rehabilitation rate to achieve 100 year pavement lives is 4.6km per annum
- The high number of Treatment Lengths with low traffic volumes and loads will allow their pavement life to be extended. These sections however require ongoing maintenance and proper monitoring for any sign of pavement deterioration due to other factors.

The annual treatment quantities predicted from the analysis are as follows:

Treatment		Trigger	High ($5.8M)	Normal ($5.2M)	Low ($4.5M)	Very Low ($3.7M)
Reseal	km/year	31.1	27.9	26.5	19.3	16.8
AC	km/year	7.23	7.3	7.07	6.69	5.98
Rehabilitation	km/year	5.6	4.3	4.1	3.6	2.9

Multi-criteria analysis of non-monetary benefits	High	Normal	Low	Very Low
Improves Reliability	0	0	-1	-1
Improves Accessibility	0	0	-1	-2
Improves Availability	0	0	0	-1
Economic growth and productivity	0	0	0	-1
Safety	0	0	-2	-3
Cost efficiency	-1	0	-2	-3
Stakeholder Acceptability	-1	0	-1	-2
Score	**-2**	**0**	**-7**	**-13**
Preferred option	**2**	**1**	**3**	**4**

The preferred budget scenario is the Normal $5.2M budget for the following reasons:

- Is adequate to maintain the current surface age, and the average remaining lives will also be maintained.
- Roughness levels can be maintained.
- While not achieving the required pavement rehabilitation of 4.6km per annum, it is only minimally less than the High budget scenario, which also doesn't achieve the 4.6km.
- The higher budget scenario will also not achieve a reduction in rutting.
- The higher budget scenario will achieve minimal additional length of resurfacing and pavement rehabilitation which is not proportional to the additional budget required.
- The lower budget scenarios see a sizable reduction of length of resurfacing and pavement rehabilitation, which will result in the deterioration of the network to below current standards.
- It is affordable to Council.

Options

Determining the Forward Works Programme

As discussed in more detail in section 8.2.2 – Asset Condition, a number of surveys are undertaken each year to determine the condition, roughness and skid resistance of the network. The results of these surveys are entered into RAMM.

The initial forward works programme for both the resurfacing and pavement rehabilitation works is determined through analysing data from RAMM, which is a combination of surface/pavement age, number of failures, roughness, level of skid resistance, traffic levels, HCV, condition rating and expected life.

The initial programme will be further validated through site inspections, with economic evaluations undertaken before being confirmed.

Treatment Selection – Pavement Rehabilitation

Hutt City Council uses numerous different treatment options when rehabilitating pavements, which include:

- Granular overlays
- Pavement Stabilisation
- Pavement reconstruction
- Structural asphaltic concrete rehabilitation

Considerations for determining treatment options include:

- Subgrade – what is the existing and surrounding subgrade
- Drainage requirements – is additional drainage required to address the cause of failure
- Traffic loadings – is there a high number of HCV, high AADT, channelised traffic, bus routes
- Land use – residential / industrial areas have different loadings/stresses on the pavement
- Public / Business disruption – is there a need for speed in construction to minimise disruption

Pavement designs are then undertaken using industry best practice.

Treatment Selection - Surfacing

Hutt City Council uses three different treatment options when resurfacing roads:

- **Chipseal** – which consists of a layer of sprayed bitumen followed by one or two layers of stone chips and provides a flexible, waterproof, skid-resistant surface.
- **Asphaltic concrete** (AC) – mineral aggregate bound together with asphalt and applied hot to the road surface in layers and compacted.
- **Slurry seal** - which is a thin mixture of bitumen, emulsion and sand.

The default treatment for all roads is chipseal, as it provides best value for money, a water proofing layer to protect the pavement, skid resistance, and a flexible layer to handle the weak subgrades that the Hutt City network is constructed on.

There are roads/areas that require an alternative treatment to chipseal to achieve cost efficiency, safety and amenity value, such as:

- Intersections/roundabouts/corners/parking areas that have high levels of traffic stresses.
- CBD and shopping centres, because of the high amount of both traffic and pedestrians.
- When a significant amount of shape correction is required to provide smoothness of ride for vehicles and bicycles, which reduces vehicle maintenance costs.
- When a structural surface is required from high AADT or heavy vehicle usage, i.e. The Esplanade with an average of 30,000 vehicle per day

Alternative treatments include:

- Asphalt (various dense graded mixes used) to provide structural strength, shape correct, amenity values such as noise reduction, and reduction of bitumen pick up on pedestrians causing tracking/damage to private property. It is also used when a chipseal surface would not handle traffic stresses.
- Stone Mastic Asphalt (SMA) to provide greater durability and life expectancy than dense graded asphalt, as well as higher skid resistance.
- High Friction surfacing to provide greater skid resistance than dense graded asphalt and chipseal.
- Slurry Seal to provide a smooth surface similar to asphalt but able to maintain flexibility.

The table below outlines examples of the decision making factors when determining treatment options other than chipseal. Slurry seal is rarely used in Hutt City as we do not see it providing cost efficiency due to slurry typically lasting less than 5 – 7 years, so has not been included in this table:

	Features required of site	Chipseal	Asphalt	Stone Mastic Asphalt (SMA)	HFS over Asphalt layer
Roundabouts	Durability, high friction for turning movements, high life expectancy on a demanding site.	High stress from turning movements would strip the chip off, reducing the life of the seal and the skid resistence	High stress from turning movements would cause the asphalt to deform and heave, reducing the life of the surface. Asphalt has little skid resistence	Has durability so will not deform and heave so will achieve longer life. SMA has high PSV and texture, so offers adequate levels of skid resistance	High cost. Not necessary if adequate skid resistance can be achieved through alternative treatment
High stress corners/turning	Durability to handle high stress from turning movements	High stress from turning movements would strip the chip off, reducing the life of the seal and the skid resistence	Asphalt has low skid resistence	Has durability so will not deform and heave so will achieve longer life. SMA has high PSV and texture, so offers adequate levels of skid resistance	High cost. Not necessary if adequate skid resistance can be achieved through alternative treatment
High intensity parking	Durability from screwing action from movement of stationery wheels being turned	High stress from stationery turning would strip the chip off causing "dinner plating" reducing the life of the seal and resulting in bitumen being tracked on vehicles and foot traffic. Significant complaints about damaged property - financial liabilities to Council	Asphalt will withstand high stress from turning movements of stationary wheels.	Additional durabitlity not required as not a high speed environment. Skid Resistence not required	Skid Resistence not required
High AADT/HCV	Structural strength to handle high volumes of traffic and/or HCV	Chipseal will not provide structural strength - relies on pavment structure. Chipseal is flexible	Structural strength will be provided through deep structural layers	Needs deep structural asphalt layers beneth SMA. Skid resistence not required	Skid resistence not required
Poor shape/high roughness	Shape correction is required to provide smoothness of ride for vehicles and cyclists, which reduces vehicle maintenance costs	Chipseal will not provide shape correction - will mirror the existing shape.	Asphalt will provide shape correction/pavement smoothing	Additional durability not required if not a high speed environment and skid Resistence is not required	Skid Resistence not required

	Features required of site	Chipseal	Asphalt	Stone Mastic Asphalt (SMA)	HFS over Asphalt layer
CBD and shopping areas	Amenity value for high amount of both traffic and pedestrians	High stress from turning movements of stationary wheels would strip the chip off causing "dinner plating" reducing the life of the seal and resulting in bitumen being tracked on vehicle and foot traffic. Significant complaints about damaged property - financial liabilities to Council. No amenity value of smoothness for traffic and pedestrians	High amenity value of smoothness and noise reduction for traffic and pedestrians	Additional durability not required as not a speed or high AADT/HCV environment. Skid Resistence not required	Skid Resistence not required
High crash corners	High skid resistance	High stress from traffic would strip the chip off, reducing the life of the seal and the skid resistence	Asphalt has low skid resistence	While SMA has good skid resistance, higher levels are required for high crash areas	Very high skid resistance and texture

Additional Investment to Optimise the Network

Skid Resistance

Roads have been identified within Hutt City which require a higher level of skid resistance to provide greater safety to road users, therefore alternative/additional treatment is required:

- Roads prone to ice during winter (identified in the Ice Map and are generally on the Western Hills)
- Roundabouts
- Wainuiomata Hill Road (as discussed in section 8.2.2 (f))
- Corners which have a history of loss of control crashes

While chipseal offers a good level of skid resistance, as outlined in the previous section, chipseal is not suitable in certain circumstances such as high traffic stress areas and alternatives to chipseal need to be used instead.
At 2 yearly intervals a 'Sideways Force Coefficient Routine Investigation Machine (SCRIM) to determine skid resistance is used to assess approximately half of the city's roading network. All arterial, collector and some access roads are tested. It is not considered necessary to test the lesser access roads due to low traffic speeds and volumes. Wainuiomata Hill Road is tested annually.

The table below demonstrates the network's level of skid resistance condition:

Skid resistance condition (lane kilometres)					
Excellent	**Good**	**Moderate**	**Poor**	**Very Poor**	**Length of network tested**
124.8	126.9	51.8	16.7	14.1	334.4

Further explanation on the measures and requirements can be found in section 8.2.2 (b)

SMA is an alternative to chipseal to provide skid resistance with texture and high PSV chip. SMA has high durability and life expectancy, and with the use of polymer provides greater value for money for HCC.

Another option for increased skid resistance is a high friction surfacing. As there number of high friction and/or high visibility surfacings available in New Zealand, HCC undertook trials on the network to determine the most cost efficient and effective high friction surfacing.

Trial sites of a variety of high friction surface products were set up around the city in high stress areas, which were monitored with a view to selecting a preferred product when extensive resurfacing of the safety seal on Wainuiomata Hill Road is required.

A total of 26 trials sections were placed on Hutt City roads covering a range of products (some of the products feature in more than one trial section), with their performance monitored as below:

- For accident reduction. Monitoring has covered 12 years
- For performance of specific surfacing. Monitoring has covered up to eight years

The following products were included in the trials:

- Calcined bauxite and proprietary binders
  - 5 different types of proprietary binders
- Natural stone chips and proprietary binders
  - 2 different types of stone, each with a different type of proprietary binder
- Man-made chips and proprietary binders
  - 1 type with a proprietary binder

These trial sites determined that calcined bauxite and an epoxy resin were the best products to use, in addition to it being applied to a polymer modified asphalt surface, for greater life expectancy.

The performance of the high friction surfacing on Wainuiomata Hill Road continues to be monitored annually, and the average life of the product has proved to be greater than the original estimate of seven years.

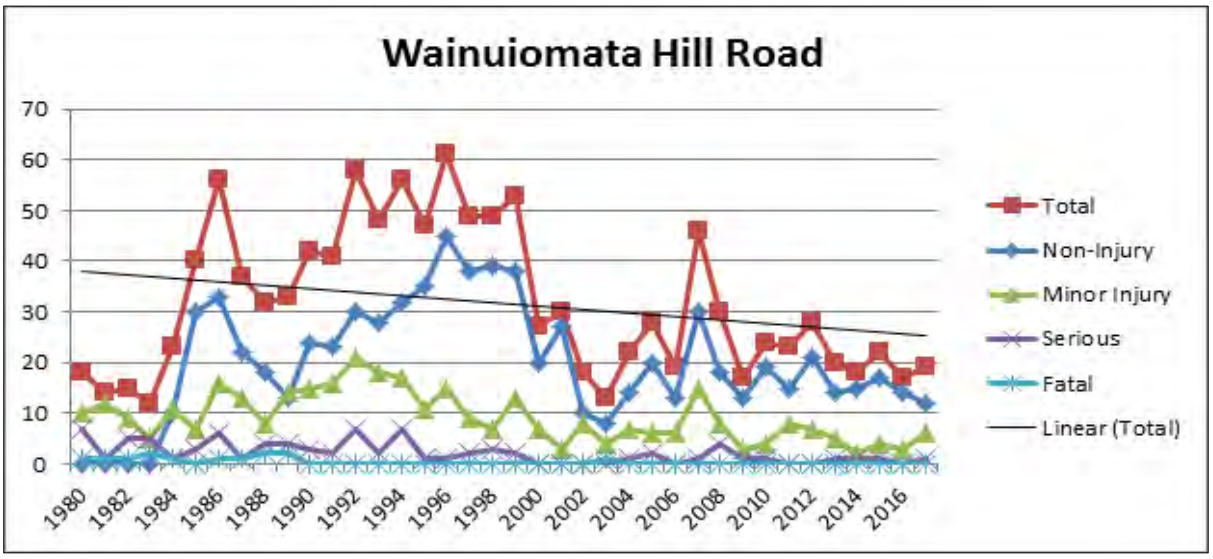
The details and findings of these trials can be reviewed in full in the report "High Friction and Specialty Surfacings Monitoring Report" by CPG New Zealand Ltd.

Wainuiomata Hill Road

Wainuiomata Hill Road is HCC's only "Regional" road, which was classified as this under the ONRC hierarchy because of the high AADT (approx. 19,000 vpd), and that the road is a sole connector between two main urban areas, with no alternative route.

Historically this road had a very high crash rate (on average one crash a week), so in 1998 a study was carried out on the Wainuiomata Hill Road to identify the causes of the high crash rate, and determine what interventions could aid in reducing this. This study led to the current safety resurfacing programme which is driven primarily by safety considerations, rather than for asset preservation reasons.

Prior to the commencement of this programme, traffic accident statistics indicated a threefold increase in the number of wet road accidents on the hill over a 10 year period. This increase was attributable to a reduction in the skid resistance of the surface due to poor texture and low Polished Stone Value. The introduction in 2000 of a high friction surfacing (calcined bauxite) in the most critical areas has proven very effective, with crash reductions in the order of 80%. This reduction has been sustained since 2000 through to today:



In view of the safety aspects, the road received a separate investigation for renewal needs in 2010. This included a full walkover, analysis of crash trends and analysis of SCRIM results.

From this review, a five year forward works programme was developed, which was implemented in the 2011/2012 season and was the basis of the annual work programme. An increased budget for the early stages of the five year works programme, combined with a sustained drive on the worst areas of the road meant that the bulk of the pressing work was completed during the 2014/2015 season. A standardised maintenance programme was established for future years.

The maintenance programme is validated each year which includes a full visual inspection, analysis of crash trends and analysis of SCRIM results (because of the importance of skid resistance on the road to sustain the reduced crash rate, a SCRIM survey is undertaken every year, with results analysed). The programme is then validated for discrete sections to be maintained as required.

A reduction in the current level of maintenance invention would result in a reduction of skid resistance levels and a related increased in crash rates, as was seen prior to the introduction of the high friction surfacing in 2000.

Weak Subgrades

The Hutt City road network is constructed on a variety of topography types ranging from the steep eastern and western hills to the flat areas of the valley floor and Wainuiomata. Marked differences exist throughout the city with respect to types of pavements and foundation strengths. Further information on the pavement strength, including subgrade type, strength zone map and Benkelman Beam test results can be found in 8.2.2 (e).

The majority of the network is built on weak subgrades that are moisture susceptible and loose strength when saturated. Poor subgrade types include peat, silt and clay.

Approximately 300 kms of the 483.8 km network is constructed on weak subgrade so is a major factor in decision making and achieving cost efficiency. As a result great emphasis has been placed on maintaining the waterproofing seal (chipseal) to protect the pavement, handle the high deflections and prevent the need for more expensive pavement rehabilitation work.

The target reseal length to maintain this waterproofing has historically been based on an average seal life of 13 years, which by comparison to other networks may seem short, but taken in context of the Hutt City network we consider this the optimal average age to achieve best whole of life costs.

Additional drainage measures need to be incorporated into the pavement rehabilitation programme, which on free draining subgrades such as sand are not required. When the subgrade is poor and moisture sensitive drainage needs to be incorporated. This includes installing/replacing subsoil drains when undertaking pavement rehabilitations.

In addition to the existing weakness of the subgrades, extreme adverse weather events have resulted in a marked deterioration in surface condition. Following the major flood event in February 2004 the surface condition index increased from around 1.8 to 2.7.

We believe the key reason for this deterioration was the adverse (ground saturating) weather from and since the February 2004 event. Since then there have been another six significant storm events (refer section 8.2.7 (c)).

The impact of the sustained adverse weather since the February 2004 event should not be understated. Although in the 13 year timeframe since then, the reseal length requirements were predicted to be in the order of 40km/year (which was close to historical lengths) the programme was reduced as more effort is concentrated towards rehabilitation works, with a strong emphasis on flexible chipseals to maintain a waterproof surface.

Hutt City has had a wet summer of 2016/17 and winter in 2017. The effects of this on the pavements and surfaces are now starting to present with localised failures.

The Table below sets out achieved reseal lengths in recent years which show the marked decrease:

Reseal Lengths	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Chip	34.1	25.4	21.7	14.3	18.4	21.4	13.2
Thin Asphalt	8.5	7.2	4.1	11.2	8.0	2.8	7.7
Total	42.6	32.6	25.8	25.5	26.4	24.2	20.9

Stone Mastic Asphalt

Stone Mastic Asphalt (SMA) is an alternative to chipseal as it provides similar levels of skid resistance with texture and high PSV chip, but has high durability and life expectancy to handle traffic stresses that chipseal cannot.

SMA is an alternative to Dense Graded Asphalt (DGA) as it provides skid resistance with texture and high PSV chip that DGA does not. SMA provides greater durability and life expectancy than DGA, and an even longer life can be achieved through the use of polymer in the SMA.

The table below demonstrates the value for money that is achieved through the use of SMA on roundabouts in Hutt City:

Treatment costs on Roundabouts

Treatment	Chipseal	Asphalt - Mix 20 50mm	SMA 40mm
Cost of RAB surfacing (m2)	$9.00	$48.00	$55.50
Expected Life (year)	1	2 - 6	10 - 12
Issues	• Traffic stresses causes: - Bitumen tracking - Chip attrition - High maintenance costs - Shape deformation • Low expected life on RAB	• No texture • Low skid resistance • Rutting and shoving • Needs waterproofing coat underneath • Relatively low expected life of RAB	• Most expensive surfacing cost • Needs waterproofing coat underneath • Significantly longer expected life on RAB
Benefits	• High Skid resistance • Low surfacing cost	• Can add polymer to extend expected life, however this would make it the same cost as SMA, but without the skid resistance	• Good texture • High skid resistance • Long life expectancy • Durable – resists rutting and fatigue

While chipseal is significantly lower in initial surfacing costs, the high maintenance and very short life expectancy makes the whole of life costs poor value for money. Safety issues such as loss of chip and loose chip also makes chipseal an unsuitable option.

Asphalt has similar initial surfacing costs but has a short life expectancy and has low skid resistance which creates safety issues.

SMA, while the highest cost for initial surfacing, offers the longest expected life (proportionally longer than the higher cost) as well as high skid resistance.

In addition to the value for money considerations, less frequent maintenance/resurfacing work reduces the amount of disruption to road users on the network.

Investment Option Risks/Consequences

Risk / consequences of Very Low and Low Investment

To reduce the budgets will significantly reduce the programme, specifically reseals and pavement rehabilitation. This has been demonstrated in the budget scenario table. The consequences of this will be significant increases in whole of life costs, amenity, accessibility, safety and resilience:

- A backlog of necessary resurfacing and pavement rehabilitation work will be created. This will create an intergenerational cost, with significant spend required in future years to catch up on deferred work.

- Loss of waterproofing seal will result in more pavement failures. This will require frequent and more extensive maintenance intervention, or full pavement rehabilitations earlier than necessary.

- The overall condition of the network will deteriorate to an unacceptable level of service for both Council and the ratepayers.

- With the increase in both heavy vehicle weights and frequency of travel, the surface and pavements will deteriorate sooner than without the heavy traffic. Restrictions to the use of overweight vehicles on the network will be one option to mitigate the damage caused. This would reduce the accessibility to Hutt City and the wider region for both freight and public transport, and impede economic growth.

- There will be less travel time reliability, through increased maintenance activity causing traffic disruptions.

- The network's resilience will be reduced, with wet weather events causing higher level of damage to the road. This will require more frequent and extensive maintenance intervention, or full pavement rehabilitations earlier than necessary.

- Without sufficient budget to provide maintenance/renewal intervention, there will be a decrease in amenity value for road users through increased roughness and vehicle maintenance costs from potholes, failures and shape deformation. Customer satisfaction levels will decrease.

- Safety of road users will be compromised through loss of skid resistance with an increase in crashes from loss of control.

Risk / consequences of High Investment

To increase the budgets will enable the programme to be increased. This has been demonstrated in the budget scenario table. This will not see notable reductions in whole of life costs, or increases in amenity, accessibility, safety or resilience:

- The high budget scenario will achieve minimal additional length of resurfacing and pavement rehabilitation which is not proportional to the additional budget required.

- Excess budgets – more budget than needed to cover identified programme.

- Resurfacing and pavement rehabilitation upon minor failure, unnecessarily reducing surface/pavement life.

- Acceleration of resurfacing and pavement rehabilitation; unaffordable to council.

- Acceleration of resurfacing and pavement rehabilitation which will create a future bow-wave and uneven budget spreading.

7.2.3 STRUCTURES

Background

The structures maintenance and replacement programmes undertake the regular inspections of all bridges, seawalls, retaining walls, barriers, guardrails and debris fences, and the resulting maintenance and replacement of these structures and components.

Hutt City has a total of 71 bridges and subways, 5.3 kms of seawalls and 162 retaining walls. The structure assets group also includes culverts larger than 3.4m^2 cross sectional area, 18.2 km of barriers and guardrail, bollards, and debris fences.

These structures provide key connections and safe access for both road users and cyclists/pedestrians across the network, and provide a resilient network from natural events such as storms, heavy rainfall and earthquakes.

The loss of serviceability of these structures would have a major impact on the roading network, in terms of disruption to accessibility, high costs for reinstatement work, and reduction in mobility.

Four major bridges span the Hutt River, with a number of lesser bridges cross the Wellington to Wairarapa railway line and other smaller rivers and streams. Council has five subways which provide safe access for pedestrians to railway stations.

Regular inspections are undertaken on structures:

- **Bridges and Subways -** General inspection every two years and Principal inspection every five years
- **Seawalls -** Inspection every two years
- **Retaining Walls -** Inspection every five years
- **Special inspections** – as necessary following significant events such as earthquakes or flood.

Additional or more frequent inspections will be done if specific monitoring is identified as necessary.

All inspections are done as part of the annual inspection programme, which is undertaken by the consulting Structural Engineer and are inspected in accordance with the NZTA "Bridge Inspection and Maintenance Manual" and the "Bridge and Other Significant Highway Structures Inspection Policy". An annual report is produced which outlines which structures were inspected, their general condition, remedial work that is required, prioritisation of the repairs, rough order costs, and any additional investigation requirements.

The remaining structures (barriers, guardrails etc.) as part of the general maintenance contract, with minor remedial work prioritised as needed.

There is approximately 5.3 kms of seawalls of various types in the Eastern Bays area to provide protection for the roading network from the frequent wave action, high tides and storms. These seawalls are along a sole connector road between the Eastern Bays and the rest of Lower Hutt, so resilience of that road is vitally important.

A significant portion of the seawalls have been assessed as having a remaining life of less than 5 years, and are to be replaced as part of the Eastern Shared Path project. The rest of the seawalls are in satisfactory condition, with maintenance work only being identified as needed at this time.

There are 162 retaining walls within the network, supporting roads or banks above the roads. These are found predominantly in the hill suburbs and are of varying types ranging from standard reinforced concrete walls to crib block and pole retaining walls.

All the retaining walls are performing satisfactorily, with minor maintenance work only being identified as needed at this time.

There is 18.2 km of fixed median barrier, guardrails and other associated road barriers. There are three main lengths of fixed median barriers:

- Wainuiomata Hill Road - ICB steel barrier on the Lower Hutt side and a concrete barrier on the Wainuiomata side

- Eastern Hutt Road – wire rope barrier

Both of these roads are high speed environments (80kms) with numerous lanes travelling in opposable directions, so additional safety measures to delineate and protect road users is required.

Barriers and guardrails increase safety for road users, cyclists and pedestrians. They provide protection from vehicles that have lost control, and deflect vehicles that have lost control from further impact with other road uses and roadside structures. This can be the difference between a minor non-injury crash and a fatal crash.

Levels of Service Measures

The ONRC customer levels of service relevant to Structures are:

- Accessibility
- Resilience
- Safety
- Travel Time Reliability
- Cost Efficiency

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	ONRC Performance Measure	Description
Accessibility	Customer Outcome 1	Proportion of the network not available to Class 1 and 50MAX vehicles
Resilience	Customer Outcome 1	Number of journeys impacted by unplanned events
Resilience	Customer Outcome 2	Number of instances where road access is lost
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
Safety	Technical Output 1	Permanent Hazards
Travel Time Reliability	Customer Outcome 1	Travel time reliability
Cost Efficiency	Cost Efficiency 5	Overall network cost

Currently there are no targets set by ONRC for each Customer Level of Service and HCC has previously benchmarked its levels against HCC's own targets which are demonstrated below, as well as other measures which show the current condition of the network:

Accessibility

Proportion of the network available to Class 1 and 50MAX vehicles (Customer outcome 1)

A key strategy for HCC is economic growth in Hutt City through freight movement and alternative transport options including public transport.

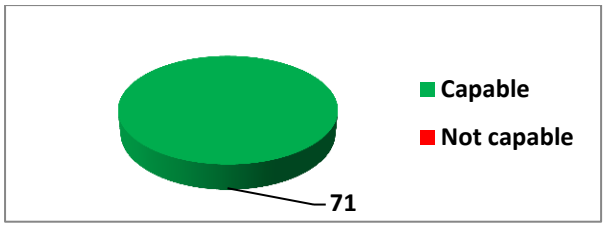
Over the years design loadings for bridges have increased as vehicle sizes and carrying capacity have been increased. Existing bridges were assessed as to their capability to take the increased vehicle sizes.

The capability of these bridges to take the increased vehicle sizes provides greater accessibility for freight and public transport within Hutt City, as well as the wider Wellington region.

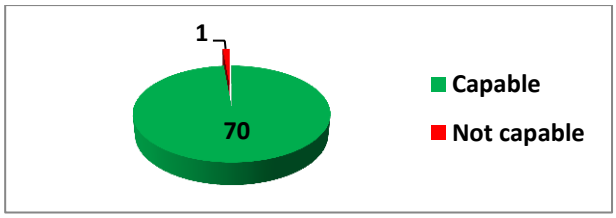
All bridges have been assessed for their capability for Class 1, 50MAX and the new 45/46 vehicles:

- All bridges have been assessed capable of full Class 1 loading
- All bridges have been assessed as 50MAX capable, except for one non-strategic bridge
- All bridges have been assessed as 45/46 tonne vehicle capable, except for one non-strategic bridge

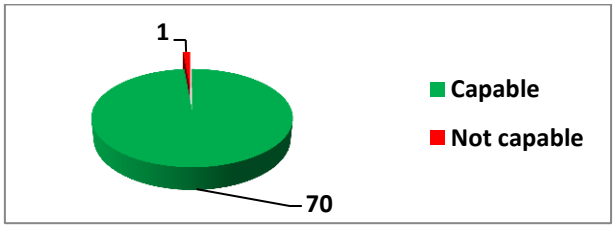
Bridges capable of carrying Class 1 vehicles



Bridges capable of carrying 50MAX vehicles



Bridges capable of carrying 45/46 tonne vehicles



The bridges' capability enables a total of 92% of network to be accessible to Class 1, 50MAX, and 45/46 tonne vehicles. All key destinations such as the Seaview Industrial area, Lower Hutt CBD, Petone CBD and Wainuiomata CBD are accessible, which enables economic growth and alternative transport choices in Hutt City.

Of the 8% of the network that is not available to these vehicles, the restrictions are limited to Secondary Collector, Access and Low Volume Roads, which are in areas that are not considered to impede economic growth or reduce alternative transport options. All Regional, Arterial and Primary Collector roads are accessible to these vehicles.

HPMV accessibility

HCC has assessed 11 key strategic bridges on the network for HPMV capability:

- All 11 key strategic bridges have been assessed as being HPMV capable.

This further enables economic growth by opening the network to service HPMV access to the Seaview Industrial area and other key destinations in Hutt City, from both north and south directions off SH2.

18 tonne Double decker bus accessibility

With the upcoming introduction of the new 18 tonne double decker public transport buses, at the request of Greater Wellington Regional Council, HCC has assessed all bridges on the current bus routes for their capability of carrying these vehicles:

- All bridges on the current bus routes have been assessed as 18 tonne double decker bus capable.

This will provide greater accessibility to the network through further enabling alternative transport choices.

Resilience

Seismic vulnerability

A seismic screening study of all bridges was carried out in 2001 (Refer to Phillips and Wood Report – Seismic Screening of Bridges – Project Report 21 March 2001). From this study a prioritised bridge strengthening programme was developed and implemented, with now only one bridge remaining to be strengthened, which is programmed for 2020/21 - pending the outcome of the Cross Valley Link project.

Corrosion Protection

The three bridges that cross estuaries have all been assessed for durability due to their location, and for visible signs of corrosion to the concrete reinforcement. Corrosion protection work is programmed to be done in 2018/19 for these bridges.

Additional corrosion protection work on railings on another two bridges has been identified to prevent the need for full component replacement in the future. This work has been programmed for 2018/19.

Remaining Life

A remaining life study estimated possible renewal dates for bridges; the figure below shows tentative replacement needs over the next 150 years.

Maximum life (years) remaining at 2017	0 - 10	11 -40	41 - 60	61 - 80	81 - 100	100 +
No. of bridges	3	0	0	4	53	11

Full breakdown of individual bridges and remaining lives can be found in Table 8.27: Bridge, culvert and subway lives and replacement.

Determining the Forward Works Programme

At the completion of the annual inspections, an annual report is produced which outlines any remedial work that is required, prioritisation of the repairs, and rough order costs for this work to be completed.

Prioritisation is based on the assessed timeframe in which the repairs need to be undertaken, with repairs prioritised into the following categories:

- **Urgent** – to be completed immediately
- **High** – to be completed within 6/12 months
- **Medium** – to be completed within 2/3 years
- **Low** – to be completed within 5+ years

Remedial work is categorised into Routine Structural repair, Routine Maintenance repair or Structure Component replacement.

Damage to safety structures such as barriers and guardrails is repaired immediately to maintain the structural integrity to ensure that there is no reduction in safety levels.

Repair works are carried out in accordance with the NZTA Bridge Inspection and Maintenance Manual. The types of maintenance work activity undertaken include:

- Repairing structural defects
- Repairing or replacing damaged components
- Restoring protective coatings
- Clearing waterway obstructions
- Installing scour protection

Routine Maintenance repairs are undertaken as part of the general roading maintenance contract, within the timeframes that were specified during the inspections.

Routine Structural repairs that are prioritised as “Urgent or High” (which now includes previous year’s “Medium or Low”) are grouped together into an annual bridge maintenance contract, which is then tendered out for construction.

Any Structural Replacement work identified has further investigation undertaken, to determine the construction work required and the estimated cost. Economic evaluation is required to determine the financial justification for best cost for whole of life. This is presented to Council as part of the Annual / Long Term planning process to secure budget, with work then programmed into the appropriate financial year, based on the timeframes specified at the time of inspections/investigation.

Investment Level

The current maintenance investment level (Medium) has been determined through:

- Annual structure inspection remedial work schedule provides rough order costs for forward works programme. Programme is prioritised – Urgent, High, Medium and Low, which is based on timeframes of when the work is required to be undertaken.

- Proven history over the years shows that this level of investment adequately covers all reactive remedial work requirements, and with no notable change in the network's structures' condition there is no known need to increase or decrease the current level of investment.

- Reducing the investment level will result in a noticeable deterioration of network condition.

- The change in network condition is negligible if the maintenance investment is increased.

- Affordability to the Council.

	Investment Level Options			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Structure maintenance	Undertake all repairs prioritised as Urgent and High	Undertake all repairs prioritised as Urgent	Undertake all repairs prioritised as Urgent and some High	Undertake all repairs when identified
Barrier component replacement	Undertake all safety replacements immediately and aesthetic replacements are prioritised	Prioritise safety replacements so that only half will be undertaken each year	Prioritise safety replacements so that only ¾ will be undertaken each year	All safety and Aesthetic Replacements are Undertaken immediately
Structure component replacement	Corrosion protection on identified bridge guardrails are undertaken over the next three years	Corrosion protection on only one identified bridge (smaller) guardrails are undertaken over the next three years	Corrosion protection on only one identified bridge (larger) guardrails are undertaken over the next three years	Guardrails are replaced

	Annual Investment Level			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Structure maintenance	$263,000	$40,000	$150,000	$700,000
Barrier component replacement	$190,000	$75,000	$112,500	$250,000
Structure component replacement	$133,000	$50,000	$83,500	$665,500
Totals	**$586,000**	**$175,000**	**$346,000**	**$1,615,500**

Multi-criteria analysis of non-monetary benefits	**Status Quo**	**Low**	**Medium**	**High**
Improves Reliability	0	0	0	1
Improves Accessibility	0	-1	0	0
Improves Availability	0	-1	0	0
Economic growth and productivity	0	-2	-1	0
Safety	0	-2	0	0
Cost efficiency	0	-3	-1	-2
Stakeholder Acceptability	0	-3	-1	-3
Score	**0**	**-12**	**-3**	**-4**
Preferred option	**1**	**4**	**2**	**3**

Investment Option Risks/Consequences

Risks / Consequences of Low Investment

To reduce the budget will reduce the programme, and with the programme primarily made up of remedial work prioritised as either “urgent” or “high”, a reduction in the programme would delay remedial work beyond the Engineer’s recommendation.

The consequences of this will be a risk to whole of life costs, accessibility, safety and resilience:

- Remedial work identified as minor may increase in size or severity if deferred; resulting in unnecessary increased maintenance costs.
- Loss of control crashes could result in more serious injury or fatality from reduced protection from barriers and guardrails.
- Restrictions to overweight vehicles on bridges with reduced load capacity will be put in place, reducing the accessibility to Hutt City and the wider region for both freight and public transport.
- The loss of serviceability of these structures would have a major impact on the roading network through disruption to accessibility for all road users, and high costs for reinstatement work.
- Resilience to natural events such as storms and earthquakes would be reduced, further impacting the accessibility and recovery of the network after such an event.

Risk / consequences of High Investment

To increase the budget will enable all identified remedial work to be undertaken at the time of inspection:

- Upgrading of asset upon failure.
- Excess budgets – more budget than needed to cover the prioritised remedial work.
- Acceleration of remedial repairs before priority recommendation, unaffordable to Council.
- Work done ad hoc without grouping of similar work to gain cost efficiency.

7.2.4 DRAINAGE

Background

The objective of the drainage assets is to provide a stormwater carrying capacity for runoff from the carriageway, footpaths, berms and adjacent properties to an outfall point to:

- Minimise flooding
- Improve safety by removing water from the carriageway and footpaths
- Extend the life of the pavement structure by removing water from under the carriageway
- Provide protection to pedestrians by delineating the carriageway

The drainage asset group includes the following assets:

- Kerb and Channel
- Sumps/cess pits
- Soak pits
- Sump leads to discharge point e.g. manhole or waterway
- Water tables
- Road culverts and headwalls
- Subsoil drains

The network's drainage assets are inspected regularly through the maintenance contract inspections and the annual RAMM Condition Rating Survey inspections for deterioration and identifying necessary remedial repairs.

Regular cyclic street sweeping and sump cleaning is undertaken to remove debris which enables efficient storm water drainage to prevent flooding and water ponding.

Very little kerb and channel constructed prior to 1950 remains in Hutt City. This is reflected in the condition profile, which shows approximately 98% of the network being in moderate condition or better. The stormwater channels in poor or very poor condition are generally in older areas of the City or are in areas where local conditions mean the life expectancy is less than normal.

Levels of Service Measures

The ONRC customer levels of service relevant to Drainage are:

- Resilience
- Safety
- Cost Efficiency

The performance measures relevant to each of these ONRC customer levels of service are:

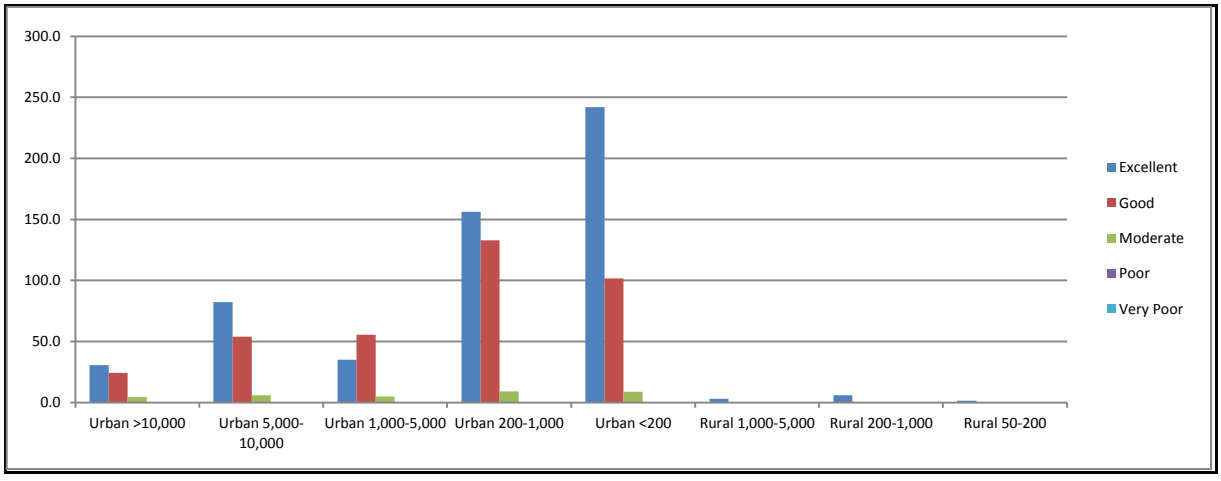
ONRC Customer Level of Service	ONRC Performance Measure	Description
Resilience	Customer Outcome 1	Number of journeys impacted by unplanned events
Resilience	Customer Outcome 2	Number of instances where road access is lost
Safety	Technical Output 4	Loss of control on wet roads
Safety	Technical Output 7	Hazardous faults
Cost Efficiency	Cost Efficiency 5	Overall network cost

Currently there are no targets set by ONRC for each Customer Level of Service and HCC has previously benchmarked its levels against HCC's own targets which are demonstrated below, as well as other measures which show the current condition of the network:

Asset Condition

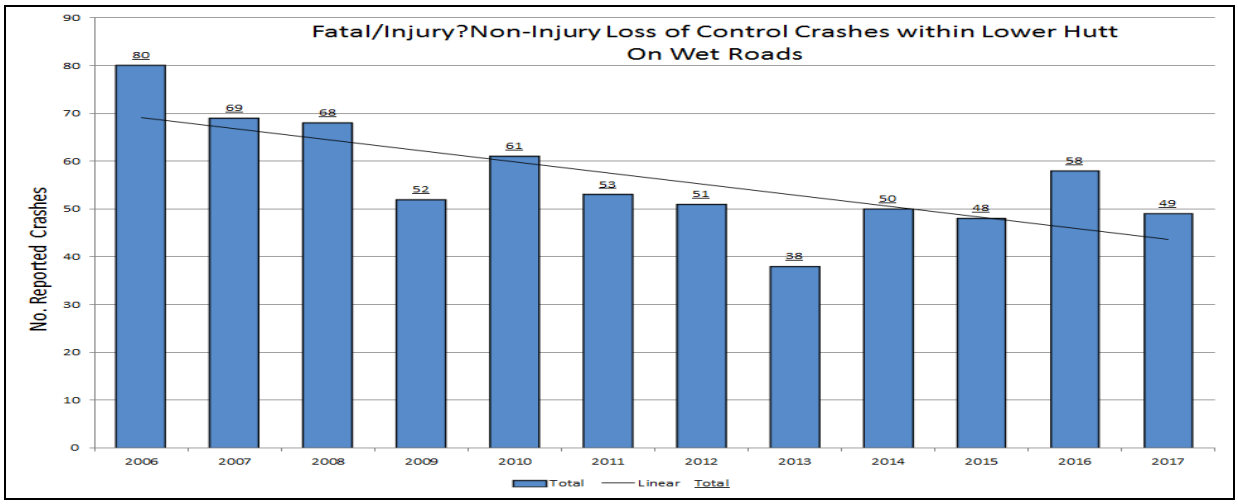
The condition ratings shown below have been determined from information collected as part of the annual RAMM Condition Rating Survey. There are approximately ten types of surface water channel in service and since deterioration affects all types in fundamentally the same way, the same asset condition table has been used to describe all types.

This shows that approximately 98% of the network's surface water channels are in moderate condition or better:



Safety

Loss of control crashes on wet roads can be in part attributable to inadequate drainage measures. The graph below shows the 10 year history of these crashes in Hutt City:



The trend over the past ten years shows a favourable downward trend overall, but with a slight increase over the past three years.

Determining the Forward Works Programme

The network's drainage assets are inspected regularly for deterioration and necessary remedial repairs, through the maintenance contract inspections and the annual RAMM Condition Rating Survey inspections.

Smaller discrete sections of damage are repaired through the general maintenance contract. This is typically damage caused by heavy vehicles or tree roots disturbing the kerb and channel. Repairs are undertaken immediately where there is an issue of public safety.

Planned maintenance which includes replacing short sections of kerb to re-establish grade (any change in channel grade is likely to cause ponding because of the city's flat topography) are prioritised based on the following considerations:

- Public safety
- Flood nuisance
- Significant further deterioration is likely
- Future costs if the work is not done
- Visual impact of defect

Street sweeping is undertaken to remove debris from the channels and sump grates to allow for free flow of storm water to the sumps to prevent flooding and water ponding. All urban streets are swept with the following frequency:

- All urban streets - every 2 months
- High priority streets - every month
- Problem streets – fortnightly
- CBD's - daily
- Reactive sweeping – as required if a problem is identified (loose metal, excessive debris or rubbish)

High/Problem streets are those that have been identified and listed on a schedule as street requiring more frequent sweeping due to factors such as higher levels of vegetation/leaves in the area which block sumps.

Regular sump cleaning is undertaken to ensure that sump capacity is kept at the optimal level to prevent flooding and water ponding. The cleaning frequency is as follows:

- All sumps – twice a year

- High priority sumps – monthly
- Reactive – as required if a problem is identified (blocked sump)

Drainage assets rated as being in poor and very poor condition are targeted for renewal through Council's road reconstruction programme. Very few streets remain that warrant full scale reconstruction, and at this time provision is currently made for one full scale road reconstruction (typically 500m) every year. The current budget provision allows for approximately 1km of kerb and channel renewal per year.

Streets have been identified for inclusion on the programme through the annual RAMM Condition Rating surveys and additional targeted inspections, rating the condition/faults of following components of each street:

- Kerb and channel
- Footpath
- Motor crossings
- Carriageway

Of the programme, only the drainage components are eligible for NZTA subsidy.

The table below outlines the forward works programme for Road Reconstruction projects:

ROAD/FOOTPATH RECONSTRUCTION PROGRAMME - General Assessment of Priority Streets

Street	Section	Kerb and Channel			Footpath		Motorcrossings		Carriageway		Rank
		Condition	Ponding	Affect on Pavement	Appear-ance	Suface Condition	Plate/ Slot	Dish Condition	Shape	Surface Defects	
Jackson Street (Sth Side Only)	Oriental- Patrick	• • • •	• • •	• •	• •	• •	• • •	/	•	/	1
Adelaide Street	Tory - Bolton	• • • •	• • •	• •	• •	• • •	• • •	/	• • •	• • •	2
Stellin Street	Charleston to end	• • • •	• • •	• •	•	• •	• •	/	/	/	3
Hart Avenue	All	• • • •	• • •	• •	•	•	/	/	/	/	4
St James Ave	All	• • • •	• • •	• •	/	/	• •	/	• •	/	5
Charleston Ave	All	• • • •	• •	•	/	/	• •	•	/	• •	6
Thornycroft Ave	All	• • •	• •	•	• •	• •	• •	/	/	/	7

Symbols

/	Not Defective
•	Fair
• •	Poor
• • •	Very Poor
• • • •	Extremely Poor

Investment Level

The current maintenance investment level has been determined through:

- Proven history over the years has shown that this level of investment adequately covers all reactive remedial work requirements, and with no notable change in the network's drainage condition there is no known need to increase or decrease the current level of investment.
- Contract rates for routine maintenance requirements such as street sweeping and sump cleaning.
- Forward works programme for Road Reconstruction projects.
- Reducing the budget below this level will result in a noticeable deterioration of network condition.
- The change in network condition, treatment cost and quantities is negligible if the budget is increased above this level.
- Affordability to the Council.

	Investment Level Options			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Street Sweeping	All urban streets every 2 months	All urban streets every 6 months	All urban streets every 4 months	All urban streets every 1 month
Sump Cleaning	All sumps cleaned twice a year	Alternative sumps cleaned once a year	All sumps cleaned once a year	All sumps cleaned Three times a year
Routine Maintenance	Repair/replacement broken assets as required	Extensively delay repair/replacement	Medium delays to repair/replacement	Repair/replacement immediately
Road Reconstruction Project	One full street per Year (500m length)	One full street every third year	One full street every second year	Two full streets a year

	Annual Investment Level			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Street Sweeping	$196,500	$84,000	$133,500	$300,000
Sump Cleaning	$37,800	$13,350	$30,000	$56,500
Routine Maintenance	$345,000	$233,500	$300,000	$460,000
Road Reconstruction Project	$136,000	$45,500	$68,000	$272,000
Totals	**$715,300**	**$376,350**	**$531,500**	**$1,088,500**

Multi-criteria analysis of non-monetary benefits	**Status Quo**	**Low**	**Medium**	**High**
Improves Reliability	0	-1	0	0
Improves Accessibility	0	-1	0	0
Improves Availability	0	-1	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-3	-1	0
Cost efficiency	0	-3	-1	-2
Stakeholder Acceptability	0	-3	-1	-2
Score	**0**	**-12**	**-3**	**-4**
Preferred option	**1**	**4**	**2**	**3**

Investment Option Risks/Consequences

Risks / Consequences of Low Investment

To reduce the budgets will reduce the programme, and with the programme primarily made up of remedial work prioritised as either “urgent” or “high”, a reduction in the programme would delay remedial work beyond the Engineer’s recommendation.

The consequences of this will be a risk to whole of life costs, accessibility, safety and resilience:

- Remedial work identified as minor may increase in size or severity if deferred; resulting in unnecessary increased maintenance costs.

- Resilience to natural events such as storms and flooding would be reduced, further impacting the accessibility and recovery of the network after such an event.

- Deferred remedial work will allow water to penetrate the carriageway pavement as well as water not being adequately removed from underneath. This will weaken and reduce the life of the pavement and unnecessarily increase costs through the need for more pavement rehabilitations.

- Safety will be affected for road users if water ponding issues on the carriageway are not addressed immediately. Situations such as aquaplaning can occur through water not being able to freely flow away from the carriageway.

Risk / consequences of High Investment

To increase the budget will enable all remedial work to be undertaken at the time of identification:

- Upgrading of asset upon failure.

- Excess budgets – more budget than needed to cover the prioritised remedial work.

- Acceleration of remedial repairs, unaffordable to Council.

- Work done ad-hoc without grouping of similar work to gain cost efficiency.

7.2.5 SEALED PAVEMENT MAINTENANCE

Background

Pavement maintenance is undertaken to provide timely intervention on the road's surface and pavements to provide safety and amenity value to road users and cyclists, and cost efficiency by addressing small failures before more extensive intervention is required.

Levels of Service Measures

The ONRC customer levels of service relevant to Structures are:

- Safety
- Amenity
- Cost Efficiency

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	ONRC Performance Measure	Description
Safety	Customer Outcome 1	Number of fatal and serious injuries on the network
Safety	Technical Output 7	Hazardous faults
Amenity	Customer Outcome 1	Smooth Travel Exposure
Amenity	Customer Outcome 2	Peak roughness
Amenity	Technical Output 1	Roughness of the road
Cost Efficiency	Cost Efficiency 5	Overall network cost

Determining the Forward Works Programme

Pavement maintenance work falls into two categories:

- Reactive maintenance – includes potholes, small pavement failures, small surface failures, service covers adjustments

- Routine maintenance – preseal repairs in advance of annual reseals

Work is determined through visual inspections of the network. The Maintenance Contractor undertakes regular inspections of the network:

- Regional/Arterial Monthly
- Primary Collector 3 Monthly
- Secondary Collector/Access/LV 6 Monthly
- All roads After any civil emergency or natural event

HCC Contracts Division undertakes audits of above inspections to ensure all faults are being identified.
Identified work is prioritised into the following categories:

- **Urgent** – to be completed immediately
- **High** – to be completed within 1 month
- **Medium** – to be completed within 3 months
- **Low** – to be completed within 6 months

Forward works programmes are submitted to HCC for approval and programmed accordingly.

Preseal repairs are identified through the site validations of the annual resealing programme, with work programmed to be completed six months in advance of the resealing, to enable the asphalt repairs to cure before resealing, which will avoid future bleeding issues of the chipseal.

Treatment Selection

The following maintenance repairs are undertaken:

Potholes	Small localised surface failures
Dig Outs	Failure is evident beyond the top surfacing or top 150mm of base layer
Surface Repairs	Failure is larger than a pothole and is not attributable to pavement base, sub-base or sub-grade weaknesses or failure.
Surface levelling	Areas of surface that is uneven due to localised settlement, wheel track rutting, sunken trenches and other depressions.

Investment Level

The current maintenance investment level (Status Quo) has been determined through:

- Proven history over the years shows that this level of investment adequately covers all reactive remedial work and preseal repairs required, and with no notable change in the network's condition there is no known need to increase or decrease the current level of investment.
- Reducing the investment level will result in a noticeable deterioration of network condition.
- Reducing the investment level will result in a need for an increased investment level of Resurfacing and Pavement Rehabilitation budgets, significantly reducing the overall network's cost efficiency.
- Safety is not comprised.
- Road accessibility is maintained.
- Affordability to the Council.
- Whole of life and value for money are sustained.

	Investment Level Options			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Dig Outs	All prioritised dig outs are undertaken	Only urgent and high prioritised dig outs are undertaken	Only urgent, high and medium prioritised dig outs are undertaken	All identified dig outs are undertaken
Pothole / Surface Repairs	All prioritised surface and pothole repairs are undertaken	Only urgent surface and pothole repairs undertaken. Safety compromised.	Only urgent and safety compromised surface and pothole repairs undertaken.	All repairs undertaken
Service cover adjustment	All service covers identified as causing nuisance or hazard in the driving lanes/cycle path are raised/lowered	Only service covers identified as causing a hazard are raised/lowered	Service covers identified as causing a hazard, and some causing a nuisance are raised/lowered	All service covers identified as causing nuisance or hazard are raised/lowered, regardless of their location on the carriageway
High Friction Surfacing Mtce	HFS repaired/ replaced as necessary to maintain desired safety levels	Half of required HFS repaired each year. Significant reduction in safety levels.	2/3 of required HFS repaired each year. Reduction safety levels.	Full lengths of HFS replaced rather than sections being repaired/replaced. No increase in safety levels
General /Misc Mtce	Most identified non-routine repairs are undertaken in a timely fashion	Only urgent non-routine repairs are undertaken. Safety compromised	Some non-routine repairs undertaken. Safety likely to be compromised.	All identified non-routine repairs undertaken

	Annual Investment Level Options			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Dig Outs	$170,000	$85,000	$113,500	$255,000
Pothole / Surface Repairs	$293,800	$146,900	$195,800	$440,700
Service cover adjustment	$50,000	$25,000	$33,500	$75,000
High Friction Surfacing Mtce	$150,000	$75,000	$100,000	$225,000
General /Misc Mtce	$189,000	$94,500	$126,000	$283,500
Total	**$852,800**	**$426,400**	**$568,800**	**$1,279,200**

Multi-criteria analysis of non-monetary benefits	**Status Quo**	**Low**	**Medium**	**High**
Improves Reliability	0	-1	0	0
Improves Accessibility	0	-1	0	0
Improves Availability	0	-1	0	0
Economic growth and productivity	0	-2	-1	0
Safety	0	-3	-1	0
Cost efficiency	0	-3	-1	-2
Stakeholder Acceptability	0	-2	-1	-2
Score	**0**	**-13**	**-4**	**-4**
Preferred option	**1**	**4**	**2=**	**2=**

Investment Option Risks/Consequences

Risks / Consequences of Low Investment

To reduce the budget will reduce the programme, and with the programme primarily made up of remedial work prioritised as either "urgent" or "high", a reduction in the programme would delay remedial work beyond the Engineer's recommendation.

The consequences of this will be a risk to whole of life costs, accessibility, safety and resilience:

- A larger backlog of necessary maintenance work will be created. There is already a backlog of this work.
- Remedial work identified as minor may increase in size or severity if deferred; resulting in unnecessary increased maintenance costs, or the need for full pavement rehabilitation or full resurfacing.
- With the increase in both heavy vehicle weights and frequency of travel, the surface and pavements will deteriorate sooner than without the heavy traffic. Restrictions to the use of overweight vehicles on the network will be one option to mitigate the damage caused. This would reduce the accessibility to Hutt City and the wider region for both freight and public transport, and impede economic growth.
- There will be less travel time reliability, through increased maintenance activity causing traffic disruptions.
- The network's resilience will be reduced, with wet weather events causing higher level of damage to the road. This will require more frequent and extensive maintenance intervention, or full pavement rehabilitations earlier than necessary.
- An increase in Loss of control crashes from reduced skid resistance on the high friction surfacing.
- Safety is comprised through hazardous faults on the road such as pot holes and surface deformations.
- Without sufficient budget to provide maintenance intervention, there will be a decrease in amenity value for road users through increased roughness and vehicle maintenance costs from potholes, failures and shape deformation. Customer satisfaction levels will decrease.
- The overall condition of the network will deteriorate to an unacceptable level of service for both Council and the ratepayers.

Risk / consequences of High Investment

To increase the budget will enable all identified remedial work to be undertaken at the time of inspection:

- Upgrading of asset upon failure.
- Excess budgets – more budget than needed to cover the prioritised remedial work.
- Acceleration of remedial repairs before priority recommendation, unaffordable to Council.
- Work done ad-hoc without grouping of similar work to gain cost efficiency.

7.2.6 ENVIRONMENTAL MAINTENANCE

Background

Environmental maintenance is undertaken on repairs/clean up from of storm damage, slip repairs, road reserve mowing, vegetation control and tree removal, and providing an after-hours service for urgent/emergency work.

Levels of Service Measures

The ONRC customer levels of service relevant to Structures are:

- Safety
- Resilience
- Cost Efficiency

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	ONRC Performance Measure	Description
Safety	Technical output 3	Sight distances
Safety	Technical Output 7	Hazardous faults
Resilience	Customer Outcome 1	Number of journeys impacted by unplanned events
Resilience	Customer Outcome 2	Number of instances where road access is lost
Cost Efficiency	Cost Efficiency 5	Overall network cost

Determining the Forward Works Programme

Environmental maintenance work falls into two categories:

- Reactive maintenance – storm damage clean up/repairs, slip repairs and after hours services
- Routine maintenance – road reserve grass mowing, vegetation control, dangerous tree removal, weed spraying road graffiti removal

Approximately 1/3 of this budget is allocated to reactive work of storm and slip clean up and repairs, as well as the after-hours component.

Because of the unpredictability of the natural occurrences (i.e. storms and weather patterns), this is a very reactive activity. Great importance placed on the availability of Contractors after-hours to clean up/repair damage to ensure that there it is as little as possible disruption to the road users, and any dangerous situation is addressed immediately to ensure continual safety.

Also as a result of this unpredictability it is always an unknown as to what the required level of funding will be each year. HCC has had to utilise the additional funding source from NZTA from the Emergency Works fund

numerous times over the last 10 years to help with the unexpected costs of significant storm clean up. This is further discussed in section 8.2.6 (c).

The other significant component of this activity is the routine maintenance of road reserve grass mowing, vegetation control, dangerous tree removal, weed spraying, and road graffiti removal.

Consideration needs to be given to the increasing weather pattern changes which have impacted greatly on vegetation control and road reserve mowing. This has forced changes in the way we approach this area of maintenance, as the 30% increased rainfall in the last 6 years has seen increased grass growth.

Road Reserve grass mowing is undertaken as follows:

- Large areas that require specialised bomford mower operations is carried out once a year, typically after spring growth.

- Routine road reserve mowing is performance based and has proven difficult due to erratic weather patterns. As a result the following options were introduced to mitigate this difficulty:

  - Agreement with contractor to decrease scope of bomford mowing from 3 to 2 sweep widths in some areas with a few to revisit higher profile areas such as Wainuiomata Hill a second time if required.

  - Relax performance levels of road reserve mowing in reasonable conditions.

  - A far greater collaborative approach with our partners in respect to pro-activeness in the event of incoming storm weather patterns. This involves a combined effort with Wellington Water and its Contractors along with HCC's Contractors to address all identified critical areas for immediate maintenance before heavy rainfall.

Weed spraying is undertaken as follows:

The contract is performance based. The contractor follows a schedule but sprays as and when required to meet the performance specification.

Vegetation control is undertaken as follows:

The contract is performance based. Bomford mowing sites are cut at least annually. Other vegetation control is undertaken as and when required.

Road graffiti removal is undertaken as follows:

The contract is performance based. The contractor removes graffiti in the road reserve within 24 hours of notification.

Investment Level

The current maintenance investment level (Status Quo) has been determined through:

- Proven history over the years shows that this level of investment adequately covers all routine maintenance work, and with no notable change in the network's condition there is no known need to increase or decrease the current level of investment.

- Reactive clean up/repair work is unpredictable, and when required and if eligible, additional funding is sought from NZTA's Emergency Works fund.

- Reducing the investment level will result in a noticeable deterioration of network condition.
- Safety is not comprised.
- Road accessibility is maintained.
- Affordability to the Council.

	Investment Level Options			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Storm / slip clean up and repair	Most issues are prioritised and attended to immediately to ensure safety and access.	Some clearances made but safety and access would be severely compromised.	Only urgent clearances would be attended to immediately.	All slip and clearances attended to immediately.
Grass mowing	All road reserve mowing is kept within performance specifications.	Grass would be unkempt for long periods of time leading to customer dissatisfaction.	Prioritised areas would be kept within performance specifications.	All areas would be kept to the highest performance standard.
Vegetation control	Vegetation controlled to eliminate visual and safety concerns.	Vegetation uncontrolled leading to fire, safety and sightline issues	Prioritised areas would be controlled to meet standards.	All vegetation controlled.
Weed spraying	Most noxious weeds under control	Noxious weeds would be uncontrolled	Prioritised areas would have noxious weeds controlled	Full control of all noxious weeds in road reserve
Graffiti removal	Most graffiti removed in a timely fashion	Loss of graffiti control resulting in increased graffiti events	Prioritised areas would have graffiti removed in a timely fashion	All graffiti removed in a timely fashion

	Annual Investment Level Options			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Storm / slip clean up and repair	$386,000	$193,000	$254,760	$579,000
Grass mowing	$73,700	$36,850	$48,640	$110,550
Vegetation control	$216,500	$108,250	$142,890	$324,750
Weed spraying	$138,000	$69,000	$91,080	$207,000
Graffiti removal	$32,000	$16,000	$21,120	$48,000
Total	**$846,200**	**$423,100**	**$566,950**	**$1,269,300**

Multi-criteria analysis of non-monetary benefits	Status Quo	Low	Medium	High
Improves Reliability	0	-1	0	0
Improves Accessibility	0	-2	-1	1
Improves Availability	0	-1	0	0
Economic growth and productivity	0	-2	0	0
Safety	0	-2	-1	0
Cost efficiency	0	-1	0	-2
Stakeholder Acceptability	0	-2	-1	-3
Score	**0**	**-11**	**-3**	**-4**
Preferred option	**1**	**4**	**2**	**3**

Investment Option Risks/Consequences

Risks / Consequences of Low Investment

Reducing the budget will reduce the maintenance programme made up of identified and urgent works.

The consequences of this investment level will be an increased risk to safety, amenity and accessibility.

- Fire hazard increased with more grass vegetation.
- Sightlines compromised with more vegetation growth.
- Dangerous or at risk trees remain in situ increasing the risk of falling on the road reserve.
- Public resentment from a reduction in service level.
- Safety and accessibility compromised by slower slip and storm damage remedial action.

Risk / consequences of High Investment

Increasing the budget would ensure most environmental issues could be addressed.

- Most weather events attended to immediately.
- Safety and accessibility ensured.
- Additional spend not aligned with incremental benefit. Poor value.
- Unaffordable to Council.
- Lost opportunity to group lower priority work and achieve cost efficiency.

7.3 TRAFFIC SERVICES

Background

Hutt City's Traffic Assets form part of the roading system that enables the safe and efficient movement of people and goods around the Hutt Valley.

When considering investment decisions for the city's traffic assets, the most important concept is that the customer is at the heart of every investment decision. This concept is achieved through the implementation of the NZTA's One Network Roading Classification system.

The customer levels of service that we seek to maintain are:

- Mobility (travel time reliability and resilience);
- Safety;
- Amenity (travel quality and aesthetics); and
- Accessibility (land access and road network connectivity).

The performance measures used to measure and compare our efficiency and effectiveness against the customer levels of service are:

- Customer Outcome;
- Technical Output; and
- Cost Efficiency.

The Traffic Assets which form part this part of the system include:

- Traffic signals;
- Traffic monitoring cameras
- Level crossing warning devices
- Traffic counters;
- On and off road carparks, mobility car parks and pay and display meters;
- Road signs: Directional signs, street name blades, regulatory, advisory and parking signs;
- Road markings and delineation devices
- Active electronic signs and variable message signs;
- Streetlight columns and streetlights;
- Utility pole mounted streetlights;
- Pedestrian crossings and associated beacons and floodlights;
- Off road lighting for public areas such as car parks and alleyways.
- Cycle paths and shared paths;
- Safety barriers, bollards and sight rails;
- Other miscellaneous street furniture;
- Local area traffic management devices including speed calming and channelization islands and pedestrian refuge islands;
- School speed zone signs.

In addition, a number of safety and travel demand management strategies are implemented to ensure the customers safety and mobility levels of service are maintained.

A number of Low Cost – Low Risk projects are undertaken each year to enhance the customer levels of service. These projects include intersection controls (such as roundabouts and traffic signals), minor safety improvements, local area traffic management and cycleway projects. The majority of these projects are identified and prioritised by our Safety Deficiency Database, however the cycleway projects are identified through more comprehensive strategic links to Government policy and Regional and Council strategic plans.
Hutt City has experienced relatively significant growth in development, traffic, congestion and parking demand over the previous five years. The November 2011 Kaikoura earthquake resulted in a rapid and significant displacement of workers from the Wellington CBD to the Petone and Lower Hutt CBD. There was a sudden increase in parking demand and traffic congestion in areas such as The Esplanade, Jackson Street and

accompanying areas. This coincides with the development of big box retail in the western Petone precinct and adds to the traffic from the existing commercial and industrial areas around Seaview and eastern Hutt.

Hutt City's maintenance and development of these traffic assets is set against this background of growth and the need to plan ahead to ensure our future management strategy provides the best outcomes for our customers.

Objectives of the Programme

Objective 1: Manage levels of service for all road users to support amenity, economic growth and accessibility.

Objective 2: Provide a safe transport system guided by the Safer Journeys Strategy 2010 - 2020;

Objective 3: Provide high quality, resilient connections;

Objective 4: Provide value for money for our Traffic Asset investment.

Strategic Alignment

Relevant Government, regional, organisational policies, strategies and goals are that influence this programme of works, are shown below:

Links to Strategies and Goals Policy or Strategy	Goal
Government Policy Statement/Investment Assessment Framework	• Economic growth and productivity • Value for money – provide the right infrastructure, to the right level at the best cost • Road Safety
Regional Land Transport Plan	• An effective network for the movement of freight • A safer system for all users of our regional transport network • An increasingly resilient transport network • A well planned, connected and integrated transport network • An attractive and safe walking and cycling network • An efficient and optimised transport system that minimises the impact on the environment
National Land Transport Programme	• Economic growth • Safety • Value for money
Hutt City Council Infrastructure Strategy	• Protect people, property and the environment; • Contribute to creating liveable communities that allow for a wide range of activities to take place; • Ensure infrastructure is resilient for the long term and adaptable to changing circumstances.
ONRC Customer Levels of Service	• Mobility (travel time reliability and resilience); • Safety; • Amenity (travel quality and aesthetics); and • Accessibility (land access and road network connectivity).

NZTA Investment

Hutt City Council undertakes this programme with financial assistance from the NZTA. This assistance for the 2018–21 NLTP is set at 51% of the total eligible programme. The NZTA work categories that this assistance funded from are:

Work Category	Name	Description of Traffic Assets and Services Provided
122	Traffic Services Maintenance	Streetlight electricity, operation and maintenance. Pedestrian crossing lighting electricity and maintenance.
123	Operational Traffic	Traffic signal equipment maintenance and electricity.
151	Network and asset management	Streetlight network maintenance, traffic counting, school travel plans, cycle behaviour change, in house professional services.
222	Traffic services renewals	Advance directional signage, traffic marking maintenance, traffic signals replacement, streetname signs, streetlight lantern replacement, streetlight standard replacement, engineering services.
341	Low cost, low risk roading improvements	Minor safety projects, traffic safety minor projects, school speed zone signage, pedestrian crossing upgrades, local area traffic management, cycleway network improvements.
432	Road Safety Promotion, education and advertising	Road safety programmes.

7.3.1 WORK CATEGORY 122 TRAFFIC SERVICES MAINTENANCE

The ONRC customer levels of service relevant to Traffic Services Maintenance are:

- Safety; and
- Amenity (travel quality and aesthetics).

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Customer Outcome 2	Collective Risk
	Customer Outcome 3	Personal risk
	Technical Output 5	Loss of driver control at night
	Technical Output 6	Intersections
Amenity	Technical Output 2	Aesthetic faults

Investment Level

The current Traffic Services Maintenance programme investment level has been developed over many years and is based on:

- Actual electricity costs;
- Historic records of damaged equipment (such as number of signs and light poles damaged by vehicles per year);
- Deterioration rates for existing road markings;

- Historic maintenance records for pedestrian crossing equipment, which keeps 100% of our pedestrian lighting operating.

Options

Investment level options have been considered to ensure that our proposed programme represents the best balance of value for money and customer level of service.

	Investment Level Options – WC122			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Street Signs Maintenance	Repair and upgrade on fail. Annual CBD signs audit. Main route audit every 3 years. Upgrade Schools 3 sets/ year.	Repair and upgrade on fail only.	Repair and upgrade on fail. 2 yearly CBD signs audit. Main route audit every 5 years. Upgrade Schools 3 sets/ year.	Repair and upgrade on fail. Annual CBD signs audit. Annual main route audit. Upgrade Schools 6 sets/ year.
Road Markings Maintenance	Cyclic maintenance. Primary Collector + annually – Secondary Collector – 2 yearly	Cyclic maintenance. Primary Collector 2 yearly – Secondary Collector – 3 yearly	Cyclic maintenance. Primary Collector 2 yearly – Secondary Collector – 2 yearly	Cyclic maintenance. All roads annually
Streetlight electricity	Cover known historic energy costs	Shortfall in energy funding	Cover known historic energy costs	Cover known historic energy costs
Damaged services repair	Cover typical damage costs based historic data	Replace 50% of damaged equipment	Replace 75% of damaged equipment	Upgrade damaged equipment when repairing
Streetlight Network maintenance	Replace old lanterns With LED when Repairing.	Delay replacement of failed lanterns.	Replace old lanterns With like for like on failure.	Replace lanterns with LED before failure.
Bad debts	Historic bad debts covered.	Bad debts covered out of other budgets	Bad debts covered out of other budgets	Cover for higher than expected bad debts
Pedestrian crossing electricity	Cover known historic energy costs	Shortfall in energy funding	Cover known historic energy costs	Cover known historic energy costs
Pedestrian crossing equipment maintenance	Maintain 100% operational	Maintain 60% operational	Maintain 80% operational	Maintain 100% operational and upgrades

	Annual Investment Level – WC122			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Street Signs Maintenance	$314,000	$250,000	$300,000	$350,000
Road Markings Maintenance	$301,000	$200,000	$250,000	$600,000
Streetlight electricity	$1,600,000	$1,500,000	$1,600,000	$1,600,000
Damaged services repair	$100,000	$50,000	$75,000	$120,000
Streetlight Network Mtce	$600,000	$500,000	$550,000	$700,000
Bad debts	$5,000	$0	$2,500	$10,000
Pedestrian crossing electricity	$62,000	$50,000	$55,000	$70,000
Pedestrian crossing equipment maintenance	$30,000	$20,000	$25,000	$40,000
Totals	$3,012,000	$2,595,000	$2,857,500	$3,490,000

Multi-criteria analysis of non-monetary benefits				
	Status Quo	**Low**	**Medium**	**High**
Improves Reliability	0	-1	-1	1
Improves Access	0	0	0	0
Improves Availability	0	0	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-1	-1	0
Value for Money	0	0	0	-1
Feasibility	0	0	0	0
Stakeholder Acceptability	0	-1	-1	-1
Score	**0**	**-3**	**-3**	**-1**
Preferred option	**1**	**3=**	**3=**	**2**

Investment Option Risks/Consequences

Risk/ consequences of Very Low and Low Investment

- Insufficient funds to pay electricity bills – penalty fees incurred, brownouts;
- Damaged assets left unrepaired – safety issues, crime issues, unacceptable to customers;
- Faded road markings compromise safety and way finding;
- Poor condition road signs compromise safety and way finding;
- No upgrading to higher performance equipment;
- Insufficient maintenance funds – higher streetlight lantern outage, crime issues, safety issues.

Risk/ consequences of High Investment

- Excess budgets – more budget than needed to cover energy costs;
- Upgrading of assets upon failure;
- Acceleration of lantern replacement (LED replacement), unaffordable to council.

The recommended budget scenario (Status Quo) is the investment level that satisfies the following criteria:

- Covers predicted energy costs;
- Is affordable to Council;
- Allows all damaged assets to be replaced in a timely manner;
- Allows signs and markings to be maintained to an acceptable level of service;
- Provides a balance of financial cost against collective and personal risk;
- The return on investment over the recommended level is subject to diminishing returns.

7.3.2 WORK CATEGORY 123 OPERATIONAL TRAFFIC

This category includes traffic signals energy costs and the maintenance of existing traffic signals.

The ONRC customer levels of service relevant to Operational Traffic are:

- Safety; and
- Travel Time Reliability.

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Customer Outcome 2	Collective Risk
	Customer Outcome 3	Personal risk
	Technical Output 6	Intersections
Travel Time Reliability	Customer Outcome 1	Throughput at indicator sites

Investment Level

The current Operational Traffic programme investment level has been developed over many years and is based on:

- Actual electricity costs;
- Known failure rates and life span for traffic signal assets including above and below ground assets.

Options

Investment level options have been considered to ensure that our proposed programme represents the best balance of value for money and customer level of service.

	Investment Level Options – WC123			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Traffic Signal electricity	Cover known historic energy costs	Shortfall in energy funding	Cover known historic energy costs	Cover known historic energy costs
Traffic signal equipment maintenance	Cover historic maintenance costs and replace most components just prior to failure	Replace components on failure	Replace components on failure	Cover historic maintenance costs and upgrade components prior to failure.

	Annual Investment Level – WC123			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Traffic signal electricity	$23,000	$20,000	$23,000	$23,000
Traffic signal equipment maintenance	$100,000	$50,000	$75,000	$120,000
Totals	$123,000	$70,000	$98,000	$143,000

Multi-criteria analysis of non-monetary benefits				
	Status Quo	**Low**	**Medium**	**High**
Improves Reliability	0	-1	-1	1
Improves Access	0	0	0	0
Improves Availability	0	0	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-1	-1	1
Value for Money	0	0	0	-1
Feasibility	0	0	0	0
Stakeholder Acceptability	0	-2	-1	-1
Score	**0**	**-4**	**-3**	**-1**
Preferred option	**1**	**4**	**3**	**2**

Investment Option Risks/Consequences

Risk/ consequences of Very Low and Low Investment

- Insufficient funds to pay electricity bills – penalty fees incurred, brownouts;
- Safety risks from more frequent traffic signal outages;
- Travel time reliability reduced by more frequent traffic signal outages.

Risk/ consequences of High Investment

- Excess budgets – more budget than needed to cover energy costs;
- Upgrading of assets prior to failure – improved reliability and less signal outages;
- Additional upgrade costs unaffordable to council.

The recommended budget scenario (Status Quo) is the investment level that satisfies the following criteria:

- Covers predicted energy costs;
- Is affordable to Council;
- Allows signal assets to be replaced just prior to failure;
- Minimises signal outages;
- Provides a balance of financial cost against collective and personal risk;
- The return on investment over the recommended level is subject to diminishing returns.

7.3.3 WORK CATEGORY 151 NETWORK AND ASSET MANAGEMENT

This work category includes professional services for asset management, traffic counting and the preparation of school travel plans (to maximise the efficiency of the road network).

The ONRC customer levels of service relevant to this work category are:

- Safety; and
- Mobility (travel time reliability).

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Customer Outcome 2	Collective Risk
	Customer Outcome 3	Personal risk
	Technical Output 9	Vulnerable users
Travel Time Reliability	Customer Outcome 1	Throughput at indicator sites

Investment Level

The current Network and Asset Management programme investment level has been developed over many years and is based on:

- A traffic counting programme that allows counting of Primary Collector, Arterial and Regional Roads every 2 to 3 years and Secondary and Access Roads every 5 to 10 years;
- Preparation of school travel plans for two to three schools per annum;
- Minimum historic costs for asset management professional services (predominantly street lighting design and advice).

Options

Investment level options have been considered to ensure that our proposed programme represents the best balance of value for money and customer level of service.

	Investment Level Options – WC151			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Network Maintenance Professional Services (street lighting)	Asset management Advice and design As required	Most services Undertaken In house	More services Undertaken In house	More extensive external advice and design
Traffic counting	Arterial counts every 2-3 years. Secondary counts Every 5 – 10 years	Arterial counts every 5 - 10 years. Secondary counts Every 10 years	Arterial counts every 3-5 years. Secondary counts Every 5 – 10 years	Arterial counts every 2-3 years. Secondary counts Every 2 – 3 years
School Travel Plans	2-3 schools per year	No school travel plans	1-2 schools per year	4-5 schools per years and more regular updates and liaison
Cycle behaviour change	Cycle skills training for 25 schools. Bike fix ups. Provide loan bikes to needy children.	Cycle skills training for 25 schools. No bike fix ups or loan bikes to needy children.	Cycle skills training for 25 schools. Bike fix ups. No loan bikes to needy children.	Cycle skills training for 25 schools. More bike fix ups and loan bikes. More community involvement grants.

	Investment Level Options – WC151			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Contract administration fees, SCRIM RAMM, dTIMS, Bridge, retaining wa and sea wall inspections	Periodic updating of RAMM data. Bridges inspected every two years. Retaining walls inspected every 5 years. Seawalls inspected every 2 years.	Less robust RAMM data and dTIMS resu Bridges inspected every four years. Retaining walls inspe every 10 years. Seawalls inspected every 5 years.	Less robust RAMM d and dTIMS results. Bridges inspected every three years. Retaining walls inspected every 7 years. Seawalls inspected every 3 years.	More robust RAMM dTIMS results. More frequent data update Bridges inspected Every year. Retaining walls inspected every 3 years. Seawalls inspected every year.
In house engineering	In house engineering for road, traffic and contract services. Provides value for money over external consultants	Higher use of external consultants.	Higher use of external consultants.	More timely response to engineering issues. More robust engineering designs.

	Annual Investment Level – WC151			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Network Maintenance Professional Services (street lighting)	$50,000	$25,000	$40,000	$75,000
Traffic counting	$75,000	$25,000	$60,000	$100,000
School Travel Plans	$35,000	$0	$25,000	$70,000
Cycle Behaviour Change	$50,000	$30,000	$40,000	$70,000
Contract administration fees, SCRIMM, RAMM, dTIMS, Bridge inspection etc.	$236,000	$200,000	$220,000	$300,000
In house engineering	$969,729	$875,000	$920,000	$1,070,000
Totals	$1,415,729	$1,155,000	$1,305,000	$1,685,000

Multi-criteria analysis of non-monetary benefits				
	Status Quo	**Low**	**Medium**	**High**
Improves Reliability	0	-1	-1	0
Improves Access	0	-2	-2	1
Improves Availability	0	0	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-2	-2	0
Value for Money	0	0	0	-1
Feasibility	0	0	0	-1
Stakeholder Acceptability	0	-1	0	-1
Score	**0**	**-6**	**-5**	**-2**
Preferred option	**1**	**4**	**3**	**2**

Investment Option Risks/Consequences

Risk/ consequences of Very Low and Low Investment

- More in house lighting advice/ design – less specialized knowledge, more risk of incorrect advice/ poor design. Could incur more remedial costs.
- Less up to date and reliable traffic data. Could lead to less robust decision making and more congestion/ less reliable travel times.
- Less investment in school travel plans could affect travel time reliability around schools and compromise vulnerable user safety.
- Less in house engineering budget would mean that fewer safety and congestion relieving projects are undertaken each year.
- Less frequent asset inspection – more risk of failure or higher levels of deterioration.

Risk/ consequences of High Investment

- More professional services advice, could exceed funds available to council.
- More school travel plans and more frequent updates could improve travel time reliability and vulnerable user safety. Would also please school stakeholders.
- More up to date traffic counts would enable robust decision making and allow travel time reliability issues to be detected earlier.
- More frequent asset inspections – more likely to pick up faults before escalation or failure.

The recommended budget scenario (Status Quo) is the investment level that satisfies the following criteria:

- Covers historic professional services costs while maintaining an acceptable level of service;
- Is affordable to Council;
- Allows a satisfactory number of school travel plans to be developed each year;
- Allows a reasonably up to date set of traffic count data to enable robust decision making;
- Provides a balance of financial cost against level of service;
- The return on investment over the recommended level is subject to diminishing returns.

7.3.4 WORK CATEGORY 222 TRAFFIC SERVICES RENEWALS

This work category includes renewals and professional services associated with electronic signs, advance directional signage, traffic marking maintenance, traffic signals replacement, street name signs, streetlight lantern replacement and streetlight standard replacement.

The ONRC customer levels of service relevant to this work category are:

- Mobility (travel time reliability);
- Safety;
- Accessibility (land access and road network connectivity).

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Customer Outcome 2	Collective Risk
	Customer Outcome 3	Personal risk
	Technical Output 5	Loss of driver control at night
	Technical Output 6	Intersections
	Technical Output 9	Vulnerable users
Travel Time Reliability	Customer Outcome 1	Throughput at indicator sites
Accessibility	Technical Output 1	Accessibility

Investment Level

The current Traffic Services Renewals programme investment level has been developed over many years and is based on:

- Historic deterioration rates and remedial costs;
- Historic streetlight life span and failure rates;
- Funding to acceptable customer levels of service;
- Minimum historic costs for asset management professional services.

Options

Investment level options have been considered to ensure that our proposed programme represents the best balance of value for money and customer level of service.

	Investment Level Options – WC222			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Electronic and advance directional signage	Replace faded/ damaged ADS. Install/ upgrade 1 ADS / year. Install 2 -3 electronic signs/ year	Allow lower LOS before replacing faded/ damaged ADS. No new ADS. No new electronic Signs.	Allow lower LOS before replacing faded/ damaged ADS. No new ADS. Install 1 -2 electronic signs/ year	Replace faded/ damaged ADS. Install/ upgrade 2 ADS / year. Install 3 -4 electronic signs/ year
Traffic markings maintenance	Replace markings be deteriorated to unacceptable level	Allow markings to Deteriorate further before remarking.	Reactive remarking	More proactive remarking
Traffic signal replacement	Replace assets prior to failure.	Replace on failure.	Replace assets prior to failure.	Replace and upgrade assets

	Investment Level Options – WC222			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
	Programmed Upgrading of underground assets.		No upgrading.	prior to failure.
Urban barriers and sight rails	Replacement on failure.	Replacement on failure.	Replacement on failure.	Upgrade on failure. Proactive upgrading.
Street name plate replacement	Identify GAPs and improve signage. Replace SNP to maintain med-high visibility.	Replace on failure.	Replace SNP to maintain med-high visibility. No improvements.	Identify GAPs and improve signage. Replace SNP to maintain high visibility.
Streetlight lantern replacement	Replace with upgraded lanterns prior to failure.	Replace like for like on failure. Allow longer outages.	Replace with upgraded lanterns prior to failure. Allow lower lamination levels prior to upgrading.	Replace with upgraded lanterns prior to failure. Maintain higher lamination prior to replace and upgrade.
Streetlight standard replacement	Identify high fatigue Risk areas and replace prior to failure.	Replace on failure.	Identify high fatigue Risk areas and replace prior to failure with reduced annual replacement programme.	Identify high fatigue Risk areas and More proactive replacement programme prior to failure.

	Annual Investment Level – WC222			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Advance directional signage	$115,000	$80,000	$100,000	$125,000
Traffic markings maintenance	$40,000	$20,000	$30,000	$60,000
Traffic signal replacement	$170,000	$120,000	$140,000	$200,000
Urban barriers and sight rails	$5,000	$5,000	$5,000	$10,000
Street name plate replacement	$20,000	$10,000	$15,000	$25,000
Streetlight lantern replacement	$200,000	$150,000	$175,000	$225,000
Streetlight standard replacement	$250,000	$200,000	$225,000	$275,000
Totals	$800,000	$585,000	$690,000	$920,000

Multi-criteria analysis of non-monetary benefits				
	Status Quo	**Low**	**Medium**	**High**
Improves Reliability	0	-1	-1	1
Improves Access	0	-2	-2	1
Improves Availability	0	0	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-2	-1	0
Value for Money	0	-2	-2	-1
Feasibility	0	-1	-1	-1
Stakeholder Acceptability	0	-3	-3	-1
Score	**0**	**-11**	**-10**	**-1**
Preferred option	**1**	**4**	**3**	**2**

Investment Option Risks/Consequences

Risk/ consequences of Very Low and Low Investment

- Less directional signage/ poorer quality – could affect congestion and travel time reliability;
- Faded markings – driver confusion, safety issues, could affect travel time reliability;
- Less reliable traffic signals, more outages, increased TMP costs, safety issues, travel time reliability affected;
- More streetlight outages, safety and crime issues;
- Less streetlight standard replacement - more failures – potential for injury or death. Safety and crime issues.

Risk/ consequences of High Investment

- Clearer signage - less journey confusion, increased travel time reliability;
- Clearer markings – improved road safety and travel time reliability
- Less frequent traffic signal outages, improved travel time reliability and safety.
- Less frequent streetlight outages. Safety and crime benefits.
- No streetlight standard failure – safety and crime improvements.
- Upgrading of substandard barriers to current standards.

The recommended budget scenario (Status Quo) is the investment level that satisfies the following criteria:

- Covers historic maintenance services costs while maintaining an acceptable level of service;
- Is affordable to Council;
- Allows an affordable and efficient upgrading programme;
- Provides a balance of financial cost against level of service;
- The return on investment over the recommended level is subject to diminishing returns.

7.3.5 WORK CATEGORY 341 LOW COST – LOW RISK ROADING IMPROVEMENTS

This work category includes low cost/ low risk projects to remedy identified safety and level of service deficiencies and make ongoing improvements to improve customer outcomes.

Typical projects include local area traffic management (traffic calming), managing permanent hazards, sight distance improvements (such as bank cutting etc.) intersection control upgrading (such as roundabouts), school speed zone signage, pedestrian crossing upgrades (lighting/ surfacing and signalisation), pedestrian refuge islands and channelisation and cycleway network improvements.

Projects are initially identified through:

- Referral from members of the public or council officers;
- Safety or asset audits;
- An existing safety programme (such as the School Speed Zone programme);
- From a central or local government strategy document.

Once identified, each project is considered for inclusion on the Deficiency Database. This includes consideration of:

- The nature of the deficiency;
- Traffic volumes;
- Crash history;
- Risks and consequences of the deficiency;
- Treatment feasibility and cost;
- The deficiency risk relative to other deficiencies.

The Deficiency Database uses a risk based prioritisation approach to determine the project ranking. This is then considered against current and future work category budgets to identify each year's Low Cost Low Risk Programme.

The ONRC customer levels of service relevant to this work category are:

- Safety;
- Mobility (resilience and travel time reliability).

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Customer Outcome 2	Collective Risk
	Customer Outcome 3	Personal risk
	Technical Output 1	Permanent hazards
	Technical Output 3	Sight distances
	Technical Output 6	Intersections
	Technical Output 8	Cycle path faults
	Technical Output 9	Vulnerable users
Resilience	Customer Outcome 1	Journeys impacted by unplanned events
	Customer Outcome 2	Instances where road access is lost
Travel Time Reliability	Customer Outcome 1	Throughput at indicator sites

Investment Level

The current Low Cost – Low Risk Roading Improvements programme investment level has been developed based on:

- The prioritisation of projects through the safety deficiency database;
- The affordability to council of project costs;
- Historic project costs;
- Funding to acceptable customer levels of service.

Low Cost Low Risk Projects	2018/ 2019	2019/ 2020	2020/ 2021
Minor safety projects	$51,000	$51,000	$51,000
Pedestrian crossing upgrade projects	$31,000	$31,000	$31,000
Traffic Safety Minor Improvements	$400,000	$400,000	$400,000
Local area traffic management	$51,000	$51,000	$51,000
Cycleways network improvements	$400,000	$400,000	$400,000
New pedestrian crossings	$53,000	$53,000	$53,000
School Speed Zone Signs	$60,000	$60,000	$60,000
Beltway Cycleway (central)	$1,000,000		
Beltway Cycleway (northern)		$500,000	
Eastern Bays Cycleway (A)	$1,000,000	$1,000,000	$850,000
Eastern Bays Cycleway (B)	$1,000,000	$1,000,000	$600,000
Pedestrian safety projects	$74,000	$74,000	$74,000
Corrosion Protection Seaview/ Port Road bridges	$700,000		
Seismic strengthening Cuba Bridge			$820,000
Totals	$4,820,000	$3,620,000	$3,390,000

Options

Investment level options have been considered to ensure that our proposed programme represents the best balance of value for money and customer level of service.

	Investment Level Options – WC341			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Minor safety projects	1 -2 MSW projects per year	No MSW projects	2 -3 MSW projects per year	3 -4 MSW projects per year
Pedestrian crossing upgrade projects	Upgrade 1 – 2 pedestrian crossings per year	No pedestrian crossing upgrades	Upgrade 2 – 3 pedestrian crossings per year	Upgrade 3 – 4 pedestrian crossings per year
Traffic Safety Minor Improvements	Manage highest priority safety deficiencies	Manage fewer high priority safety deficiencies	Manage fewer high priority safety deficiencies	Manage high priority safety deficiencies
Local area traffic management	Install 2 LATM schemes/ year	Install 1 LATM schemes/ year	Install 3 LATM schemes/ year	Install 4 LATM schemes/ year
Cycleways network improvements	Install 2 – 3km new trail per year	No new cycle trails	Install 1 – 2km new trail per year	Install 3 – 4 km new trail per year
New pedestrian crossings	Install 1-2 upgraded Ped x per year.	No ped x installs.	Install 1 upgraded Ped x per year.	Install 2-3 upgraded Ped x per year.
School Speed Zone Signs	Install 3x SSZ per year	No SSZ installs. Maintain only.	Install 1x SSZ per year	Install 4x SSZ per year
Beltway Cycleway (central)	Complete cycleway to best practice	Reduce cycleway standard and unable	Reduce cycleway standard or unable	Complete cycleway to highest

	Investment Level Options – WC341			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
	standards	to complete entire length	to complete entire length	standards
Beltway Cycleway (northern)	Complete cycleway to best practice standards	Reduce cycleway standard and unable to complete entire length	Reduce cycleway standard or unable to complete entire length	Complete cycleway to highest standards
Eastern Bays Cycleway (A)	Complete cycleway to best practice standards	Reduce cycleway standard and unable to complete entire length	Reduce cycleway standard or unable to complete entire length	Complete cycleway to highest standards
Eastern Bays Cycleway (B)	Complete cycleway to best practice standards	Reduce cycleway standard and unable to complete entire length	Reduce cycleway standard or unable to complete entire length	Complete cycleway to highest standards
Pedestrian safety projects	Complete 1 major And 4-5 minor pedestrian safety initiatives per year	Complete 3 Minor pedestrian safety initiatives per year	Complete 1 major And 3-4 minor pedestrian safety initiatives per year	Complete 1 major And 6-7 minor pedestrian safety initiatives per year
Corrosion Protection Seaview/ Port Road bridges	Project completed to mitigate corrosion damage	Project delayed, Increased risk of damage or failure	Project delayed, Increased risk of damage or failure	Project completed to mitigate corrosion damage
Seismic strengthening Cuba Bridge	Strengthening completed on programme	Project delayed, Increased risk of damage or failure	Project delayed, Increased risk of damage or failure	Strengthening completed on programme

	Annual Investment Level – WC341			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Minor safety projects	$51,000	$0	$76,000	$102,000
Pedestrian crossing upgrade projects	$31,000	$0	$47,000	$62,000
Traffic Safety Minor Improvements	$400,000	$200,000	$300,000	$600,000
Local area traffic management	$51,000	$25,000	$75,000	$100,000
Cycleways network improvements	$400,000	$0	$320,000	$480,000
New pedestrian crossings	$53,000	$0	$25,000	$75,000
School Speed Zone Signs	$60,000	$0	$20,000	$80,000
Beltway Cycleway (central)	$1,000,000	$750,000	$900,000	$1,200,000
Beltway Cycleway (northern)	$500,000	$400,000	$450,000	$550,000
Eastern Bays Cycleway (A)	$1,000,000	$900,000	$950,000	$1,100,000
Eastern Bays Cycleway (B)	$1,000,000	$900,000	$950,000	$1,100,000
Pedestrian safety projects	$74,000	$45,000	$85,000	$100,000
Corrosion Protection Seaview/ Port Road bridges	$700,000	$600,000	$650,000	$700,000
Seismic strengthening Cuba Bridge*	$820,000	$740,000	$780,000	$900,000
Totals	$6,140,000	$4,560,000	$5,628,000	$7,149,000

*Note Cuba Bridge Seismic Strengthening is planned for 2020/ 2021 and Beltway (northern) is planned for 2019/2020.

Multi-criteria analysis of non-monetary benefits				
	Status Quo	**Low**	**Medium**	**High**
Improves Reliability	0	-2	-2	0
Improves Access	0	-2	-2	1
Improves Availability	0	0	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-2	-1	1
Value for Money	0	-2	-2	-1
Feasibility	0	-2	-2	-1
Stakeholder Acceptability	0	-2	-2	-1
Score	**0**	**-12**	**-11**	**-1**
Preferred option	**1**	**4**	**3**	**2**

Investment Option Risks/Consequences

Risk/ consequences of Very Low and Low Investment

- Increased risks to road users;
- More pedestrian injuries;
- Longer waiting list for LATM – more speed related crashes;
- More delays at high volume intersections;
- Less attractive cycleways, less active mode use;
- Additional bridge corrosion damage and increased risk of failure;
- Higher risk for vulnerable users.

Risk/ consequences of High Investment

- Shorter waiting time for LATM schemes – less speed related crashes;
- Reduced risk to road users;
- Higher active mode use;
- Less risk for vulnerable users.

The recommended budget scenario (Status Quo) is the investment level that satisfies the following criteria:

- Allows LATM complaints to be dealt with in a timely manner;
- Allows highest priority safety issues to be remedied on a prioritised basis;
- Is affordable to Council;
- Allows an affordable and efficient upgrading programme;
- Provides a balance of financial cost against level of service;
- The return on investment over the recommended level is subject to diminishing returns.

7.3.6 WORK CATEGORY 432 ROAD SAFETY PROMOTION, EDUCATION AND ADVERTISING.

This work category includes our road safety programme which includes targeted promotion, education and advertising activities to engage the community and achieve outcomes of safer road user behaviours and reduced injury crashes.

The activity lists are separated into High and Medium Strategic Fit categories as shown in Table 3 and Table 4. The objective of these programmes is to contribute towards achieving the Safer Journeys 2020 goal 'A safe road system increasingly free of death and serious injury'.

The Hutt City Transport Division also has a key performance indicator to contribute towards 'a reducing trend in the number of fatalities and serious injury crashes on the local road network'.

The Activity Management Plan, Activity sheets and Road Safety Action Plan all align with the Safer Journeys 2010-2020 Strategy, Safer Journeys Action Plan 2016-20, and are informed by data in 2017 Communities at Risk Register.

There is widespread collaboration on the road safety programme throughout the Wellington region between partner agencies through the RSAP process, through Wellington region road safety forum group, and locally through the Safe Hutt Valley interagency working group. There are also joint projects as opportunities arise, such as with ACC / MSAC who are currently leading regional collaboration on a number of motorcycle safety projects, campaigns and events including Shiny Side Up and 'Ride and Decide'.

Joint projects ensure cost effective delivery by collaborating to share resources and achieve consistent messaging across the region e.g. Wellington region intersection safety campaign involves NZTA and neighbouring TLA's. e.g. use of local funding to extend reach of NZTA campaigns 'Legend' and 'Less speed, less harm'.

Joint projects also manage risks by ensuring that education resources, advertising material and event management are of consistently high quality, are effectively targeted, and reflect current best practice.

The ONRC customer levels of service relevant to this work category are:

- Safety.

The performance measures relevant to each of these ONRC customer levels of service are:

ONRC Customer Level of Service	Performance Measure	Description
Safety	Customer Outcome 1	The number of fatal and serious injuries on the network
	Customer Outcome 2	Collective Risk
	Customer Outcome 3	Personal risk
	Technical Output 6	Intersections
	Technical Output 9	Vulnerable users

Table 3 Road Safety Promotion, High Strategic Fit Activity List

Safer Journeys Area	Activity/ Programme Name	Evidence of problem/ opportunity	Planned Intervention
Alcohol and drugs	Drive sober campaigns, promotions and education activities.	Safer Journeys - HIGH concern. CAS data incomplete. Communities at Risk Register 2017 shows unfavourable trend (Hutt ranking 41, was 61 in 2015). Police report they are still stopping significant number of drivers with BAC above legal limit.	Promote NZTA campaigns locally, particularly during summer season (e.g. 'Legend' billboards). With partners, run AIEP (Alcohol Impairment Education Programme) sessions for Community Corrections clients with drink-drive convictions. Promote host responsibility in sports clubs, sportsville hubs.
Speeds (incl. drive to the conditions)	Speed awareness campaigns and education	Safer Journeys - HIGH concern. Communities at Risk Register 2017 shows unfavourable trend (Hutt ranking 26, was 47 in 2015). In 2016 on local roads, 24 injury crashes 'speed too fast'. (18% of total injury crashes). 6 serious and 23 minor injuries.	Support NZTA speed campaigns. Local billboard campaigns 4 per year. Support Police targeted enforcement with media releases, and education material in local media, social media. Use speed radar feedback trailer at locations with high mean speeds. Support Police efforts to reduce illegal street racing.
Younger drivers	Younger drivers education	Safer Journeys - HIGH concern. Police report high number of licence breaches (in 2016, approx. 12,000 in Wellington region). In 2016, 32 injury crashes with at-fault driver aged 15-25 (23% of injury crashes). 4 serious, 36 minor injuries.	Promote DRIVE resources for people preparing to sit L and R tests. Support providers to deliver LL tuition. Support community driver mentor schemes that help prepare young drivers for R test. X-Roads or RYDA event for secondary schools (2-yearly), joint project with UHCC and Safe Hutt Valley interagency group partners. Work with regional partners to promote use of NZTA curriculum resources in schools. Support SADD activities in secondary schools.
Motorcycles	Motorcycle safety campaigns, promotions and education activities	Safer Journeys - HIGH concern. Making Motorcycling Safer is one of four key new activities in the Safer Journeys Action Plan 2016-20. In the two years 2015-16, motorcycles + mopeds 11 serious injuries, 19 minor injuries. No clear trend.	Work with partners to promote Ride Forever skills training courses. Support ACC, MSAC and NZTA safety campaigns eg 'Look twice for motorcycles', 'Motorcycle Awareness month' and 'Get Ride Ready'. Events e.g. Shiny Side Up. Engagement with riders e.g. 'Ride and Decide'. Support Police campaigns targeting motorcyclists.
Roads and roadsides (incl. intersections)	Intersection safety campaigns and education activities.	Safer Journeys area of HIGH concern. Communities at Risk Register ranks Hutt City 15th / 73 TLA's (unfavourable trend, was 33 in 2015). In 2016 49 injury crashes on local roads. 36% of total injury crashes. 8 serious and 55 minor injuries.	Work with partners to promote Ride Forever skills training courses. Support ACC, MSAC and NZTA safety campaigns eg 'Look twice for motorcycles', 'Motorcycle Awareness month' and 'Get Ride Ready'. Events e.g. Shiny Side Up. Engagement with riders e.g. 'Ride and Decide'. Support Police campaigns targeting motorcyclists.

Table 4 Road Safety Promotion, Medium Strategic Fit Activity List

Safer Journeys Area	Activity/ Programme Name	Evidence of problem/ opportunity	Planned Intervention
Cycling	Cycle Safety campaigns, promotions and education activities	Safe Journeys - MEDIUM concern. Cycling safety is a core road safety activity in the Safer Journeys Action Plan 2016-20. In past 5 years 2012-16 on local roads 9 cyclists were seriously injured, 47 received minor injuries. No clear trend. Opportunity - maintaining a focus on cyclist safety will contribute to overall growth in cycling trips and success of UCP projects.	Cycle safety campaigns (e.g. NZTA 'Share the road). Publish educational resources targeting cyclists, and drivers of other vehicles. Support regional campaigns and activities e.g. workshops that bring bus / truck drivers together with cyclists. Events with safety messaging (Go by Bike Day, community bike fixups). support Police operations that target cyclists - helmet and lights compliance, high-vis gear. Work with GW Pedal Ready to deliver cycle skills training in schools, and in the community for adults.
Walking	Pedestrian safety campaigns, promotions and education activities.	Safer Journeys - MEDIUM concern. Pedestrian safety is a core road safety activity in the Safer Journeys Action Plan 2016-20. Crash data for Hutt City shows recent upward trend in pedestrian injuries, reflects regional trend. In 2016 on local roads 25 injury crashes involved pedestrians (18% of total injury crashes) 7 serious and 18 minor injuries.	Pedestrian safety campaigns. Publish educational resources targeting both pedestrians and drivers of vehicles. Messaging about road safety around schools, and parent safe driving / parking behaviour. Provide ongoing support for school road safety programmes i.e. school travel plans, walking school buses, school road patrols, scooter skills training, 'safe walking' road safety education, promote use of NZTA curriculum resources in schools.

Investment Level

The current Road Safety Promotion, Education and Advertising programme investment level has been developed based on:

- Safer Journeys 2010-2020 Strategy and objectives;
- Safer Journeys Action Plan 2016-20;
- Hutt City Council Transport Division key performance indicators;
- The Activity Management Plan;
- Activity sheets;
- Road Safety Action Plan;
- 2017 Communities at Risk Register.
- The affordability to council of project costs.

Options

Investment level options have been considered to ensure that our proposed programme represents the best balance of value for money and customer level of service.

	Investment Level Options – WC432			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Road Safety Programmes	High and Medium Strategic Fit Programmes. Full time Road Safety Coordinator.	Medium strategic fit programme. Part time Road Safety Coordinator.	High Strategic Fit Programme. Part time Road Safety Coordinator.	Enhanced high and Medium Strategic Fit Programmes. Full time Road Safety Coordinator.

	Annual Investment Level – WC432			
Asset/ Service	**Status Quo**	**Low**	**Medium**	**High**
Road Safety Programmes	$82,000	$40,000	$60,000	$120,000
Road Safety Coordinator and Professional Services	$126,000	$63,000	$100,000	$140,000
Totals	$208,000	$103,000	$160,000	$260,000

Multi-criteria analysis of non-monetary benefits				
	Status Quo	**Low**	**Medium**	**High**
Improves Reliability	0	0	0	0
Improves Access	0	0	0	0
Improves Availability	0	0	0	0
Economic growth and productivity	0	0	0	0
Safety	0	-2	-2	1
Value for Money	0	-2	-2	-1
Feasibility	0	-2	-2	-1
Stakeholder Acceptability	0	-3	-3	-1
Score	**0**	**-9**	**-9**	**-2**
Preferred option	**1**	**3=**	**3=**	**2**

Investment Option Risks/Consequences

Risk/ consequences of Very Low and Low Investment

- Increased risks to road users;
- More risk for vulnerable users;
- Less uptake of active travel modes;

Risk/ consequences of High Investment

- Enhanced road safey programme;
- Reduced collective and personal risk;
- Higher active mode use;
- Less risk for vulnerable users.

The recommended budget scenario (Status Quo) is the investment level that satisfies the following criteria:

- Allows effective collaboration with other regional agencies and partners;
- Allows highest priority safety issues targeted in a cost efficient way that is aligned with regional priorities;
- Allows Council to meet its commitments towards the Safer Journeys Strategy;
- Is affordable to Council;
- Provides a balance of financial cost against level of service;
- The return on investment over the recommended level is subject to diminishing returns.

8 MANAGING THE ASSET LIFECYCLE

This section develops the broad strategies and specific work programmes required to achieve the goals and standards outlined in Section 4.0 and meet future demand for services as outlined in Section 5.0.

It presents the lifecycle management plan for roading assets, and includes:

- The lifecycle asset management framework (Section 8.1):
  - asset management process
  - operations, maintenance, renewal and development strategies

- Lifecycle management plans for each asset group, consisting of:
  - a description of the assets
  - asset condition and performance
  - work programmes and associated financial forecasts

The lifecycle management plans are presented in the following sections:

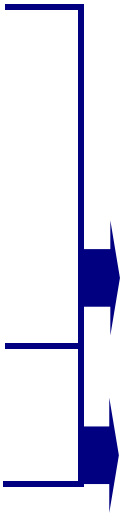
- Section 8.2 Carriageways pavements
- Section 8.3 Bridges, subways, and other structures
- Section 8.4 Drainage
- Section 8.5 Footpaths and cycleways
- Section 8.6 Traffic signals
- Section 8.7 Car parks and parking meters
- Section 8.8 Road signs and markings
- Section 8.9 Roadside berms, gardens, and plantings
- Section 8.10 Streetlights

Figure 8-1: High Street

8.1 LIFECYCLE ASSET MANAGEMENT FRAMEWORK

Life cycle management covers the four key strategies necessary to deliver the required service standards. These strategies are:

- **Management / monitoring strategy:** Management functions required to support the programmes.
  Developed and Implemented by Council
- **Maintenance and operations strategy**: To ensure efficient operation and serviceability of the assets so that they achieve the required levels of service over their useful lives, through to eventual disposal.
  Managed by Council - Implemented by external service providers
- **Capital Replacement strategy**: To provide for the progressive replacement of individual assets that have reached the end of their useful lives.
  Managed by Council- Implemented by external service providers.
- **Capital Development strategy:** To improve parts of the system currently performing below the required level of service standards and to allow development to meet future demand requirements.
  Managed by Council- Implemented by external service providers



Maintaining the level of service required from the asset and ensuring that the assets continue to achieve that whilst managing risk

Closing service gaps. Meeting future demand

The purpose, scope, strategies, standards and specifications of these plans are described below. The programmes and supporting asset information are covered in the asset specific sections which follow.

Financial programmes associated with the four strategies are form part of the Council's long term financial planning.

8.1.1 MANAGEMENT / MONITORING STRATEGY

Management and monitoring strategies set out the activities required to support value creation processes including maintenance, operations, renewal and asset development programmes. These activities include:

- Strategic planning
- Data management and evaluation
- Business processes
- Monitoring
- Financial management
- Performance measurement

The relationship between these activities is indicated in Figure 8-2.

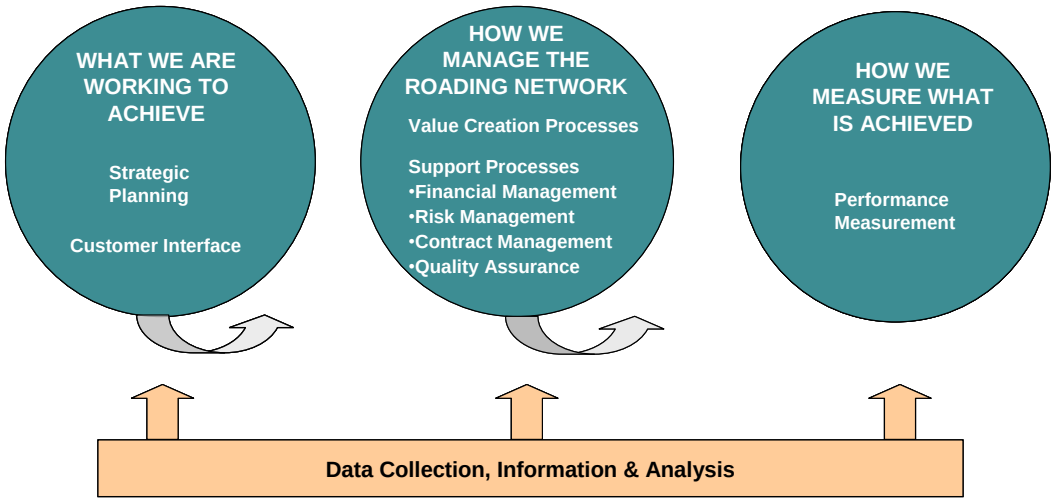


Figure 8-2: Roading activity – planning, management and monitoring process

Strategic planning and a focus on meeting the needs of the community drives the design of management processes which in turn are reflected in the level of performance that is achieved. Collection of data necessary to manage the roading network activity effectively and processes for the analysis and interpretation of this data support all management activities.

The program budget for planning, policy and management work to implement the asset management strategies is shown in Table 8-1.

Management and Monitoring Expenditure of Network and Asset Management Budgets			
Activity	2018/19	2019/20	Comment
Traffic Counting	$75,000	$75,000	Data collection contract to be renewed in 2017.
Forward Planning fees (Traffic)	$135,000	$135,000	Improvements to local area traffic modelling in progress.
Traffic Admin - minor investigations	$50,000	$50,000	Subsidisable portion of Admin fees, minor traffic investigations
Administration fees	$10,000	$10,000	
SCRIM Survey	$30,000	$30,000	
Condition & Roughness Surveys	$65,000	$65,000	
RAMM Support fee	$55,000	$55,000	
d'TIMS Licence	$5,000	$5,000	
Traffic Advertising	$7,000	$7,000	
Corp membership	$5,000	$5,000	
Site safety audits	$3,000	$3,000	
"Digsafe"	$38,000	$38,000	
Bridge Inspection Contract Engineering Fees	$30,000	$30,000	
School Based Activities	$85,000	$85,000	
In House Professional Fees	$969,729	$969,729	

Management and Monitoring Expenditure of Network and Asset Management Budgets			
Activity	2018/19	2019/20	Comment
Fees (Non-Subsidisable) Engineering Maint	$20,000	$20,000	Where engineers advice is sought for not related to NZTA subsidy.
Footpath Condition Survey (non-subsidisable)	$20,000	$20,000	
Footbridge Fees (non-subsidisable)	$7,000	$7,000	
General Eng Fees (non-subsidisable) Assets	$50,000	$50,000	
Road Legalisation Fees (non-subsidisable)	$10,000	$8,000	
TOTAL	$1,669,729	$1,669,729	

Table 8-1: Network and asset management budgets

The main network and asset management activities undertaken are:

- **Road planning** - analysing the transport network, preparing forward programmes for Council, NZTA and Greater Wellington Regional Council, annual plan programme implementation, preparing briefs for design and contract documentation, auditing professional service and contractor performance, responding to enquiries from Councillors and members of the public, establishing the city's future direction in conjunction with planning staff, liaising with NZTA and other Local Authorities as it relates to state highway network and neighbouring authority roads and consulting with the public.

- **AMP development** – establishing the 3 yearly plan and monitoring, presenting and effecting change on levels of service and performance outcomes.

- **Active transport and safety** – establish active transport needs, monitor, analyse and respond to network safety and efficiency concerns, engage external peer review resources, liaise with active transport groups such as schools, cycle groups, the Regional Council for passenger transport needs, liaise with other road safety groups including Police, ACC, DHB and NZTA.

- **Road Policy** – establishing and monitoring road asset policy, submitting on Central Government policy, servicing internal and external industry working groups.

- **Subdivision Policy** – vetting and approving engineering plans for private land development, assisting staff to establish consent conditions, prepare and present expert evidence at hearings, inspect and "sign off" land developments prior to vesting with Council.

8.1.2 MAINTENANCE AND OPERATIONS STRATEGY

Operations and maintenance strategies set out how the roading network will be operated and maintained on a day-to-day basis to consistently achieve the optimum use of assets. Operations and maintenance activities fall into the following categories, each having distinct objectives and triggering mechanisms:

- **Operations** - Activities designed to ensure efficient utilisation of the assets, and therefore that the assets achieve their service potential. Operational strategies cover activities such as condition assessment and street cleaning.

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

    - **Programmed (proactive) maintenance** - A base level of maintenance carried out to a predetermined schedule. Its objective is to maintain the service potential of the asset system.
    - **Condition maintenance** - Maintenance actioned as a result of condition or performance evaluations of components of the road network system (e.g. weed spraying, bridge repairs). Its objective is to avoid critical asset or system failure.
    - **Response maintenance** - Maintenance carried out in response to reported problems or system defects (e.g. pothole repairs). Its objective is to maintain day-to-day levels of service.

As required by legislation for works that attract NZTA funding, Council contracts out its roading network operations and maintenance work. Maintenance contracts generally cover the following:

- Procedures, standards and end results are defined, but there is flexibility for the contractor to determine the most appropriate materials and methods.
- Compliance with legislation, e.g., Health and Safety.
- Response times (to routine and emergency work) are defined for notified defects; there are standards by activity type and road type.
- Inspection programming and reporting requirements.
- Timing and approvals for work programmes.
- Schedule of quantities.
- Monthly reporting. The contractor must provide data in a computer database format. The data may be used for making claims and for forward programming of work.

Operations and maintenance works are currently packaged together as detailed in Table 8-2**.**

Contract No.	Contract Scope	Expiry	Term (yrs)	Value	Annual Value
2541	After Hours Service (Intergroup)	Jun -19		$38,000	$38,000
4140	Street Utility Cleaning (Intergroup I)	Oct -17	3+1+1	$5,541,741	$1,847,250
4059	Street Maintenance (Fulton Hogan	Jun-18	3+1+1	$6,573,192	$2,191,064
4063	Graffiti Removal (MMS)	Apr-18	3+1+1	$567,000	$189,000
4247	Roadmarking (Capital)	June-19	3+1+1	$824,243	$274,747
4116	Vegetation Control (Wellington Weedspray)	Jun-19	3+1+1	$795,664	$265,221
4246	Maintenance of Streetlighting (Fulton Hogan)	Aug-19	3+1+1	$1,923,699	$641,223
4248	Street Sign Maintenance (Directions)	Jul-19	3+1+1	$593,906	$197,968
4138	Collection: Refuse bags (Waste Management)	Jun-17	3+1+1	$1,704,090	$568,030
4139	Collection: Recyclables (Waste Management)	Jun-17	3+1+1	$4,357,958	$1,452,653
4216	Resurfacing & Pavements Professional Services (Calibre)	Jun-21	3+1+1	$2,173,740	$434,748
4185	Asphalt Resurfacing/AWPT (Higgins)	Jun-21	3+1+1	$8,571,391	$1,714,278
4060	Maintenance Chip Seal (Higgins)	Jun-18	3+1+1	$4,765,995	$953,199
4189	RAMM Condition Rating (Opus)	Jul-17	3+1+1	$206,000	$69,000
4237	Bridge Inspections and Administration (GHD)	Jun-21	3+1+1	$216,786	$72,262

Contract No.	Contract Scope	Expiry	Term (yrs)	Value	Annual Value
4086	Wainuiomata Hill Rd Safety Seal(Fulton Hogan)	Jun-18	3+1+1	$3,435,045	$687,009
	Concrete Vehicle Crossings & Footpaths (Fulton Hogan)	Jul-18		$90,000	$30,000
In-house	Parking Enforcement (HCC Env Health)		1	$1,117,000	$1,117,000
	Riverbank Car Park Security Patrols (Recon Security)	Ongoing engagement	1		$13,000
	Streetlight Energy Supply (Contact Energy)	Sept-2018	2.5	Depends on usage	Approx. $1,600,000
AD16-3969	Traffic Counting (HTS)	2017	3+1+1	$112,480	$37,493
	Library car park rentals (St James Church)	ongoing			$27,495
	Riverbank Car Park Rental (Greater Wellington)	ongoing			$60,000
C4141	Parking Meter Maintenance	March 2020			$273,000

Table 8-2: Roading operations and maintenance contracts

8.1.3 ASSET RENEWALS STRATEGY

The purpose of the renewal plan and the associated draft financial programme is to provide for the progressive replacement of individual assets which have reached the end of their useful life at a rate which maintains the standard and value of the system of assets as a whole. This programme does not increase the standards of service able to be provided, but maintains these standards at current levels. This programme must be maintained at adequate levels to maintain standards of service, and the overall quality of assets.

Required levels of expenditure on the cyclic asset replacement programme will not be uniform but will vary from year to year and will reflect:

- the age profile of the system,
- the condition profile of the system,
- the ongoing maintenance demand, and
- the differing economic lives of individual assets which comprise the overall system of assets.

Failure to maintain an adequate cyclic asset replacement programme will be reflected in a decline in the overall standard of the system of assets. Thus Council aims to maintain this programme within a band of +/- 10% of the target programme on a cumulative basis. Where the actual programme falls below the cumulative budget target, the shortfall will be reflected in a reduction in the overall depreciated replacement cost value of the system.

Age and condition profiles of roading network components will be used as reference points to determine forward renewal programmes. These programmes are intended to maintain the overall standard of the system.
Cyclic renewal works fall into two categories:

- **Rehabilitation:** Involves major work on an existing asset or asset component which is capitalised rather than expensed under maintenance. An example is pavement smoothing works to reinstate the quality of ride. Rehabilitation does not provide for a planned increase in the operating capacity or design loading. It is intended to enable the system to continue to be operated so as to meet the current standards of service.

- **Renewal:** Typically, complete replacement of an existing asset. Does not provide for a planned increase to the operating capacity or design loading. Some minor increase in capacity may result from the process of

renewal, but a substantial improvement is needed before system development is considered to have occurred. An example is the renewal of kerbs and footpaths through the road reconstruction programme.

Cyclic renewal proposals will be supported by economic appraisals where appropriate, and if accepted, included in the Council's Annual Plan, as part of the forward works programme. Cyclic renewal works items, recommended for inclusion in an Annual Plan but not gaining funding in that financial year, will be listed on the forward works programme for the following year.

8.1.4 ASSET DEVELOPMENT STRATEGY

This section of the plan covers strategies for the creation of new assets (including those created through subdivision development, work associated with State Highway upgrades and other development) or works which upgrade or improve an existing asset beyond its existing capacity or performance in response to changes in traffic needs or customer expectations.

The capital works programme identifies two broad categories of projects planned:

- **Growth related** – projects focused on meeting increased traffic or changes in traffic patterns
  - Road widening
  - Intersection upgrades including new traffic signals or controls
  - New roads and bridges

- **Service level related** – projects planned to improve the level of service
  - Cycleway construction
  - Bridge strengthening
  - Neighbourhood street improvement works
  - Footpath extensions
  - Crash reduction projects

Asset development and asset renewal can occur simultaneously. The purpose of asset renewal is to restore the service potential of an asset which is lost over time due to age, use and deterioration. An ongoing renewal programme prevents long term decline in the service potential of the assets, whereas asset development is concerned with service improvement measured by asset performance.

These programmes are intended to progressively close gaps between target service standards (taking account of demographic and economic growth projections) and the current service capability of the roading network system.

8.1.5 NETWORK DEVELOPMENT

Potential network development programmes intended to address this growth include;

- Eastern CBD Ring Route (Cornwall Street) – to be assessed as part of the RiverLink project.
- East – West Connector Route – in the Business Case process.

- State Highway 2 Melling Interchange inclusive of duplicate bridge. - to be assessed as part of the RiverLink project.
- Sub-standard Road Upgrade Programme
- Cycleway Development Programme
- Walkway Development Programme
- Eastern Bays Shared Path
- Wainuiomata Hill Shared Path
- The Beltway
- Intersection Improvement Plan
- Petone / Grenada Link (NZTA Project)

Provision is also made in the capital development programme for;

- Opportunistic land purchases where Council maintains public roads on land not vested for this purpose.
- The installation of broad band cabling in association with road construction.

The capital development programme has been prepared to address the deficiencies in asset performance identified in the asset information presented above and growth demand identified in section 5.

This programme is subject to annual approval as part of the Annual Plan process. Expenditure on this programme is capitalised and reflected in an increase in the value of the system.

All projects attracting subsidy must be justified via the Business Case Approach which considers the following factors;

- Seriousness and urgency of the issue in relation to;
    - the strategic context
    - linkage to defined outcomes
    - scope of problem being addressed

- Effectiveness of the proposed solution in terms of;
    - optimisation of the proposal
    - implementation risks
    - performance risks
    - contribution to the objectives of the NZTA Act
    - contribution to effectively enhancing economic development, safety and personal security, access and mobility, public health and environmental sustainability

- Economic efficiency of the proposal.

Specific Network Improvement Projects

- **East Access Road:** Since the mid-1980's the Central Business District (CBD) has been subject to major growth and redevelopment. During this period Council traffic planning has been guided by a series of reports, including Hutt City Central Area Traffic and Roading Review, prepared by Traffic Design Group (TDG) in 1997. Most of the work proposed by TDG is now complete. The current priority improvement is for an East Access Route skirting the CBD following Knights Road, Cornwall Street and Pretoria Street (Refer to Barclay Traffic Planning Report 'Lower Hutt CBD Roading Network Review' dated May 2006). This work is currently programmed for 2020/21 but will be aligned with the outcomes of the RiverLink project.

- **Arterial Roads Network Review:** A scoping study has been carried out into 24 key intersections throughout the city, beyond the CBD. (Refer to Hutt City Arterial Roads – Network Review – Scoping Study by Barclay Traffic Planning dated October 2006). This report has been used to identify and prioritise potential improvement works for the 10 year programme. The majority of this work will be addressed through the Traffic Safety Improvement Programme (Low Cost Low Risk) along with projects identified and prioritised through the Deficiency Data Base.

- **Gracefield / Grenada / Ngauranga Transportation Study:** A joint study with NZTA and Wellington City Council investigating the feasibility of these routes was completed in 2009/10. The Hutt City 'Cross Valley Link' (CVL) component of this study indicated a poor BCA economic return for the proposed Wakefield Street route. However, it is apparent the proposed Petone to Grenada Route (P2G) will, in time, increase traffic volumes on The Esplanade and a Strategic Business Case has been written and endorsed by NZTA for an enhanced East – West connection across the valley. Hutt City Council is working with NZTA on scoping the Programme Business Case for this project. Earlier investigations indicate the likely cost of the CVL is in the order of $65m and financial provision has been made in the LTP for this in 2024 -2027

- **Sub-standard Road Upgrade Programme:** There are approximately 20kms of roads within the city that are below the standard specified in the District Plan. The main deficiencies are that they are under width and without footpaths. Council has an on-going long term programme to upgrade these roads. The programme is based on a report by Barclay Traffic Planning - 'Upgrading of Substandard Roads' dated January 1997. Refer to Appendix D for the most recent report (June 2010). An allowance of approximately $250,000 per year is provided in the capital works budget for these works.

- **Deficiency data-base – Proposed Traffic Improvement Works**: The database identifies road safety deficiencies and prioritises interventions on the basis of risk. Within the Government's *'Safe Systems'* approach, road controlling authorities need to consider sites where the consequences of a crash could be significant, but where to date there have been no of few recorded crashes. To address these sites systematically, NZTA have developed a Deficiency Database Prioritisation Process (DDPP) using a risk-based approach. This system allows both historical and potential crashes to compete fairly. The outcomes of DDPP are then exported into the various work categories, allowing budgets for these categories to be spent on an evenly based priority system.. The long term Deficiency Database work category programmes are included as Appendix D. Overall, $51,000 per year is provided for the LATM programme and $400,000 per year for traffic safety improvements

- **Reconstruction improvements**: an average of $80,000 per annum provided for improvements in association with road reconstruction; works are typically amenity improvements and traffic calming.

- **Broad band ducting:** $21,000 budgeted per annum for the laying of ducts in association with road reconstruction to reduce the incidence of future trenching.

- **Land purchase for roads:** $10,000 budgeted per annum for the purchase for the opportunistic purchase of land for legal road where a road is located on private land (mostly in association with sub-division).

8.1.6 ROAD SAFETY

Safe Road Use is one of the four pillars of the Safe System previously outlined in Section 3.3.

> "A safe system assumes road users receive adequate information and education so they understand how to be a responsible road user.
>
> Responsible users are competent, alert, comply with the road rules and are unimpaired by alcohol, drugs, distraction or fatigue. They take steps to improve their own safety and the safety of others."

Hutt City Council places a high priority on safety in all its transport-related activities. Alongside its ongoing investment in improving the safety and level of service of the various types of physical infrastructure, it also invests in providing information and education for our community of road users, in line with the Safe System approach. Council works in partnership with other agencies to deliver road safety promotion activities, through the Road Safety Action Plan process. Key partner agencies are the NZ Transport Agency, Greater Wellington Regional Council's safe and sustainable transport team, Upper Hutt City Council and other TLA's in the Wellington region, NZ Police, and Accident Compensation Corporation.

The Council targets investment in road safety education, information and activities towards addressing identified local and regional risk factors, and towards vulnerable road users - pedestrians and cyclists, and primary school pupils. NZTA's CAS database is the main source of data on crash numbers and trends. It provides evidence of the causes of crashes, and on which groups of road users are most at risk.

Identifying Risk

The Communities at Risk Register has been published regularly by NZTA since 2011. From data on fatal and serious crashes on both state highways and local roads, it gives an indication of the level of personal injury risk to road users in each TLA, in each of 14 Safer Journeys risk categories. Its ranking system allows Hutt City to identify risks and to compare its safety performance with 72 other TLA's nationwide.

Communities at Risk Register – Hutt City's ranking / 73 TLA's

Risk Area	CAR 2017	CAR 2015
Intersections	15	33
Speed	26	47
Older road users	28	46
Pedestrians	36	60
Cyclists	36	47
Restraints	39	60
Alcohol	41	61
Motorcyclists	50	54
Young Drivers	52	69
Overall – all categories	55	66

High priority areas for campaigns and activities in the coming funding period 2018-21 will be intersections, speed, older road users, pedestrians and cyclists. Activities that address alcohol, motorcyclists and young drivers will be retained in the road safety programme, as these are Safer Journeys areas of high concern. Restraints are an area of medium concern, and will be addressed by ongoing Police enforcement and NZTA nationwide campaigns, rather than by local or regional safety campaigns.

Council will maintain a focus on cycling safety during this period. New cycling infrastructure is scheduled for completion, and with promotional campaigns the number of cycling trips is expected to increase significantly. A public perception that cycling is a safe choice will help participation in cycling to grow.

In the short term, the risk register shows an unfavourable trend, with Hutt City's overall ranking climbing from 66 to 55.

KPI for Safety Performance

The Transport Division's key performance indicator for safety in its Annual Plan / LTCCP is a measure of the crash trend, expressed as the change from the previous calendar year in the number of fatal and injury crashes on the local road network. The goal is to 'Contribute to a reducing trend as measured over 10 years'.

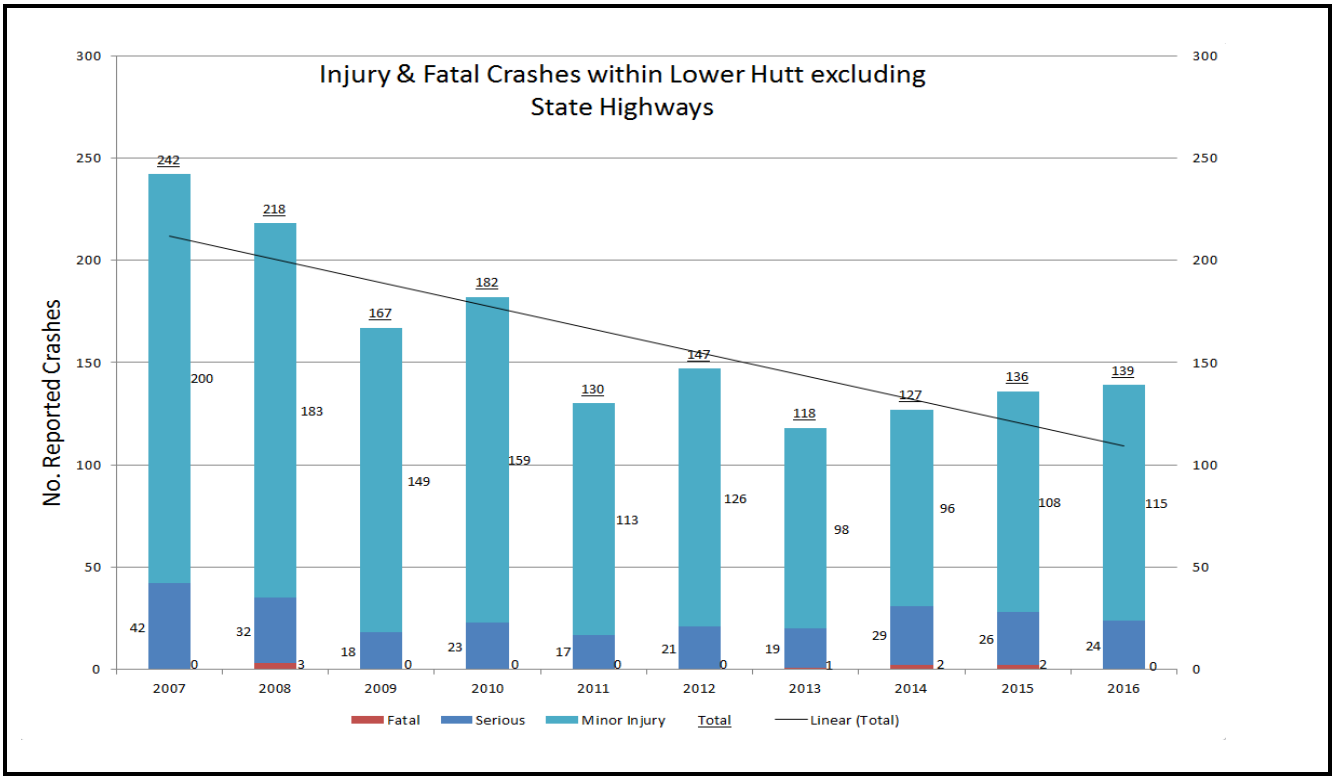


Figure 8-3: Hutt City injury crash statistics

The trend over the past ten years shows a favourable downward trend overall, but with an increase over the past three years which reflects the nationwide trend.

8.2 CARRIAGEWAY PAVEMENTS

This asset group includes:

Carriageway - subgrade
- subbase
- basecourse
- surfacing

The assets are provided to:

- Enable higher traffic volumes on the roading network
- Improve safety by providing a smooth ravel surface with sufficient surface friction to enable stopping
- Reduce maintenance costs by providing a notably strong structure for the traffic and waterproofing to reduce damage
- Enabling economic development, safe travel for multiple modes, and least cost.

8.2.1 ASSET DESCRIPTION AND LIVES

Road pavements vary in width, structure and surfacing types. Details on the three pavement categories are listed in Table 8-4.

Material	Area (m2)	Length (km)	Approx value of surfacing (/m2)	Life cycle range (yrs)
Chipseal	3,326,321	387.4	$4.50-$8.00	1 – 20
Asphaltic Concrete	526,078	89.5	$30.00 - $55.50	8 – 22
Concrete / Interlocking blocks & other	50,938	6.9	$100.00	35+
Totals	**3,309,337**	**483.9**		

Table 8-3: Pavement surface attributes

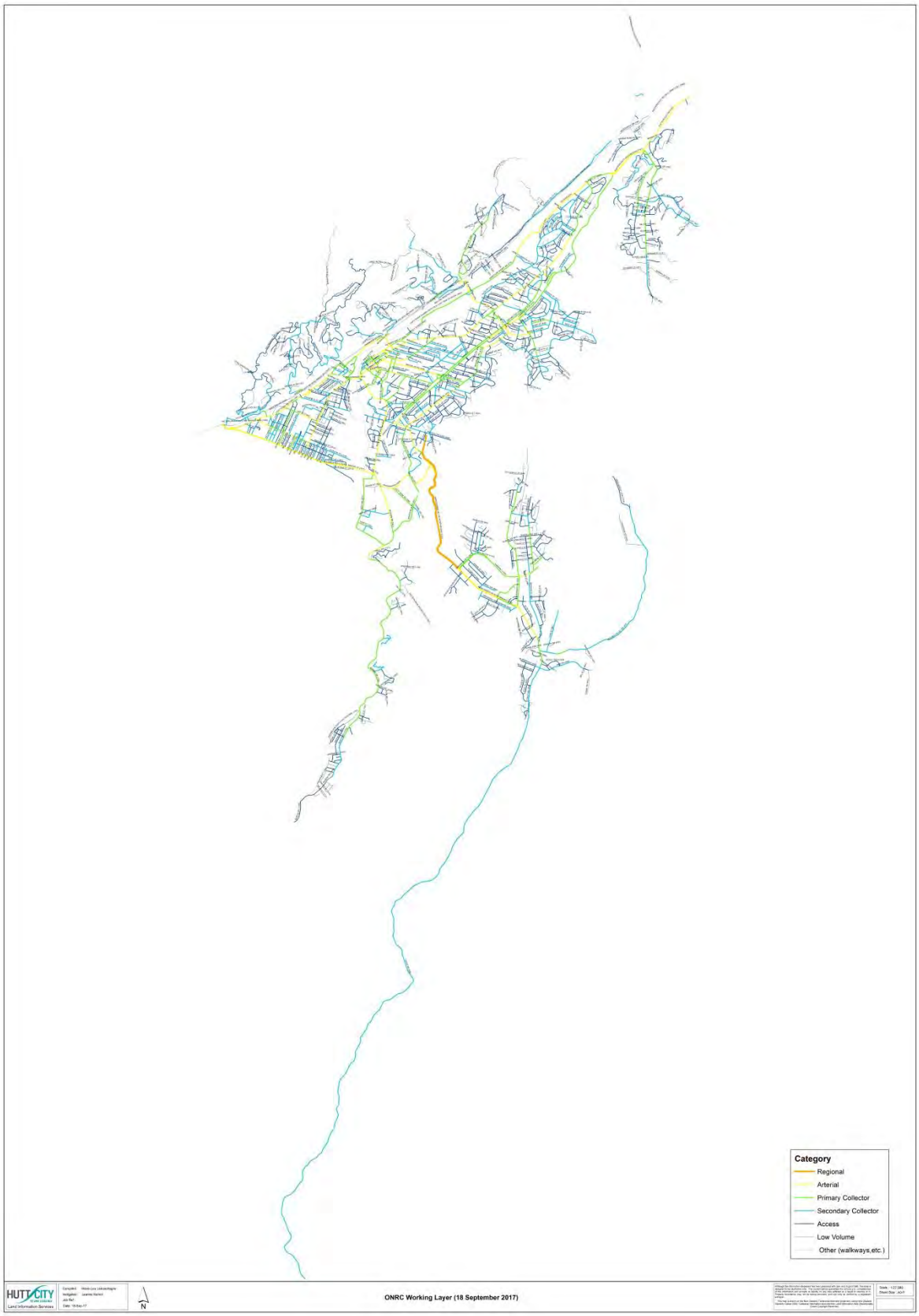


Figure 8-4: Layout of the road network and ONRC hierarchy

8.2.2 ASSET CONDITION

The major causes of pavement deterioration include:

- Loss of flexibility causing cracking.
- Stripping of metal aggregate from the bitumen binder.
- Flushing of chip into binder caused by heat and high volumes of traffic or excessive binder.
- Loss of surface shape due to sub-grade failure.
- Loss of skid resistance due to polishing of aggregate
- Kerb and channel failure leading to water ingress.
- Poor surface drainage leading to water ingress.
- Ingress of water into the subgrade.

Condition is currently assessed by road roughness, visual inspection and skid resistance.

Figure 8-5: Pavement cracking (Waiwhetu Rd.)

a) Pavement roughness

Road roughness, as defined in terms of NAASRA (National Association of Australian State Roading Authority) counts, is an indicator of road condition and performance. NAASRA counts are measured by laser equipment in specifically modified vehicles. The higher the NAASRA counts per kilometre the rougher the road. The sealed road surfaces are rated as to surface condition as follows:

- All roads bi-annually.
- Roads with a traffic volume of 5,000 vehicles per day or more, annually.
- This is carried out contractually as part of the RAMM database updating procedures.

The linkages between pavement condition rating, surface roughness and maintenance categories are shown in Table 8-5. Table 8-6 shows NZTA Maintenance Guidelines (2012) for the linkages between road user satisfaction measures, pavement roughness and maintenance work categories.

The roughness survey includes travel over features such as speed humps, judder bars and rough paving stones. The inclusion of these features will produce a higher roughness result.

While these features can be eliminated from the survey, because they have been included in the survey historically, for consistency between the years, these features have remained in the survey and not taken out.

Environment	Group Name	Average annual daily traffic	**Adjustment factors** (optional, apply where desired to some or all measures)		
			Terrain Type	**% HCV's**	**Traffic Type**
Urban	A	>10,000	Continuous flat and/or straight: Move up one group* Undulating: no adjustment Steep and/or winding: Move down one group * Applicable to routes where average speeds change significantly, as a result of the consistent terrain type.	>15% HCVs: Move up one group. <3% HCVs: Move down one group.	>20% tourist traffic and/or major tourist destination: Move up one group.
	B	5,000 - 10,000			
	C	1,000 - 5,000			
	D	200 - 1,000			
	E	200 - 50			
	F	<50			
Rural	A	>10,000			
	B	10,000 - 5,000			
	C	1,000–5,000			
	D	200–1,000			
	E	50–200			
	F	<50			
Additional Road Type	**Group Name**	**Traffic Volume & Type**	**Maintenance Guidelines**		
Tracks	G	Recreational use, very low traffic volume, all year round access.	Safely passable by 4WD saloon vehicles at low speed. Minimal signage and marker posts.		
	H	Recreational use, very low traffic volume, dry season access only.	Safely passable by 4WD saloon vehicles at low speed, in dry season. Minimal signage and marker posts.		

Table 8-4: NZTA Road Groups for Maintenance Guidelines

ROAD USER SATISFACTION MEASURES					
Measures	**Explanation**	**Method of measurement**	**Target values by road group**		**NZTA related work category**
			Urban	**Rural**	
Maximum average roughness on sealed roads	Average NAASRA roughness of all sealed roads in a Group	RAMM roughness report	A – 90 B – 100 C – 110 D – 120 E – 140	B – 90 C – 100 D – 110 E – 120 F – 140	Sealed pavement maintenance Sealed road resurfacing Sealed road pavement rehabilitation Road reconstruction
Maximum roughness on roughest sealed roads.	No more than 5% by length of roads in any group shall exceed the average roughness limits	RAMM roughness report	A – 120 B – 130 C – 140 D – 150 E – 170	B – 110 C – 120 D – 130 E – 150 F – 180	Sealed pavement maintenance Sealed road resurfacing Sealed road pavement rehabilitation Road reconstruction

Table 8-5: Maintenance guidelines linked to road user satisfaction

NZTA Maintenance Guidelines set out various roughness thresholds depending on the traffic loading of various road categories. The various categories of road and the associated roughness values are compared to the accepted levels of roughness. Table 8-7 shows the current actual level of roughness vs. the target level as set out in the NZTA Maintenance Guidelines.

No specific levels of acceptable roughness have been set for the ONRC classification. The provisional levels set for industry consultation on the Performance Indicators were the same as shown in the table above and the Maintenance Guidelines.

Due to an external system error, the Wainuiomata Hill Road was incorrectly reclassified to an Arterial from its correct classification of Regional. The tables below have Wainuiomata Hill Road included in the Arterial figures.

Urban Roads	Arterial	Primary Collector	Secondary Collector	Access	Low Volume
Kilometres	54.2	69.7	92.8	149.1	84.4
Roughness Rating (average)	93	105	115	120	100
Maintenance Guide	100	100	110	120	140
Rural Roads	**Arterial**	**Primary Collector**	**Secondary Collector**	**Access**	**Low Volume**
Kilometres	NA	NA	26.3	NA	NA
Roughness Rating (average)			111		
Maintenance Guide			110		

Table 8-6: Average NASSRA / Maintenance Guidelines Target

Comparing with the peer group Hutt CC has a higher average roughness for all classes of road. The roughness survey includes travel over features such as speed humps, judder bars and rough paving stones. The inclusion of these features will produce a higher roughness result.

Urban Roads	Arterial	Primary Collector	Secondary Collector	Access	Low Volume
Kilometres	54.2	69.7	92.8	149.1	84.4
Roughness Rating (95 %ile)	176	205	219	214	214
Maintenance Guide	130	140	140	150	170
Rural Roads	**Arterial**	**Primary Collector**	**Secondary Collector**	**Access**	**Low Volume**
Kilometres	NA	NA	26.3	NA	NA
Roughness Rating (95 %ile)			226		
Maintenance Guide			130		

Table 8-7: 95 Percentile Roughness / Maintenance Guidelines

Another 'global' network wide simple measure of overall roughness is tracked annually as shown in Table 8-8.

Parameters	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Average Network Roughness	102.2	114.5	111.5	114.9	113.3	108.2	113.9	110.7
% Better than 150 NAASRA	79.4	79.45	79.1	79.51	79.48	79.05	78.83	80.88
% Better than 130 NAASRA	71.08	71.14	70.00	70.71	70.83	71.71	70.15	71.35

Table 8-8: Network wide- average roughness recent trend

Another global measure of network roughness is the "Smooth Travel Exposure" (STE) index. This measure takes account of the total vehicle kilometres travelled on roads that meet the NZTA roughness guidelines. From the 2016/17 survey, the pavement condition in respect of roughness for each hierarchy type is given in the table below.

Urban Roads	Arterial	Primary Collector	Secondary Collector	Access	Low Volume
Kilometres	54.2	69.7	92.8	149.1	84.4
Smooth Travel Exposure %	78.2	87.7	86.6	82.2	79.02
Rural Roads	**Arterial**	**Primary Collector**	**Secondary Collector**	**Access**	**Low Volume**
Kilometres	NA	NA	26.3	NA	NA
Smooth Travel Exposure %			93		

Table 8-9: Smooth Travel Exposure

Smooth travel exposure is below that of the peer group for arterial access and low volume roads. The overall trend in recent years has been static as shown below.

Year	Urban	Rural	Both
1997/98	72%	97%	73%
1998/99	72%	94%	72%
1999/2000	72%	95%	73%
2000/01	72%	95%	73%
2001/02	72%	94%	73%
2002/03	73%	94%	74%
2003/04	73%	94%	73%
2004/05	75%	93%	75%
2005/06	74%	92%	74%
2006/07	75%	90%	75%
2007/08	77%	91%	77%
2008/09	80%	92%	80%
2009/10	83%	88%	83%
2010/11	76%	91%	76%
2011/12	74%	89%	74%
2012/13	76%	90%	76%
2013/14	77%	86%	77%
2014/15	79%	91%	79%
2015/16	77%	88%	78%
2016/17	82%	93%	82%

Table 8-10: Tracks the changes in STE index in recent years.

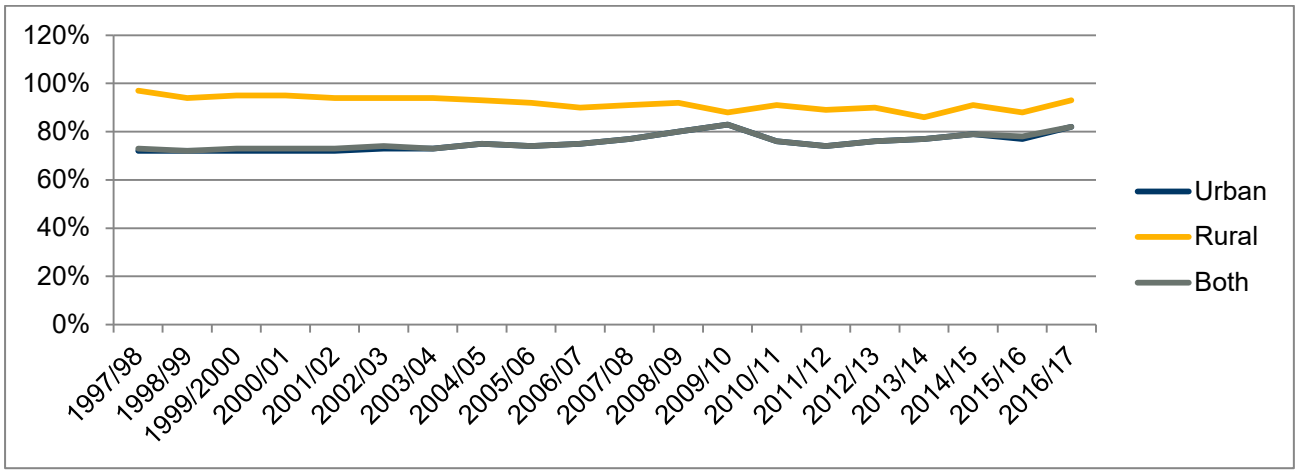


Figure 8-6: Smooth travel exposure (% distance travelled) - historical trend

b) Pavement skid resistance

The key factor affecting the safety of road users is the skid resistance of the pavement. At 2 yearly intervals a 'Sideways Force Coefficient Routine Investigation Machine (SCRIM) to determine skid resistance is used to assess approximately half of the city's roading network. All arterial, collector and some access roads are tested. It is not considered necessary to test the lesser access roads due to low traffic speeds and volumes. Wainuiomata Hill Road is tested annually.

The importance of skid resistance is graphically shown by the dramatic reduction in crashes on the Wainuiomata Hill Road following the introduction of calcined bauxite surfacing over sections of the road. A study on the northbound section of the hill from The Summit to Rishworth Street has found up to an 80% reduction in crashes.

Minimum desirable skid resistance coefficients recommended by NZTA differ in various situations as shown in the table below. The definitions for skid resistance and pavement condition with respect to skid resistance skid are also shown in the table below.

Coefficient	Road description
0.35	• Divided Carriageway
0.40	• Normal Road
0.45	• Approach to Intersections
0.50	• Curves less than 250m radius. Gradients greater than 10%
0.55	• Areas potentially highly hazardous.

Table 8-11: Minimum acceptable skid resistance coefficients

Category	Description	Maintenance status
Excellent	Coefficient greater than 0.1 above standard for each particular site	No work required
Good	Coefficient up to 0.1 above standard	
Moderate	Coefficient fails to meet standard but no more than 0.05 below.	Assess need for resurfacing in conjunction with reseal programme
Poor	Coefficient in the range of 0.06 to 0.1 below standard	
Very poor	Coefficient greater than 0.1 below standard	Resurfacing warranted for safety reasons alone.

Table 8-12: Notes to skid resistance coefficients

Skid resistance condition (lane kilometres)					
Excellent	**Good**	**Moderate**	**Poor**	**Very Poor**	**Length of network tested**
167.4	118.6	28.4	13.7	5.3	333.6

Table 8-13: Skid Maintenance Results

c) Surface condition index

NZTA has developed a road surface condition index based on a 'basket' of recognised visible failure modes as detailed below.

Defect	Weighting
Cracking	Area times 4
Flushing	Area times 1.2
Potholes	Number times 80
Scabbing	Area times 0.5

Table 8-14: Surface Condition Index parameters

Financial Year	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Surface Condition Index (CI)	2.6	2.7	2.7	2.8	1.4	2.0	1.7	1.7	1.5	1.2	1.7	1.5	1.6

Table 8-15: Surface condition index (all roads) - historical trends

The table below details pavement condition in respect of roughness for each hierarchy type. Note that the "Age Index" component of the Surface Condition Index has been omitted from the above. The Condition Index only has been shown (note: the lower the index value, the better the surface condition is).

Network Category	Urban >10,000	Urban 5,000-10,000	Urban 1,000-5,000	Urban 200-1,000	Urban <200	Rural 1,000-5,000	Rural 200-1,000	Rural 50-200	Totals
Kilometres	36.3	56.7	110	161.6	87.8	0.3	25.5	4.4	483.9
Surface condition index	3.88	2.69	2.59	0.74	0.70	0.30	0.76	0.13	

Table 8-16: Surface Condition Index

The Condition Index (CI) shows an improving trend but note:

- The output from the RAMM Treatment Selection Analysis (Reseal in budget plus Reseal next time) has decreased over the last nine years, improving from approximately 152km to approximately 100km. (refer Table 8-15)).
- The cracks/joints historical table showed a dramatic increase following the 2003 and 2004 major floods but has improved over recent years.

- These improvements reflect the recent achievements in resurfacing being above the long term required average.
- Condition Index is now better than the National and Peer Group averages. This is reflected in resurfacing lengths in the near future of below the long term required average.
- The summer and winter of 2016 – 2017 was continually wet, which has resulted in a saturated network. This has been evidenced recently with numerous slips on the network, and it is anticipated that there will be a significant increase in pavement failures that will need intervention.

Total reseals	Oct 2007	Nov 2008	Oct 2009	Oct 2010	Oct 2011	Sept 2012	Sept 2013	Sept 2014	Sept 2015	Sept 2016	Sept 2017
Reseal in budget plus reseal next time (km)	95.9	89.9	114.3	108.4	116.2	117.1	102.7	110.8	133.4	114.2	127.7

Table 8-17: Treatment selection summary from RAMM
Note: B/C = 11.0

d) Pavement integrity index

The Pavement Integrity Index that takes into account the strength of the underlying structure and draws on the traditional defect measures of rutting and roughness.

An indication of how the index reflects the underlying defects is shown in the detailed analysis (i.e. in 1998/99 showing the lowest (best) index in the last 10 years with all component indicators at historical lows).

Year	Old PII Index	Rutting	Alligator Cracking	Ave Rough	Shoving	Potholes	Scabbing	Patching
1998/99	0.4	10	1,100	116	80	300	4632	200
2005/06	1	190	4,700	121.2	240	370	15857	430
2007/08	0.9	160	4,900	124	130	300	12476	250
2008/09		30	2,500	117.4	35	130	3840	260
2009/10		144	3454	110.1	128	135	2237	188
2010/11		24	3651	114.1	151	112	3114	64
2011/12		51	5542	111.5	254	76	3525	71
2012/13		137	3617	114.9	171	80	1757	38
2013/14		29	2992	113.3	82	31	1208	31
2014/15		56	4191	108.2	38	22	792	12
2015/16		71	2453	113.9	613	82	1887	85
2016/17		39	3689	110.7	17	38	796	38

Table 8-18: Pavement Integrity Index – Detailed Analysis

Although all PII component indicators show little variation in condition over recent years, there is a risk that this apparent steadiness does not truly represent the underlying pavement strength situation. In the past the annual reseal lengths achieved have been greater than the 40 km per year average long term requirement, and the concern is that some underlying pavement weakness were masked. These pavement weaknesses certainly haven't been addressed through the limited amount of strengthening work in recent years.

Note that there has been a change in the formula for calculating the PII. Under the old formula, Hutt City held below 1.0, where the lower the number is better. Under the new formula, higher is better and shows Hutt City scoring in the order of 6 to 7.

Pavement condition in respect of Pavement Integrity Index for each road class is shown below:

Network Category	Urban >10,000	Urban 5,000-10,000	Urban 1,000-5,000	Urban 200-1,000	Urban <200	Rural 1,000-5,000	Rural 200-1,000	Rural 50-200	Totals
Kilometres	36.3	56.7	110	161.6	87.8	.3	25.5	4.4	483.9
Pavement integrity index	1.34	0.62	1.08	0.36	0.69	0	1.07	0	

Table 8-19: PII for each road hierarchy

As stated earlier, the formula for the Pavement Integrity Index was changed. The trend in respect of both the old and the new Pavement Integrity Index is shown below.

Financial Year	04/5	05/6	06/7	07/8	08/9	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
PII from 2006 asset management plan	1.0	1.0	0.9	0.9									
Revised PII from RAMM	7.4	7.0	7.2	7.2	6.9	6.4	6.1	6.1	6.4	6.2	6.4	7.8	7.8

Table 8-20: Pavement integrity index (all roads) - historical trends

e) Pavement strength

The Hutt City road network is built on a variety of topography types ranging from the steep eastern and western hills to the flat areas of the valley floor and Wainuiomata. Marked differences exist throughout the city with respect to road widths, types of pavements, foundation strengths, provision for pedestrians and traffic safety services.

The 'Pavement Strength Zone Map' (Figure 8-7) defines distinctive areas of reasonably uniform pavement strength. The map is based on areas of unique underlying ground conditions, age, quality of construction and pavement depth supported by local knowledge and subsequent pavement strength testing (Benkelman Beam tests followed by network wide Falling Weight Deflectometer testing). The pavement strength 'structural number' derived from this data is a key input into the dTIMs model. Table 8-20 shows the detailed results of the Benkelman Beam tests.

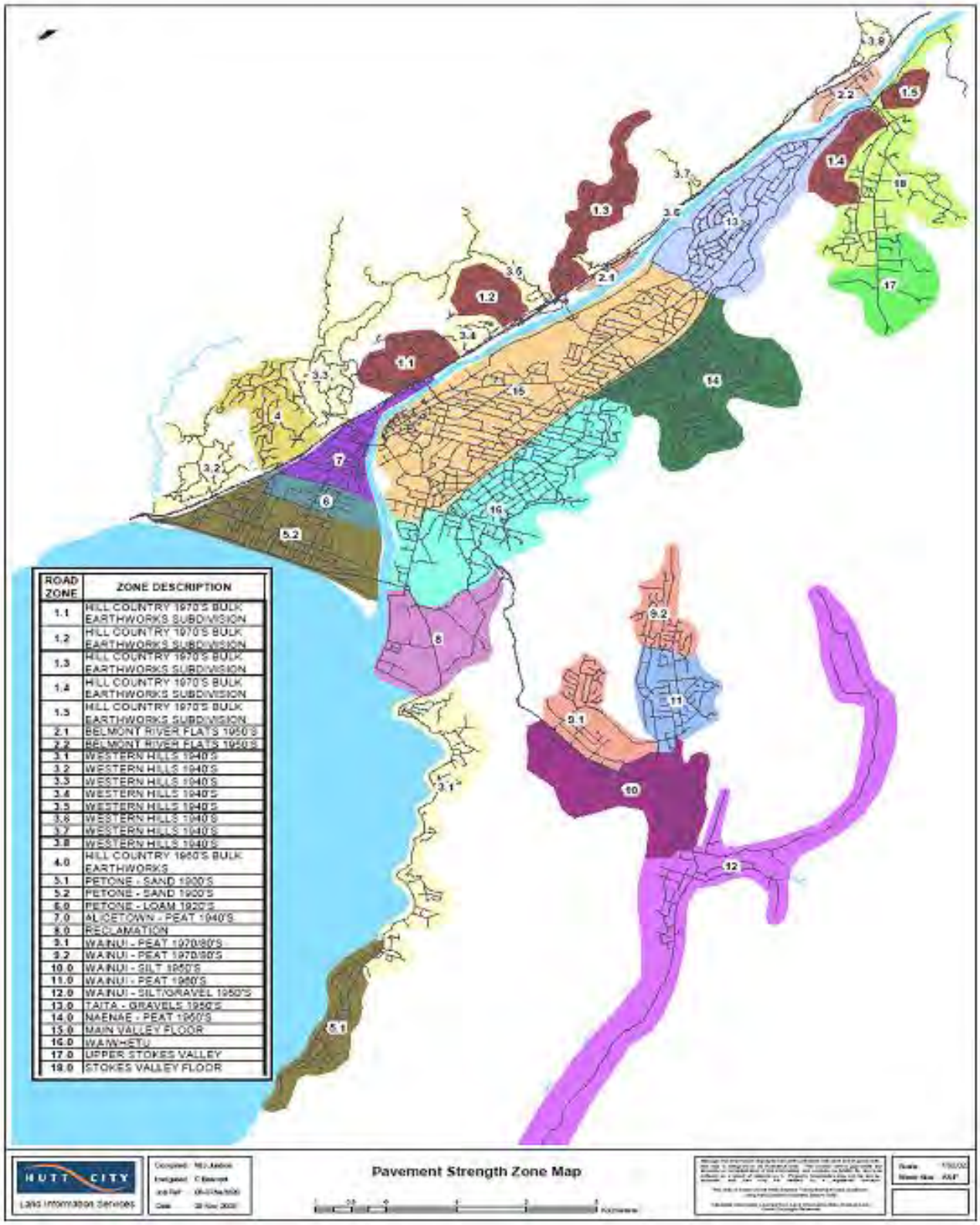


Figure 8-7: Map of pavement strength zone

The weaker pavement strengths are in the original swampy areas of Wainuiomata (10) and Naenae (14); this data feeds into the dTIMs analysis and is reflected in the use of deeper pavement structural layers.

The re-routing of bus routes is a significant factor in areas with weaker pavement strengths, shortening the residual lives of the road sections affected.

Zone	Description	Road Lengths (km)		Initial Assumptions			Benkelman Beam Tests		
		Distributor Roads	Access Roads	Subgrade Strength C.B.R.	Basecourse Depth mm	Structural Number	Location Site	Deflection in mm	Structural Number
1	Hill Country 1970's Bulk Earthworks Subdivisions	1.8	25.3	10	200	2.1	Levin Grove	2.2	0.7
2	Belmont River Flats 1950's	0	3.9	8	150	1.8	Carter Street	0.9	2.3
3	Western Hills 1940's	9.6	49	12\12	150\100	2\2	Pekanga Rd / Rakeiora Gr	1.2\1.5	1.5\1.1
4	Hill Country 1960's Bulk Earthworks	2.8	8.5	10	200	2.1	Maple Street	0.6	3.3
5	Petone-Sand 1900's	10.5	30	6	150	1.5	Tory Street	1.2	2.1
6	Petone-Loam 1920's	0.7	4.1	6	200	1.7	South Street	1.4	1.8
7	Alicetown-Peat 1940's	5.3	10	3	200	0.9	Moa Street	3.1	1.5
8	Reclamation	3.8	7.1	15	200	2.4	Waterman St	1.4	1.1
9	Wainui-Peat 1970/80's	1.9	16.7	2	450	1.1	Meremere St	1	3.6
10	Wainui-Silt 1950's	3.7	14.9	3	300	1.2	McKillop S	2.7	1.6
11	Wainui-Peat 1960's	0.2	13.2	2	300	0.7	Bythell St	1.9	2.6
12	Wainui-Silt/Gravel 1950's	0.5	30.2	6	200	1.7	Peel Place	1.1	2.2
13	Taita-Gravel 1950's	10.5	18.5	8	150	1.8	Lockwood St	1	2.1
14	Naenae-Peat 1950's	3.5	32.5	4	150	1.1	Dempsey S	1.6	2
15	Main Valley Floor	23.4	50.7	6	150	1.5	St James Gr	0.7	3.1
16	Waiwhetu	9.7	35.7	6	150	1.5	Frickleton Gr	2.7	0.9
17	Upper Stokes Valley	0	5.1	8	200	0.4	Dalton Gr	1.4	3
18	Stokes Valley Floor	3.4	17.2	5	150	1.3	Kapuranga Gr	2.7	1.1

Table 8-21: Detailed pavement strength results

f) Wainuiomata Hill Road

A separate study was carried out on the Wainuiomata Hill Road in 1998. This study led to the current safety resurfacing programme which is driven primarily by safety considerations rather than for asset preservation reasons.

Prior to the commencement of the safety resurfacing programme, traffic accident statistics indicated a threefold increase in the number of wet road accidents on the hill over a 10 year period. This increase was attributable to a reduction in the skid resistance of the pavement due to the polishing action of traffic. The use of a high friction (calcined bauxite) seal in the most critical areas has proved very effective with accident reductions in the order of 80% (Refer to the Duffill Watts & Tse report of March 2007, Wainuiomata Hill Bauxite: Friction and Accident Trends).

The performance of the seal on the hill continues to be monitored annually, and the average life of the product has proved to be greater than the original estimate of seven years. Trial sites of a variety of high friction surface products were set up around the city in high stress areas, which were monitored with a view to selecting a preferred product when extensive resurfacing of the safety seal on the hill is required. These trial sites determined that calcined bauxite and an epoxy resin were the best products to use, in addition to it being applied to a polymer modified asphalt surface, for greater life expectancy.

In view of the safety aspects, the hill road received a separate investigation for renewal needs in 2010. This included a full walkover, analysis of crash trends and analysis of SCRIM results.

From this review, a five year forward works programme was developed. This programme was implemented in the 2011/2012 season and is the basis of the annual work programme. The five year forward work programme is amended each year following a full walkover of the hill and analysis of crash statistics for the preceding year and latest SCRIM results.

An increased budget for the early stages of the five year works programme, combined with a sustained drive on the worst areas of the hill road has meant that the bulk of the pressing work on the programme will be completed during the 2014/2015 season and a standardised maintenance programme has been established.

As a result the ongoing budget is being held at $800,000 out into the future years.

g) dTIMS predictive modelling analysis

In 1998 Council commissioned a study to determine the optimum maintenance requirements for road pavements within the City's roading network (excluding Wainuiomata Hill that is specifically targeted by a separate on-going detailed assessment). The city-wide study utilised the Highway Design and Maintenance computer model (HDM-III). This model was developed by the World Bank for projecting long term maintenance costs. Council, along with Tauranga and Marlborough, was one of the first NZ Local Authorities to develop a pavement deterioration model.

Subsequent to Council's HDM-III study, the industry developed the 'Implementation of 'Predictive Modelling for Road Management' project dTIMs.

The dTIMs model is based on the HDM-III model but is more flexible. This flexibility is critical for the calibration of the model to reflect NZ conditions. Whereas the RAMM condition rating surveys provide a clear indication of current network condition, and thus identifies a relatively reactive short-term works programme, dTIMs takes into account pavement strength and future traffic loading data to develop a long term optimised programme.

Council's dTIMs model has been through continuous improvements since the development of the initial model and it is re-run on a 3- yearly basis ahead of each 3 year funding round. The latest re-run was in November 2014 following the annual RAMM condition rating survey, with the latest re-run being currently undertaken in 2017, following the completion of the condition rating survey in August 2017.

Generally, dTIMS reports have highlighted concerns around pavement condition and pavement age. However over 90% of our network is urban and over 80% of this consists of low traffic local roads without heavy vehicles, so pavement wear is negligible on them. These roads are maintained by keeping them waterproofed and are not deteriorating. Roughness is usually being shown as high also. Investigation from previous surveys shows that roughness values are mainly the result of high or low service covers, speed humps, failed trenches, flat tops, etc. Not because of pavement or surface failures.

The 2014 dTIMS outputs are summarised in the table below.

10 Year Averages		Trigger	High ($5.8m)	Normal ($5.2m)	Very Low ($3.7m)
Work Quantities (k/year)	**Current**	**Predicted Average**			
Resurfacing (Chipseal)	13.2	31 .1	27.9	26.5	16.8
Resurfacing (AC)	7.7	7.2	7.3	7.1	6.0
AWPT	3.5	5.6	4.3	4.1	2.9
Agency Cost ('000) – 10 Year Annual Average					
Programmed Maintenance					
Condition	**Current**	**Predicted Network Average After 10 years**			
Roughness	4.5		3.9	3.9	4.2
SII	1.9		1.8	1.9	5.4
Rutting	2.3		2.7	2.7	2.7
Surface Age	6.9		6.3	6.4	9.0
Pavement Age	49.2		53.3	53.5	54.8

Table 8-22: dTIMS summary output

8.2.3 Asset Performance

The following roads have historical sign postings with weight restrictions notices or forewarnings of truck turning problems.:

- Waitohu Rd, York Bay, has a weight restriction of 3000kg from number 17 to the top.
- Orihau Tce, Eastbourne, is a private road with a weight restriction notice put in place by residents of that road.
- Mackenzie Rd, Eastbourne, has two signs, a weight restriction of 3000kg and a "No Public Vehicular Access Beyond This Point" notice, this notice is near the top.
- Richmond Road, Mahina Bay, Moana Road and Huia Road, Days Bay, all have "no truck turning" notices for some or all of their lengths.
- Karaka St off Kowhai St no truck turning notice.
- Pitoitoi-Korimako Service Lane Days Bay, called The Drain Track Days Bay by Eastbourne fire crews, 3000kg Axle Limit, but very tight and narrow. Access off Pitoitoi Road.
- Westhill Rd, Point Howard has an Axle Limit of 3,000kg from start of road.
- Korokoro Road, Petone, has a weight restriction of 2000kg over a portion from London Road to Singers Road.

8.2.4 SURFACE TREATMENT SELECTION

Hutt City Council uses three different treatment options when resurfacing roads:

- **Chipseal** – which consists of a layer of sprayed bitumen followed by one or two layers of stone chips and provides a flexible, waterproof, highly skid-resistant surface
- **Asphaltic concrete** (AC) – which is a mixture of chip and bitumen and applied hot to the road surface
- **Slurry seal** - which is a thin mixture of bitumen and chip.

The default treatment for the roads is chipseal, as it provides best value for money, a water proofing layer to protect the pavement, skid resistance, and a flexible layer to handle the weak subgrades that Hutt City is built on.

There are roads/areas that require an AC surface to achieve best value for money:

- Intersections/roundabouts/corners/parking areas that have high levels of traffic stresses.
- CBD and shopping centres, because of the high amount of both traffic and pedestrians.
- When a significant amount of shape correction is required to provide smoothness of ride for vehicles and bicycles, which also helps reduce vehicle maintenance costs.
- When a structural surface is required from high AADT or heavy vehicle usage, i.e. The Esplanade with an average of 30,000 vehicle per day

Skid Resistance

Roads have been identified within Hutt City which require a higher level of skid resistance to provide greater safety outcomes, and therefore alternative/additional treatment is required:

- Roads prone to ice during winter (identified in the Ice Map, and are generally on the Western Hills). These are either surfaced in chipseal, or where there are higher levels of stress, in Stone Mastic Asphalt (SMA) as SMA has a higher level of skid resistance than Dense Graded Asphalt (DGA).
- Roundabouts are surfaced in SMA to provide a higher level of skid resistance than DGA as well as SMA achieving significant longer life than DGA on roundabouts.
- Wainuiomata Hill Road (as discussed in section 8.2.2 (f).
- Corners which have a history of loss of control crashes are surfaced in either SMA or AC with a High Friction Surfacing treatment applied.

8.2.5 RISK ASSESSMENT

A risk assessment of the network has been undertaken to identify the main risks to the network and enable appropriate mitigation measures to be developed where these do not exist.

Opus International Consultants were engaged to carry out a risk study of the physical network. The aim is to identify vulnerabilities to flood or earthquake and to identify potential mitigating measures.

The HCC Transport division have also developed an Emergency Response Plan as a guide during major events. This plan has been given rigorous ‘tests’ in recent years with 5 flood events since February 2004 and the significant earthquake and flood events of November 2016 that have warranted full implementation of the plan (and corresponding application to NZTA for emergency funding).

The following high or significant risks have been identified on the road network:

- Parts of the network with dangerous geometry (black spots) and / or substandard skid resistance, with the potential to result in fatal or injury accident. The current strategy for managing this risk is to identify, prioritise and remedy black spots using the NZTA accident records and utilise the SCRIM surveys in the reseal treatment selection programme (refer Appendix D for the Deficiencies Data-base).
- Lack of funds for maintenance / renewal resulting in reduced pavement effective life. The current strategy to manage this risk is to monitor condition annually and implement dTIMS to improve understanding of pavement performance. Ongoing development of the dTIMS model is included in the improvement programme.
- Pavements that have insufficient capacity to carry traffic loading, resulting in reduced pavement effective life. A specific area of concern is The Esplanade. The current strategy is to monitor traffic trends and use dTIMS to assess the impact of increased loading on the network condition and expenditure.
- Reinstatement after utility installation resulting in deteriorating network pavement condition and reduced pavement effective life. Hutt City Council has adopted the NZ Code of Practice for Utilities' Access to Transport Corridors, however, it is acknowledged that ongoing auditing by Council staff is the key method for managing this risk.

8.2.6 PAVEMENT OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

Defects are identified either through regular inspections by the maintenance contractor (varying from weekly for arterial roads to four monthly for local roads), observation by the Infrastructure Contracts Division and other Council staff or resident complaints. The contractor submits a monthly programme for approval identifying the required repairs. If notified by the Engineer, the contractor is required to respond to emergency callouts within 24–hours. General Maintenance of sealed roads comprises:

- Pavement and shoulder maintenance.
- Repair of potholes.
- Dig out repairs.
- Repair of surface defects.
- Repair of edge breaks.
- Pre-seal repair work (hot mix surfacing, milling high lips, re-levelling surface boxes, patch stabilisation).
- Emergency works (repair to storm damage, removal of dead animals, accident cleanups).
- Repair of surface openings and minor surface levelling.
- Adjusting surface covers.

Within this work category, work is classed as priority work where:

- The safety of road users may be compromised.
- It is likely that the area of distress may expand or the method of repair change such that the cost of any repair will increase
- Subsequent work may depend on the completion of the work.

Street cleaning and litterbin collecting is carried out at regular intervals to achieve the target level of service in terms of customer satisfaction with streetscapes.

8.2.7 CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

a) Overview

The pavement renewal work categories are resurfacing, rehabilitation (based on economic justification in terms of NPV) and reconstruction (based on economic justification in terms of BCR). The selection of the actual sections of carriageway treated each year and the treatment used is based on output from RAMM, which analyses average life data for each surfacing material, the volume and mix of traffic using the road, the current condition, and field inspection to validate the RAMM outputs. The results of skid resistance testing can also trigger pavement reseals.

To determine long term financial forecasts, Council undertakes predictive modelling studies using dTIMS software to determine the optimum renewal requirements for road pavements within the city's roading network. The dTIMS model utilises the pavement strength data gathered from Falling Weight Deflectometer (FWD) surveys. Refer to the November 2014 MWH report for information on the latest rerun of the dTIMS model.

Resurfacing includes chipseals and thin asphalt surfacings. High density roads and intersections, mainly in the Central Business District and urban area key intersections, are candidate locations for thin asphaltic concrete surfacing or Stone Mastic Asphalt due to the high frequency of braking and turning which makes these locations inappropriate for chipseals.

Reconstruction and rehabilitation involves a range of techniques for smoothing and strengthening the existing pavement in areas of rough pavement and/or areas of pavement showing distress.

b) Historic Trends

The target reseal length (chip and thin asphalt) has historically been based on an average seal life of 13 years equating approximately to a 37km annual reseal length.

The majority of the network is however built on weak subgrades that are susceptible to loss of strength when saturated.

There was a marked deterioration in surface condition following the major flood event in February 2004. (The surface condition index increased from around 1.8 to 2.7). We believe the key reason for this deterioration was the adverse (ground saturating) weather from and since the February 2004 event. The severity of these weather conditions is detailed below.

c) Extreme Adverse Weather

Hutt City had benefited from a respite in major storm events since the major flood of December 1976. However, a flood occurred in 2003, and then a major flood occurred in February 2004. There have been five other severe storms since this event that have required NZTA emergency funding to rectify network damage:

- February 2004 $1.9million network damage
- August 2004 $0.9 million
- January 2005 $0.2 million
- March 2005 $0.9 million
- July 2006 $0.9 million
- June 2013 $0.5 million
- November 2016 $0.25 million

These major events have been compounded by an above average number of ground saturating rainfall events of greater than 40mm per day. The Greater Wellington Regional Council Hydrological Monitoring Technical Report - Watts L, shows that the long term average for such '40mm' events was exceeded in six of the seven years prior to 2006 at their Wainuiomata Reservoir monitoring site and for all nine of the previous nine years at their Wallaceville site.

GWRC advise that this extremely adverse weather in recent years is attributable to the Interdecadal Pacific Oscillation (IPO) which impacts on the El Nino and La Nina events as opposed to 'climate change'. However in the longer term, rainfall intensity and storm frequency for the region are predicted to increase due to climate change.

Since the storm events of 2003 to 2006 recorded above, other storm events have occurred in the region, but not with the severe ground saturating effects of those storms.

d) Pavement Work Programme

The impact of the sustained adverse weather since the February 2004 event should not be understated. Although in the 10 year timeframe since then, the reseal length requirements were predicted to be in the order of 40km/year (which was close to historical lengths) the programme was reduced as more effort is concentrated towards rehabilitation works, with a strong emphasis on flexible chipseals to maintain a waterproof surface.

The Table below sets out achieved reseal lengths in recent years:

Reseal Lengths	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Chip	34.1	25.4	21.7	14.3	18.4	21.4	13.2
Thin Asphalt	8.5	7.2	4.1	11.2	8.0	2.8	7.7
Total	42.6	32.6	25.8	25.5	26.4	24.2	20.9

Table 8-23: Historical reseal lengths (excludes Wainuiomata Hill)

The prime driver however for identifying the coming year's pavement works programme remains the annual RAMM condition rating/treatment selection process.

The overall 'pavements' budget (chipseal/thin asphalt/AWPT) was reduced up to the 2017/2018 financial years. As the surface condition was holding or had improved, the resurfacing lengths were reduced and expenditure on AWPT was held. That was possible because of the favourable rates obtained for Council's three major surfacing and pavements contracts over that period, the fact that from the last re-run of dTIMS, and the forward works programme interrogation of the RAMM database of surfacing ages, showed these dates corresponding to the low budget/maintenance point coming up, with the peak to come. There was some risk to this approach with the subgrades vulnerable to extreme wet weather, but it was been done on the understanding that budgets could be reinstated if required.

With this low period coming to an end, with the predicted peak approaching and the contracts with favourable rates due for re-tendering, the overall 'pavement' budgets are reinstated to normal levels from 2018/19 onwards.

Pavement Forecasts 2018/19 Onwards						
Surface	**2018/19**		**2019/2020**		**2020/21**	
	$	**Km**	**$**	**Km**	**$**	**Km**
Chip	$1,776,000	14.4	$1,809,000	14.2	$1,841,000	14.5
A/C	$1,124,000	18.3	$1,491,000	24.3	$1,659,000	27.0
AWPT	$2,250,000	4.4	$2,250,000	4.4	$2,250,000	4.4
Totals	**$5,150,000**		**$5,550,000**		**$5,750,000**	

Table 8-24: Short term pavement renewal programme

8.2.8 PAVEMENT DISPOSALS

Any roads to be closed or narrowed, Due to the established nature of the Hutt City Road Network it is unlikely that a road would be closed or narrowed, however before such an event Council would consult with affected parties, if possible the land would be sold on the basic on a valuation. This has happened with the disposal of walkways in the Farmers Crescent redevelopment in the period 2012-15.

Land to be sold to adjoining property owners, Council has sold or exchanged land in order to realign roads on widely roads.

8.3 BRIDGES, SUBWAYS AND OTHER STRUCTURES

This asset group includes the following assets:

- Bridges - Road and Footbridges
- Subways
- Culverts larger than 3.4m^2 cross sectional area
- Seawalls
- Retaining Walls
- Barriers, Guardrail, bollards, speed humps, traffic islands, debris fences

Structures are provided on the roading and pedestrian networks to:

- Improve accessibility and efficiency of the network
- Improve safety
- Improve resilience by preventing damage

8.3.1 BRIDGES AND SUBWAY

8.3.1.1 BRIDGE AND SUBWAY ASSET DESCRIPTION

The bridges and subways within the roading network provide key connections for both road users and cyclists/pedestrians across significant features within Hutt City. Four major bridges controlled by Hutt City Council span the Hutt River. A fifth bridge crossing the Hutt River at Silverstream is controlled by Upper Hutt City Council, however Hutt City Council contribute on a 50/50 cost sharing agreement for maintenance.

A number of road bridges cross the Wellington to Wairarapa railway line and other smaller rivers and streams are bridged by lesser structures. Council has five subways. The subways that are linked to railway stations are owned and maintained by Greater Wellington Rail Ltd. Bridge and subway locations are shown in Figure 8-8.

Bridge type / category	Number of structures	Base lives (years)
Over Hutt River	4	120
Over Railway or Major Over-bridges	13	120
Roads over Streams	25	120
Road Underpasses	1	100
Footbridges	20	100
Subways	4	100
Major Culverts	4	100
TOTAL	**1**	

Table 8-25: Summary of Bridges and Culverts

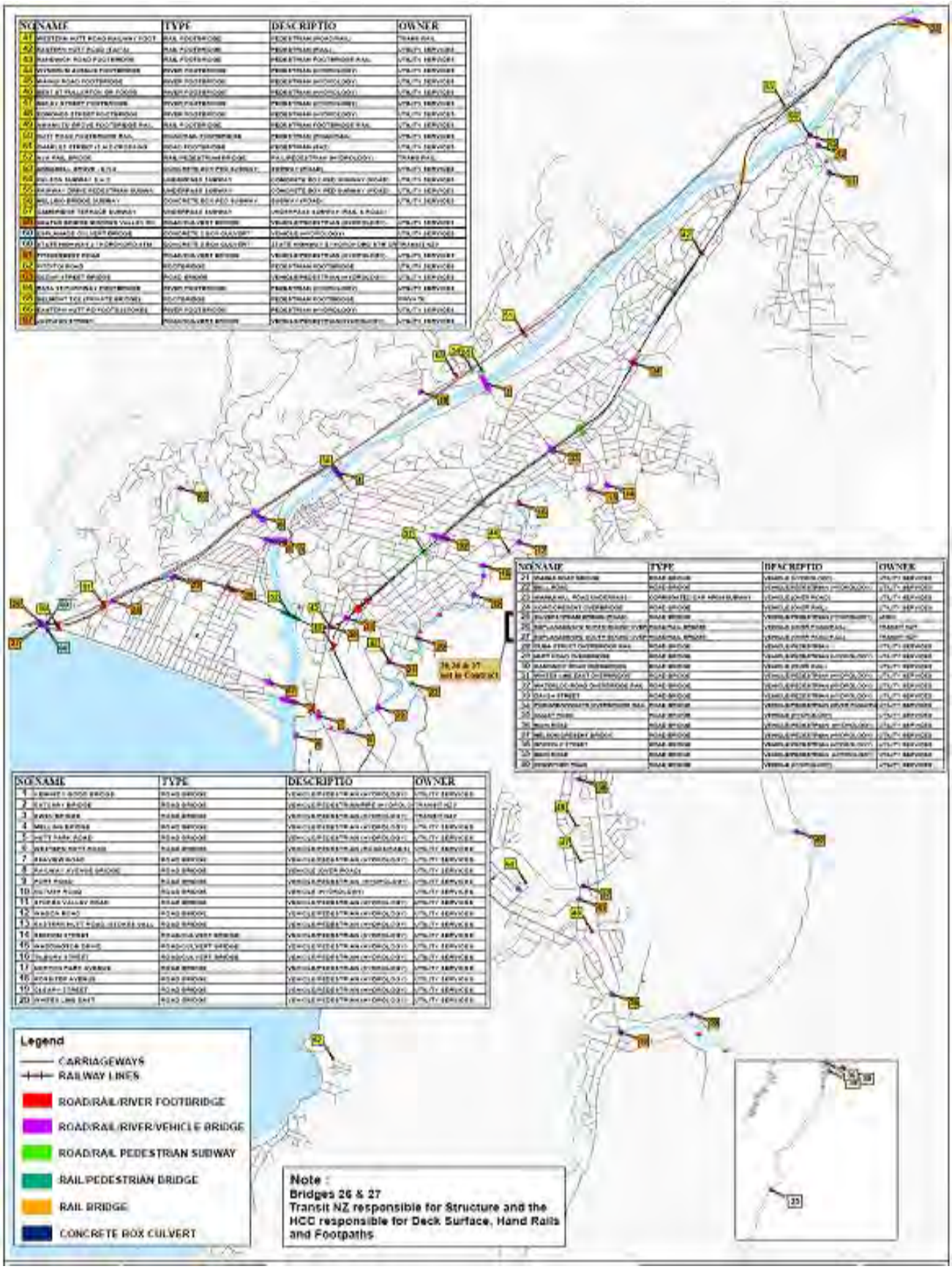


Figure 8-8: Location of Bridges and Subways

Bridge ID	Bridge Name	Road Name	Constructed	Age at year 2017	Possible Year Of Replacement	Maximum life at 2017
1	KENNEDY-GOOD BRIDGE	FAIRWAY DR (374)	1/01/1977	40	2106	89
2	ESTUARY-WAIONE STREET	WAIONE ST (1071)	1/01/1954	63	2026	9
3	EWEN	EWEN BRIDGE (805)	1/01/1994	23	2106	89
4	MELLING	MELLING LINK (788)	1/01/1954	63	2104	87
6	NORMANDALE OVER BRIDGE	NORMANDALE RD (146)	1/01/1969	48	2106	89
7	SEAVIEW	SEAVIEW RD (543)	1/01/1960	57	2106	89
8	RAILWAY AVENUE OVERBRIDGE	RAILWAY AVE (139)	1/01/1967	50	2106	89
9	PORT ROAD	PORT RD (353)	12/05/1959	58	2106	89
10	NATUSCH ROAD	NATUSCH RD (814)	1/01/1982	35	2106	89
11	STOKES VALLEY ROAD	STOKES VALLEY RD (216)	1/01/1950	67	2100	83
12	WAGON ROAD	WAGON RD (1191)	1/01/1955	62	2105	88
13	EASTERN HUTT RD.	EASTERN HUTT RD (186)	1/01/1950	67	2100	83
14	SEDDON STREET	SEDDON ST (377)	1/01/1960	57	2106	89
15	WADDINGTON DRIVE	WADDINGTON DR (378)	1/01/1960	57	2106	89
16	TILBURY STREET	TILBURY ST (403)	1/01/1960	57	2106	89
17	NORTON PARK AVE.	NORTON PARK AVE (494)	1/01/1960	57	2026	9
18	ROSSITER AVE	ROSSITER AVE (504)	1/01/1964	53	2106	89
19	CLEARY STREET	CLEARY ST (706)	1/01/1960	57	2106	89
20	WHITES LINE EAST 1	WHITES LINE EAST (666)	1/01/1960	57	2106	89
21	WAINUI ROAD.	WAINUI RD (356)	1/01/1960	57	2106	89
22	BELL ROAD	BELL RD (551)	1/01/1960	57	2106	89

23	WAINUI HILL ROAD.	WAINUI HILL RD ON RAMP (1178)	1/01/1980	37	2106	89
24	KOROKORO ROAD BRIDGE	KOROKORO ROAD BRIDGE (1024)	1/01/2008	9	2156	139
28	CUBA STREET	CUBA ST (105)	1/01/1928	89	2078	61
29	HUTT ROAD	HUTT ROAD (PETONE) (100)	1/01/1928	89	2078	61
30	RANDWICK ROAD	RANDWICK RD (552)	1/01/1928	89	2078	61
31	WHITES LINE EAST RAIL O/B	WHITES LINE EAST (666)	1/01/1928	89	2078	61
32	WATERLOO ROAD	WATERLOO RD (459)	1/01/1953	64	2103	86
33	DAYSH STREET	DAYSH ST (408)	1/01/1953	64	2103	86
34	POMARE/WINGATE	WINGATE BRIDGE (792)	1/01/1954	63	2104	87
35	CATCHPOLE	COAST RD (836)	1/01/1971	46	2106	89
36	MAIN ROAD [WAINUI RIVER]	MAIN RD (896)	1/01/1952	65	2102	85
37	NELSON CRESCENT	NELSON CRES (913)	1/01/1958	59	2026	9
38	NORFOLK STREET	NORFOLK ST WAINUIOMATA (917)	1/01/1960	57	2106	89
39	MAIN ROAD [BLACK CREEK] WOA	MAIN RD (896)	1/01/1952	65	2102	85
40	CROWTHER ROAD	CROWTHER RD (839)	1/01/1970	47	2106	89
42	TAITA COLLEGE FOOT BRIDGE	EASTERN HUTT/HIGH WALKWAY (1367)	1/01/1954	63	2104	87
43	RANDWICK ROAD FOOTBRIDGE	RANDWICK/TREVETHICK GRV WALKWAY (1455)	1/01/1953	64	2103	86
44	WYNDRUM AVENUE FOOT BRIDGE	RIVERSIDE/WYNDRUM WALKWAY (1388)	1/01/1960	57	2106	89
45	WAINUI ROAD FOOT BRIDGE	WAINUI RD (356)	1/01/1960	57	2106	89
46	BEST STREET FOOT BRIDGE	BEST/FULLERTON WALKWAY (1316)	1/01/2008	9	2156	139
47	MCKAY STREET FOOT BRIDGE	WELLINGTON/MCKAY WALKWAY (1296)	1/01/1964	53	2106	89
48	EDMONDS STREET FOOT BRIDGE	WESTMINSTER/EDMONDS WALKWAY (1300)	1/01/1964	53	2106	89
49	AWAMUTU GROVE FOOT BRIDGE	YORK/AWAMUTU WALKWAY (1314)	1/01/1960	57	2106	89

54	KELSON SUBWAY UNDER MOTORWAY	MAJOR/FAIRWAY SUBWAY-WALKWAY (1504)	1/01/1963	54	2106	89
55	KELSON SUBWAY UNDER KGB	FAIRWAY DR SUBWAY-WALKWAY (1503)	1/01/1979	38	2106	89
56	MELLING TERRACE	MELLING BRIDGE (EAST) SUBWAY (1500)	1/01/1954	63	2104	87
57	CAMBRIDGE TERRACE SUBWAY	HINAU ST/GUTHRIE ST SUBWAY (1502)	1/01/1950	67	2100	83
61	FITZHERBERT ROAD CULVERT	FITZHERBERT RD (853)	1/01/2010	7	2106	89
62	BRIDGE LS2 RICHARD PROUSE	MOORES VALLEY RD (910)	1/01/1960	57	2106	89
63	BRIDGE LS3 TE WHITI FOOTBRIDGE	RIVERSIDE DR CENTRAL (412)	1/01/1970	47	2106	89
65	CEDAR ST	CEDAR ST (170)	1/01/2000	17	2156	139
66	EASTERN HUTT ROAD FOOT BRIDGE	EASTERN HUTT RD (186)	1/01/1980	37	2106	89
67	JACKSON ST EAST CULVERT	JACKSON ST (1018)	1/01/1940	77	2106	89
68	BELMONT SCHOOL ROAD CULVERT	BELMONT SCHOOL ACCESS ROAD (1292)	1/01/1978	39	2106	89
69	KOTARI RD FOOT BRIDGE	KOTARI RD (1091)	1/01/1980	37	2106	89
70	WESTERN HUTT RD RAIL FOOTBRIDGE	WESTERN HUTT RD (SH2) (1186)	1/01/2008	9	2156	139
72	MOORES VALLEY RD BRIDGE	MOORES VALLEY RD (910)	1/08/2007	10	2155	138
73	THE ESPLANADE NTH CULVERT	THE ESPLANADE NTH (1057)	1/01/1960	57	2106	89
74	THE ESPLANADE STH CULVERT	THE ESPLANADE STH (1068)	1/01/1960	57	2106	89
75	CHARLES ST-WESTERN HUTT RD	WESTERN HUTT RD (SH2) (1186)	1/01/1968	49	2106	89
76	AVA FOOT BRIDGE WALKWAY	AVA FOOT BRIDGE WALKWAY (1623)	1/01/2010	7	2156	139
77	COAST ROAD-SMELLY CREEK	COAST RD (836)	1/01/1950	67	2106	89
78	BELMONT TCE FOOT BRIDGE	BELMONT TCE (604)	1/01/1990	27	2131	114
79	HIGH/DUDLEY WALKWAY VERANDA	HIGH/DUDLEY WALKWAY (1328)	1/01/1980	37	2106	89
80	DILLION ST-MARINE DR WALKWAY	RESERVE RD PVT (1618)	1/01/2008	9	2156	139
81	MCKENZIE AVENUE BRIDGE	MCKENZIE AVENUE BRIDGE (1654)	20/01/2009	8	2156	139

82	PITO-ONE ROAD BRIDGE	PITO-ONE ROAD (1653)	1/01/2008	9	2156	139
83	THE ESPLANADE-HUTT RD SP BRIDGE	THE ESPLANADE-HUTT RD SHARED PATH (1696)	1/01/2009	8		
84	RONA/TOTARA ST BRIDGE	RONA/TOTARA ST WALKWAY (1478)				
85	PUKEATUA BRIDGE	WAINUIOMATA HILL ROAD SHARED PATH (1689)	1/08/2015	2		
86	NAENAE/STRAND BRIDGE	NAENAE/STRAND CRES WALKWAY (1486)	1/01/1950	67		
87	WADDINGTON/STRAND BRIDGE	WADDINGTON/STRAND CRES WALKWAY (1448)	1/01/1950	67		
88	RATA ST - PARKWAY FOOTBRIDGE	RATA ST WAINUIOMATA/PARKWAY WALKWAY (1622)	1/01/2012	5	2156	139
89	KONINI ST BOX CULVET	KONINI ST (888)	1/01/1963	54	2106	89
90	RAWHITI ST BOX CULVET	RAWHITI ST (248)	1/01/1963	54	2106	89

Table 8-26: Bridge, culvert and subway lives and replacement

8.3.1.2 BRIDGE AND SUBWAY ASSET CONDITION

There are a wide range of bridge types and ages within the roading network. Rating for condition takes into account age, appearance, defects and structural integrity. Age itself is generally a reflection of a bridges ability to withstand earthquakes as the design of these structures was carried out in accordance with the code that prevailed at that time.

Consultants were engaged to carry out an investigation of a sample of 10 bridges to determine their remaining lives and to assess the benefits of any measures that may be taken to arrest deterioration. The first part of this investigation is complete and the remaining lives determined were used in the 2006 asset revaluation work.

The Transport Division has in place a bridge inspection programme whereby all bridges within the network are inspected on a regular basis. The bridges and subways are inspected in accordance with the NZTA "Bridge Inspection and Maintenance Manual" and the "Bridge and Other Significant Highway Structures Inspection Policy" as follows:

Superficial	Annually
General Inspections	Every 2 years
Principal Inspections	Every 5 years
Special Inspections (e.g. following significant earthquake or flood event)	Immediately after event

The condition rating definitions used for the inspection are shown in the table below.

Category	Description	Maintenance status
Excellent	Sound structure designed to meet current standards, well maintained. Designed post 1976.	No maintenance required
Good	As previous condition but not designed to current standards or showing wear and tear and minor deterioration of surfaces. Some spalling but with no staining from corrosion of reinforcement. Deterioration causing minimal influence on performance.	
Moderate	Functionally sound but appearance affected by minor cracking, staining, vegetation growth efflorescence or exudation.	Maintenance required
Poor	Structure functioning but with problems due to significant cracking, spalling, deformation, corrosion or undermining of foundations. Likely to cause a marked deterioration in performance in the medium term. Some asset replacement or rehabilitation needed within the medium term.	
Very poor	Structure has serious problems and is performing inadequately. For example bridge has stability problems or is load restricted. Minimal life expectancy, requiring urgent replacement or rehabilitation.	Major rehabilitation or replacement.

Table 8-27: Definitions for bridges, culverts and subways condition ratings

The bridge rating condition by road hierarchy is shown in the table below. This includes the bridges and major culverts under the management of the Transport Division, and excludes Silverstream Road Bridge which is owned by the Upper Hutt City Council, Hutt Park Road Bridge, now used as a foot bridge and managed by Parks and Reserves and the two Esplanade Road Bridges linking Petone to State Highway Two, and Korokoro Road Bridge, which are under the control of NZTA.

Network Category	Number of Bridges, Culverts and Subways at Condition Rating					
	Excellent	Good	Moderate	Poor	Very Poor	Totals
Major District Distributors	1	4	6			11
Minor District Distributors	1	3	3			7
Local Distributors		3	2			5
Access Roads	3	4	12			19
Rural Roads	2	2				4
Subways	1	3	1			5
Footbridges	5	3	12			20
Current Condition Totals	12	22	36			71

Table 8-28: Bridge condition ratings by road hierarchy

The bridge condition profile (figure below) shows that the majority of the bridges are in moderate or better condition.

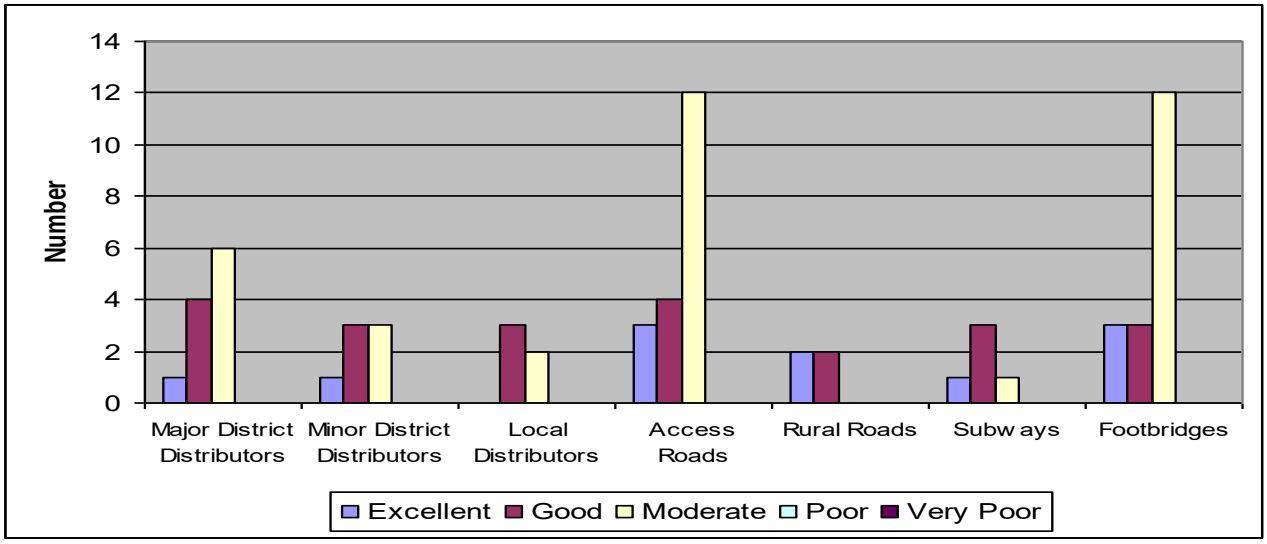


Figure 8-9: Bridges, culverts and subways asset condition

8.3.1.3 BRIDGE AND SUBWAY ASSET PERFORMANCE

- **Traffic capacity:** Generally the bridges perform well under present day daily traffic volumes. A joint investigation is currently underway with GWRC and NZTA to assess the need to replace the Melling Bridge, however this is primarily due to the restricted waterway under the bridge as opposed to lack of traffic capacity across the bridge

- **Load capacity:** All bridges have been assessed capable of full class 1 loading. Over the years design loadings have increased as vehicle sizes and carrying capacity have been increased:

  - High Productivity Motor Vehicles (HPMV): 11 bridges have been assessed as being HPMV capable, which services access from SH2 to Seaview, from both north and south directions off SH2.

  - 50 MAX vehicles: All bridges have been assessed as 50 MAX capable, except for the bridge on Main Road, Wainuiomata (#36)

  - 45/46 tonne vehicles: All bridges have been assessed as 45/46 tonne vehicle capable, except for the bridge on Main Road, Wainuiomata (#36)

- 18 tonne double decker buses: All bridges on the current bus routes have been assessed as 18 tonne double decker bus capable

The Overweight routes (see Appendix F) have been reaffirmed, and design templates for each bridge on these routes have been developed, to enable the rapid analysis of their capacity to cope with today's increasing loads.

8.3.1.4 BRIDGE AND SUBWAY RISK ASSESSMENT

A risk assessment of the network has been undertaken to identify the main risks to the network and enable appropriate mitigation measures to be developed where these do not exist.

The risk assessment has identified bridges as **critical assets** in the network. Council has implemented a comprehensive programme of bridge inspections in compliance with the NZTA Bridge and Maintenance Inspection Manual and has detailed and current information on bridge condition.

Seismic vulnerability: A seismic screening study of all bridges was carried out in 2001. (Refer to Phillips and Wood Report – Seismic Screening of Bridges – Project Report 21 March 2001). From this study a prioritised bridge strengthening programme was developed and implemented with the final bridge to be strengthened in 2020/21.

Insurance: Insurance cover has been arranged for the two major bridges spanning the Wellington Fault Line; these being The Normandale Overbridge and The Melling Bridge as neither bridge would withstand a fault line rupture event.

It is considered that insurance cover is not warranted on the remainder of the bridges in the network for the following reasons:

- We have been working through a seismic strengthening programme to enable our bridges to meet the Wellington Lifelines Group 1 in 250 year return period 'Regional Earthquake'. This programme is almost complete.
- Experience has shown that major floods are very concentrated and severe flood damage is limited to particular catchments, not the entire city. In addition, many of our bridges do not cross waterways.
- Council's bank overdraft facility ($55m) is in excess of the current replacement valuation of the bridge asset. ($49m)
- Replacement bridges would attract a minimum NZTA subsidy of 51% for capital projects.
- There is the potential to gain 'Government Grant' funding of half the local share in extreme events as was the case in the February 2004 storm.

8.3.1.5 BRIDGE AND SUBWAY STRUCTURES OPERATIONS AND MAINTENANCE PROGRAMME

The Network Maintenance Contractor undertakes superficial maintenance e.g. cleaning deck drainage and first response.

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc. Bridge Maintenance Contracts are let for more significant repair works.

Maintenance programmes are developed from the schedules of defects identified during the inspections. Repair works are carried out in accordance with the NZTA Bridge Inspection and Maintenance Manual. The types of maintenance work activity undertaken include:

- Repairing structural defects
- Repairing or replacing damaged components
- Restoring protective coatings

- Clearing waterway obstructions
- Installing scour protection

Repair treatments and priorities are determined by considering the impact on:

- Public safety
- Traffic movement
- Future costs if the work is not done

Maintenance and major bridge repairs needs are identified under the categories:

- **Urgent** – to be completed immediately
- **High** – to be completed within 6/12 months
- **Medium** – to be completed within 2/3 years
- **Low** – to be completed within 5+ years

Maintenance expenditure for bridges and subways, is shown in the table below. This is determined by the faults and items requiring repair from inspections.

Activity	2018/19	2019/20	2020/21
Routine Maintenance	$5,000	$5,000	$5,000
Structural Repairs and Maintenance	$258,000	$258,000	$258,000
Total	$263,000	$263,000	$263,000

Table 8-29: Bridge and Subway operations and maintenance budget

8.3.1.6 BRIDGE AND SUBWAY CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

Replacement

Replacement bridges and sub-ways are programmed for renewal supported by asset condition assessments.

A remaining life study estimated possible renewal dates for bridges; the figure below shows tentative replacement needs over the next 150 years.

The Norton Park Avenue / Nelson Crescent Bridge is programmed for replacement ion 2027/28 at a cost of $950,000.

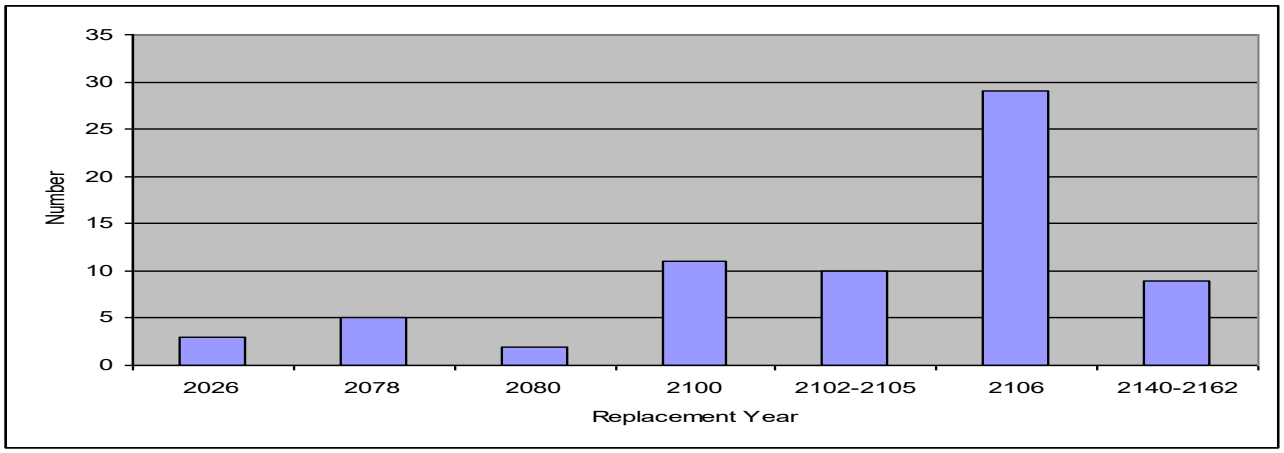


Figure 8-10: Bridge and Subway Replacement Programme

Seismic Upgrading

Seismic Strengthening has been completed on a number of bridges. Only one bridge has been programmed for upgrading in the next 10 years, which is dependent on the outcome of the Cross Valley Link project. The table below also sets out other bridges that still require to be seismically upgraded.

Bridge/ Subway/Culvert	Detail	Comment
Cuba St Overbridge	Seismic Strengthening	Programmed for 2020/21 at $820,000
Wainui Road / Waiwhetu Stream	Seismic Strengthening	Completed
Seaview Road / Waiwhetu Stream	Seismic Strengthening	Completed
Pomare / Wingate Overbridge	Seismic Strengthening	Completed

Table 8-30: Renewal programme - structures

Corrosion Protection

The three estuary bridges (Waione Street, Port Road and Seaview Road) have all been assessed for durability due to their location and visible signs of corrosion to the concrete reinforcement. Chloride contamination profiles and electrochemical surveys were recently carried out in certain bridge elements.

Results were benchmarked against earlier investigation results done in 1995. No evidence of significant changes in these elements were detected, but recommendations are to regularly monitor for spalling on piers, the application of a saline based coating to some elements and installing sacrificial anodes to some capping beams and piles. $900k was spent on corrosion protection of the Estuary (Waione Street) in 2016/17.

It is proposed to undertake Corrosion Protection on the Port Road and Seaview Bridges in 2018/19 ($700,000) and further work on the Estuary Bridge in 2025/26 ($959,000).

Other Capital Projects

The following capital works are included in the 10 year programme:

- **State Highway 2 – Melling Interchange/ Replacement Bridge:** $6.5m has been allocated in 2025/26 as 1/3 share of a possible new bridge. This bridge is being upgraded as part of the RiverLink project..

8.3.1.7 BRIDGE AND SUBWAY DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable valve.

8.3.2 SEAWALL STRUCTURES

8.3.2.1 SEAWALL ASSET DESCRIPTION

Seawalls provide protection for the roading network from wave action. There are approximately 5.3 km of seawalls of various types in the Eastern Bays area from Point Howard to start of Days Bay fulfilling this function.

	Number of seawalls	Length of seawalls	Base lives	Approx replacement value ($) 2015
Seawalls	22	5.3 kms	60-90 years	10m

Table 8-31: Summary of Seawalls

The location of HCC seawalls managed by the Transport Division is shown in Figure 7.19. The seawall on the Petone foreshore is not a Transport Division asset, but is managed by the Parks & Gardens Division.

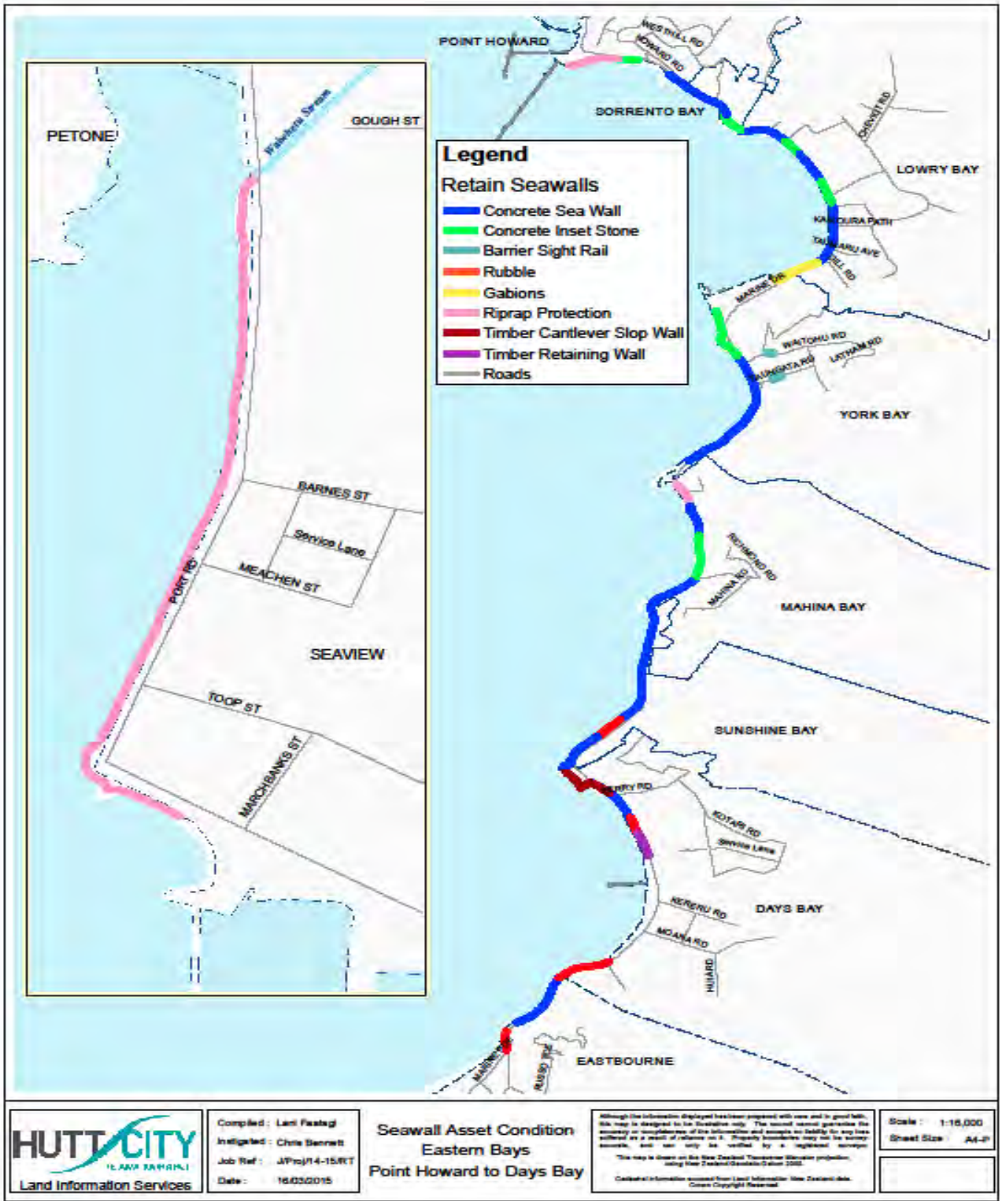


Figure 8-11: Location of Seawalls

8.3.2.2 SEAWALL ASSET PERFORMANCE

The seawalls around the Eastern Bays are performing satisfactorily despite being of poor to moderate condition and in many areas of poor design. Where they are nearing the end of their economic lives it is intended to replace seawalls in conjunction with the roll-out of the Eastern Bays Shared Path. The new sea walls are designed to accommodate the increased frequency and severity of storms.

8.3.2.3 SEAWALL RISK ASSESSMENT

A risk assessment of the network has been undertaken to identify the main risks to the network and enable appropriate mitigation measures to be developed where these do not exist. For seawalls, climate change and the attendant risk of an increasing number of severe storms along with rises in sea level are significant risks.

8.3.2.4 SEAWALL ASSET CONDITION

Seawalls are inspected every two years as per the NZTA inspection policy requirements for bridges and other significant highway structures.

These inspections are undertaken on the same cycle as the routine bridge inspections.

Condition ratings are described in the table below.

Category	Description	Maintenance status
Excellent	Sound structure well designed. Well maintained.	No maintenance required
Very Good	Structure showing minor wear and tear and deterioration of surfaces.	No maintenance required
Good	Some spalling but with no corrosion staining; needs to be inspected in the medium term. Deterioration causing minimal influence on performance.	Minor maintenance required
Moderate	Functionally sound structure but appearance affected by minor cracking, staining and vegetation growth. Deterioration beginning to be reflected in adjacent carriageway.	Maintenance required
Poor	Structure functioning but with problems due to significant cracking, spalling, loss of stability, deformation and corrosion. Likely to cause a marked deterioration in performance in the medium term. Some asset rehabilitation needed within the medium term.	Significant Maintenance required
Very poor	Structure has serious problems and has failed or is about to fail in the near future resulting in unacceptable performance. Minimal life expectancy, requiring urgent replacement or rehabilitation.	Major rehabilitation or replacement

Table 8-32: Definition of Seawall Condition Rating

Eastern Bays Seawalls – Point Howard to Eastbourne							
Location	**Displacement Start**	**Displacement End**	**Length (m)**	**Existing Wall Type**	**Age**	**Condition**	**Remaining Life Assessment**
Point Howard	600	660	60	Rip Rap	Unknown	Good	30
Point Howard	660	720	60	Vertical stone and concrete wall	Unknown	Poor	5
Point Howard	720	820	100	Sloping stone and concrete wall	Unknown	Moderate	20
Sorrento Bay	820	870	50	Concrete wall	2007	Good	90
Sorrento Bay	870	950	80	Curved sloped overlay	1993	Good	80
Sorrento Bay	950	1010	60	Concrete wall with stone insets	Unknown	Good	50
Sorrento Bay	1010	1070	60	Trial stone wall built by Auckland Stonemasons	1989 - 1990	Moderate	30
Sorrento Bay	1070	1110	40	Concrete wall - slope 45 deg	1984-1985	Good	40
Sorrento Bay	1110	1140	30	Vertical Stone wall	1985-1986	Good	40
Sorrento Bay	1140	1150	10	Curved sloping overlay	Unknown	Moderate	20
Sorrento Bay	1150	1160	10	Curved sloping overlay	Unknown	Moderate	20
Lowry Bay	1160	1300	140	Early double curved wall	1985-1989	Good	80
Lowry Bay (to white boat shed)	1300	1360	60	Wide sloping wall	1992	Very Good	70
Lowry Bay (from white boat shed to Cheviot Road)	1360	1550	190	Concrete with stone walls	Unknown	Very Poor	1
Lowry Bay (Cheviot Road to Kakoura Path)	1550	1660	110	Concrete wall at 45 deg	Unknown	Moderate	20
Lowry Bay	1660	1720	60	Concrete with stone walls	Unknown	Poor	5
Lowry Bay	1720	1820	100	Concrete wall at 45 deg	1985 - 1986	Moderate	20
Lowry Bay	1820	1900	80	Concrete wall at 45 deg	1989	Moderate	20
Lowry Bay (up to Whiorau Reserve)	1900	1950	50	Gabion baskets	Unknown	Very Poor	3
Lowry Bay (end of Whiorau Reserve)	2200	2250	50	Concrete sloping wall	Unknown	Good	50
York Bay	2290	2560	270	Concrete wall overlay	1992 - 1993	Good	50
York Bay	2560	2580	20	Concrete and Stone	Unknown	Very Poor	2
York Bay	2580	2890	310	Double and single curved wall	2009 - 2012	Excellent	100
Mahina Bay	2920	3000	80	Rip Rap	1991	Poor	5

Eastern Bays Seawalls – Point Howard to Eastbourne							
Location	**Displacement Start**	**Displacement End**	**Length (m)**	**Existing Wall Type**	**Age**	**Condition**	**Remaining Life Assessment**
Mahina Bay	3050	3300	250	Concrete and stone	1985 - 1986	Very Poor	2
Mahina Bay	3300	3440	140	Concrete overlay	1991	Moderate	20
Mahina Bay /Sunshine Bay Point	3440	3500	60	Headland - natural	Unknown	Very Poor	2
Sunshine Bay	3500	3800	300	Concrete walls and overlays	1989 - 1991	Moderate	30
Sunshine Bay	3800	3880	80	Medium term path repair	2013	Good	10
Sunshine Bay	3880	3930	50	Walls - various	Unknown	Very Poor	2
Sunshine Bay	3930	4030	100	Concrete block riprap	Unknown	Very Poor	3
Days Bay	4240	4340	100	Timber Walkway	Unknown	Good	50

Table 8-33: Seawall Condition Rating (GHD 2016)

Network Category	Seawall Condition Rating(m)						
	Excellent	Very Good	Good	Moderate	Poor	Very Poor	Totals
Arterial	0	0	0	0	0	0	0
Primary Collector	100	60	960	910	200	720	2950
Secondary Collector	0	0	0	0	0	0	0
Access	0	0	0	0	0	0	0
Low Volume Access	0	0	0	0	0	0	0
Current Condition Totals	**100**	**60**	**960**	**910**	**200**	**720**	**2950**

Table 8-34: Summary of Seawall Condition Rating

8.3.2.5 SEAWALL OPERATIONS AND MAINTENANCE PROGRAMME

Historically, minimal maintenance has been required on seawalls, but the increased frequency and severity of storms and swells has resulted in an increased requirement for remedial maintenance to deliver the appropriate level of service.

Regular maintenance is undertaken as required. Contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

Maintenance programmes are developed from the schedules of defects identified during the routine inspections. The types of maintenance work activity undertaken include:

- Repairing damage
- Reinstating displaced armour rack or concrete units

Repair treatments and priorities are determined by considering the impact on:

- Public safety
- Traffic movement, and
- Future costs if the work is not done.

Maintenance and major repairs needs are identified under the categories:

- Urgent – to be completed immediately
- High – to be complete within 6/12 months
- Medium – to be complete within 2/3 years
- Low – to be completed within 5+ years

Maintenance expenditure for seawalls is shown below. This includes the cost of routine inspections and any faults that may be found during the inspections.

Activity	2015/16	2016/17	Comment
Seawall Maintenance	$5,000	$267,500	Inspections and maintenance work undertaken in 2016/17

Table 8-35: Seawall operations and maintenance budget

8.3.2.6 SEAWALL CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

Seawall renewals are programmed on demand supported by condition assessments.

The renewal of some seawalls is an important component of the Eastern Bays Shared Path Project. This project is in the Detailed Design phase of the Business Case Process and construction is expected to commence in 2018.

The Port Road erosion mitigation project is scheduled to 2017/2018 at a cost of $726,000.

8.3.2.7 SEAWALL DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable value. Armour rock may be recycled if the size is appropriate.

8.3.3 RETAINING WALLS

8.3.3.1 RETAINING WALL ASSET DESCRIPTION AND LIVES

Retaining walls, supporting roads or banks above the roads are found predominantly in the hill suburbs and are of varying types ranging from standard reinforced concrete walls to crib block and pole retaining walls.

	Number of structures	Base lives	Approx. replacement value ($) 2015
Retaining walls	168	50-100 years	14.1m

Table 8-36: Summary of Retaining Walls

8.3.3.2 RETAINING WALL ASSET CONDITION

An asset data base and condition rating survey dedicated to retaining walls has been set up. Condition assessments have been incorporated into the 'Bridge Inspection' professional services contract on a 5 yearly cycle. As with seawalls, expenditure on retaining walls has been very low historically and it is not anticipated that this will change.

The loss of serviceability of these structures would have a major impact on the roading network, both in terms of disruption to traffic flows and potentially high costs for reinstatement work. The results of the most recent condition assessment are shown in the table below. (GHD Survey April 2013)

Of the 6747 square metres total face area of the retaining walls, 92 % is rated from moderate to excellent condition while 7% is rated as poor and 1% is rated as very poor.

Quantity	Excellent	Good	Moderate	Poor	Very poor	Totals
Length (metres)	214	1293	307	155	59	2028
Face Area (sq. metres)	546	4491	1147	469	94	6747

Table 8-37: Retaining Wall Condition Rating

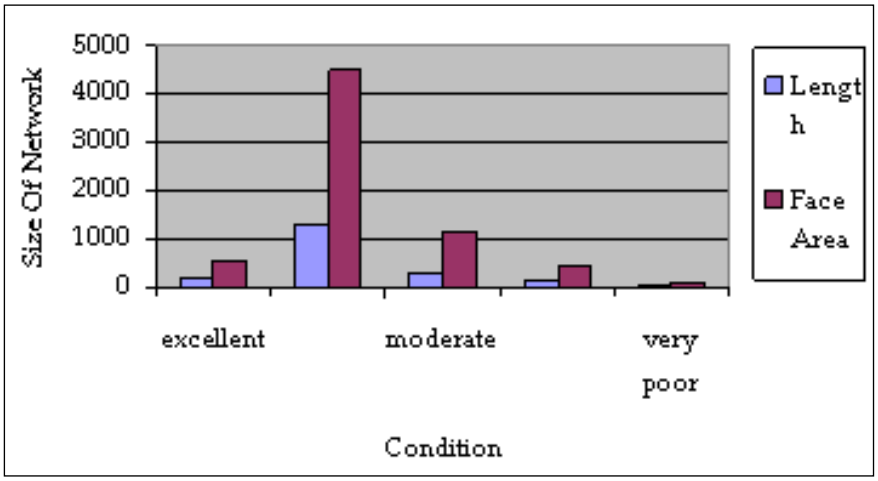


Figure 8-12: Retaining walls condition profile

8.3.3.3 RETAINING WALL ASSET PERFORMANCE

Retaining walls are performing satisfactorily. After the GHD Survey of April 2013 some minor maintenance work was undertaken.

8.3.3.4 RETAINING WALL RISK ASSESSMENT

A risk assessment of the network has been undertaken to identify the main risks to the network and enable appropriate mitigation measures to be developed where these do not exist. No major issues were identified.

8.3.3.5 RETAINING WALL OPERATIONS AND MAINTENANCE PROGRAMME

Maintenance is generally carried out on an 'as required' basis in response to damage caused by vehicle accidents or land slips.

Maintenance work relating to retaining walls is identified in the inspection report. Minor maintenance items, such as the removal of young trees from crib walls, are referred to the Maintenance Section for action.

The occasional structural work that is identified, such as under-pinning of eroded foundations, is incorporated into the annual bridge maintenance physical works contract.

Maintenance expenditure for retaining walls is shown below.

Activity	2015/16	2016/17	Comment
Retaining Wall	$90,000	$0	Maintenance work undertaken in 2015/16

Table 8-38: Retaining Wall operations and maintenance budget

8.3.3.6 RETAINING WALLS CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

Retaining wall renewals are programmed on demand supported by condition assessments. No specific budget provision is included in the 10 year programme. Council does not anticipate constructing any new retaining walls but new retaining walls from new subdivisions are vested in Council.

8.3.3.7 RETAINING WALL DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable value.

8.3.4 OTHER STRUCTURES

8.3.4.1 OTHER STRUCTURES ASSET DESCRIPTION

Other structures include barriers, guardrails, bollards, raised pedestrian crossings, speed humps and traffic islands which are installed to improve road safety and definition. Debris fences are installed to protect road users in areas below road cuttings and embankments at risk from falling debris. The lives of these assets are enhanced by regular inspection and maintenance.

	Length of structures	Base lives	Approx replacement value ($) 2015
Other structures	18.2 kms	25-60 years	7.4m

Table 8-39: Other Structures replacement values

8.3.4.2 OTHER STRUCTURES ASSET CONDITION

No condition profile has been determined for this array of assets as they are generally robust structures which are not subject to a cyclic replacement programme. Debris fences are regularly inspected to remove debris and check condition.

8.3.4.3 OTHER STRUCTURES ASSET PERFORMANCE

All minor structures are performing satisfactorily.

8.3.4.4 OTHER STRUCTURES RISK ASSESSMENT

A risk assessment of the network has been undertaken to identify the main risks to the network and enable appropriate mitigation measures to be developed where these do not exist. No major issues were identified.

8.3.4.5 OTHER STRUCTURES OPERATIONS AND MAINTENANCE PROGRAMME

Maintenance is generally carried out on an ‘as required’ basis in response to damage caused by vehicle accidents or land slips.

Minor maintenance items, such as the removal of young trees from behind debris fences, are referred to the Maintenance Section for action.

Maintenance expenditure for these structures is shown in the table below:

Activity	2016/17	2017/18	Comment
Barriers	$20,000	$20,000	

Table 8-40: Other Structures Operations and Maintenance Budget

8.3.4.6 OTHER STRUCTURES CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

Miscellaneous road structure renewals are programmed on demand supported by condition assessments.

No specific capital development works are programmed in the 10 year planning period for minor structures.

8.3.4.7 STRUCTURES DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable valve.

8.4 DRAINAGE

This asset group includes the following assets:

- Kerb and Channel
- Sumps/cess pits
- Soak pits
- Sump leads to discharge point e.g. manhole or waterway
- Water tables
- Road culverts and headwalls
- Subsoil drains

Drainage assets are provided on the roading network to:

- Minimise flooding
- Improve safety by removing water from the pavement
- Extend the life of the pavement structure by removing water
- Provide protection to pedestrians by delineating the carriageway

8.4.1 ASSET DESCRIPTION

The objective of drainage asset is to provide a stormwater carrying capacity for runoff from the carriageway, footpaths, berms and adjacent properties to an outfall point and, where pedestrian usage warrants it, providing a protective barrier for pedestrians from passing traffic. Removal of water from under the pavement extends the life of the pavement

	Base lives years	Approx replacement value ($) 2015
Drainage assets	15-80	95m

Table 8-41: Summary of Drainage Assets

Kerb & channel	Length (kms)
Dished Channel (Asphalt)	.150
Dished Channel (Concrete)	24.400
Dished Channel (Half pipe)	2.203
Dished Channel (Sealed)	2.825
Extra Channel footpath-or road	51.990
Kerb & Channel (Concrete)	713.887
Kerb & Channel (Stone)	.199
Kerb & Dished Channel (Concrete)	1.756
Kerb Only (Concrete)	18.158
Kerb Only (Stone)	.297
Mountable Kerb & Channel (Concrete)	10.363
Mountable Kerb Only (Concrete)	1.118
Other Type	1.237

Slot Channel (Concrete)	.716
SWC (Deep, >200 Below Seal Edge)	.036
SWC (Shallow, <200 Below Seal Edge)	.635

8.4.2 ASSET CONDITION

There are approximately ten types of surface water channel in service. Deterioration affects all types in fundamentally the same way, therefore the same asset condition table has been used to describe all types. Very little kerb and channel constructed prior to 1950 remains. This is reflected in the condition profile, which shows approximately 98% of the network being in moderate condition or better. The stormwater channels in poor or very poor condition are generally in older areas of the City or are in areas where local conditions mean the life expectancy is less than normal.

The latest condition ratings and condition profile shown below have been determined from information collected as part of the annual RAMM Condition Rating Survey. Definitions for condition ratings are shown below.

Category	Description	Maintenance status
Excellent	No defects.	No maintenance required
Good	As previous condition but showing some weathering and minor cracking.	
Moderate	Functionally sound but showing some cracking, minor areas of uplift or settlement or spalling of the surface. Following rain there is localised ponding in the channels.	Carry out minor localised maintenance
Poor	Asset usable but significant lengths of cracking, uplift or settlement, spalling or surface degradation. Following rain there are significant lengths of channel with ponded water.	Minor localised maintenance ***OR*** Monitor condition, view inclusion in renewal programme
Very poor	Asset potentially dangerous to road users. Asset does not function and shows major cracking, uplift or settlement, spalling or surface degradation. Following rain flooding of the surrounding footpaths and roadway often occurs. Significant sections achieve economic justification required to obtain NZTA subsidy.	Inclusion in cyclic renewal programme

Table 8-42: Definitions for surface water channel condition ratings

	Surface Water Channels Rating Condition (Km*)*								
Network Category	Urban >10,000	Urban 5,000-10,000	Urban 1,000-5,000	Urban 200-1,000	Urban <200	Rural 1,000-5,000	Rural 200-1,000	Rural 50-200	**Totals**
Excellent	30.6	82.3	35.0	156.2	242.0	3.1	5.9	1.5	556.6
Good	24.3	53.9	55.6	132.8	101.7				368.3
Moderate	4.4	5.9	4.9	9.2	8.9				33.3
Poor									0.0
Very Poor									0.0
Current Condition Totals	59.3	142.1	95.5	298.2	352.6	3.1	5.9	1.5	**958.2**

Table 8-43: Condition rating for Surface Water Channels

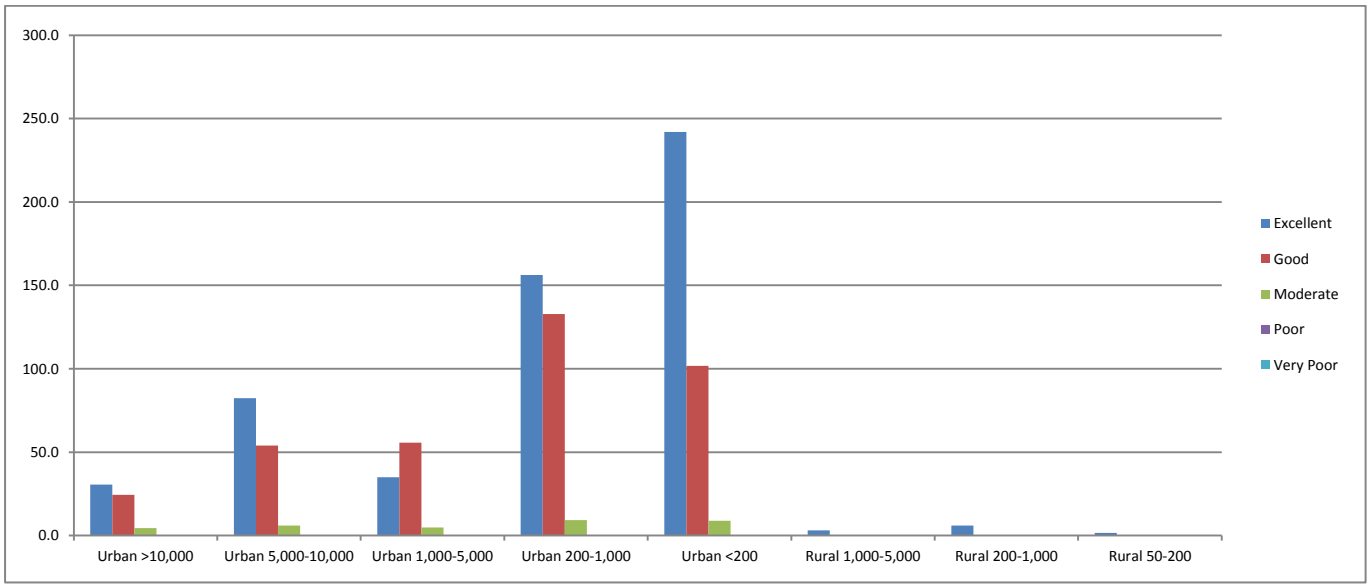


Figure 8-13: Condition Rating for Drainage assets

The profile shows that the majority of the kerb and channel throughout the network is in good or excellent condition.

8.4.3 ASSET PERFORMANCE

City wide the performance is very good. There is a lack of drainage control assets in some roads on the western hills. This deficiency is being addressed through the on-going sub-standard road upgrading programme. In the areas of the western hills yet to be upgraded through the sub-standard roading programme, surface water is controlled in critical areas by targeted asphalt bunding.

A list of 'critical sumps' has been developed. Blockage of these sumps has the potential to cause property damage and they are given special attention in the maintenance regime.

8.4.4 RISK ASSESSMENT

A risk assessment of the network has been undertaken using the framework described earlier to identify the main risks to the network and enable appropriate mitigation measures to be developed where required.

The following high or significant risks have been identified on the road network relating to kerb and channel:

- Subdivision road kerbs not designed to cope with appropriate design rainfall. Flooding and accidents / injury could result. Subdivision applications are closely vetted by experienced engineers with extensive local knowledge specifically mindful of the need to create secondary flow stormwater paths.

- Blockage of sumps and pipes resulting in flooding.

8.4.5 DRAINAGE OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc. The types of maintenance work activity undertaken are:

- **Unplanned maintenance** - Repairing damaged kerb typically caused by heavy vehicles or tree roots. The majority of defects are notified by the public, and a 24 hour call-out service is provided to attend complaints. Repairs are undertaken immediately where there is an issue of public safety (i.e. broken kerb).

- **Planned maintenance** - Replacing short sections of kerb to re-establish grade (any change in channel grade is likely to cause ponding because of the city's flat topography). Planned maintenance programmes are developed from the schedules of defects identified during programmed condition surveys. Repair priorities are determined by considering the impact on:

    - Public safety.
    - Flood nuisance.
    - Significant further deterioration is likely.
    - Future costs if the work is not done.
    - Visual impact of defect.
    - Maintenance

The growing range of kerb types (e.g. decorative kerb in the CBD and mountable kerbs in residential subdivisions) will, in time, lead to higher maintenance costs

8.4.6 DRAINAGE CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

Road Reconstruction

The stormwater channels in poor and very poor condition are targeted for renewal through Council's road and footpath reconstruction programme. Priorities for this programme are assessed through analysis of the Condition Rating data and physical inspections of streets within the network.

The cyclic renewal programmes approved by Council has resulted in a significant improvement in the condition of the kerb and channel over the last 15 years. Over that period, the number of streets identified in the cyclic kerb renewal programme has dropped year by year. Whereas up to 14 streets had been reconstructed annually under this programme, under the current budget only 1 street per year has been allowed for.

There has been a 'shift' in recent years to reduce the 'capital replacement road reconstruction programme and replace targeted shorter lengths of kerb under the operating programme. Very few streets remain that warrant full scale reconstruction. At this time, provision is currently made for one full scale road reconstruction (typically 500m) every year. The current budget provision allows for approximately 1km of kerb renewal per year.

As the worst urban streets have now been reconstructed under the road reconstruction programme subsidies for replacement of kerb and channel are difficult to justify thus the current emphasis on the targeted operating repairs. In some areas with free draining sub-soil conditions, broken kerb can have little detrimental effect on the adjacent carriageway and the key driver for renewal can be aesthetic rather than functional.

Kerb and channel renewal works fall within NZTA's Major Drainage Control work category. Economic justification is required to be determined for projects within this category.

Ground strength data obtained from the falling weight deflectometer pavement strength testing survey enabled a reassessment to be made of the anticipated remaining life of the kerb and channel within the network. This assessment is based on the type of construction, age and condition of the existing kerb and channel and takes into consideration the relative subgrade strengths throughout the city as determined by the pavement strength survey. The desirable replacement cycle for kerb and channel is in the range 65 to 95 years. The figure below indicates anticipated remaining kerb and channel life as derived from the revaluation works. As can be seen, the anticipated rate of renewal remains low for 12 years, but increases substantially beyond that timeframe.

Consequently, we intend to continue the cyclic kerb renewal programme at the current 1.5 km per annum level subject to the identification of projects that achieve economic justification.

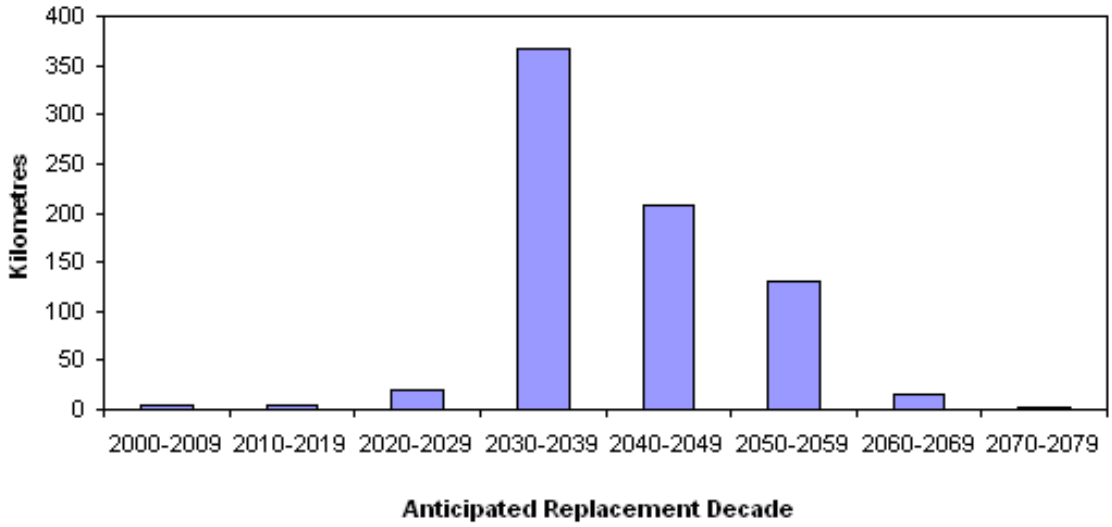


Figure 8-14: Predicted replacement timing for kerb and channel

No specific capital works are included in the programme, although it is noted that the deficiency data base projects and the pavement improvements programme incorporate kerb and channel development work.

8.4.7 STRUCTURES DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable valve.

8.5 FOOTPATHS AND CYCLEWAYS

This asset group includes:

- Footpaths
- Accessways
- Cycleways (in road reserve or adjacent to road)
- Kerb ramps
- Vehicle crossings

Footpaths and cycleways are provided on the roading network to:

- Improve safety for pedestrians and cyclists
- Provide accessible routes for physically impaired
- Provide opportunities for active transport modes
- Reduce negative environmental impact.

8.5.1 ASSET DESCRIPTION AND LIVES

The objective of footpaths and cycleways/ shared paths is to provide a safe, comfortable and efficient network of footpaths and facilities catering for pedestrians (including the physically disabled), and cyclists. There are currently approximately 728 km of footpaths and cycleways. The layout of the HCC cycleways is shown in Figure 8-18.

- How many KM of footpath, cycleway and shared path by ONRC classification
- How many vehicle crossings 29442+

Policy of installing kerb crossings

Kerb crossings are installed to allow vehicle access to road side land use and to allow footpath users to safely cross the carriageway and access the footpath.

Vehicle crossings are installed at the property owners cost, however council can organise and manage contractors to undertake the work on the property owner's behalf and pass on the costs.

Council maintains driveways from the edge of the carriageway to the back of the footpath where footpaths are constructed. If there are no footpaths then the property owner maintains the driveway.

Kerb crossings are provided by council at locations which match desire lines for pedestrian crossing movements, typically at road intersections. These crossing points are designed to me friendly for mobility impaired users such as mobility scooters and baby buggies.

Kerb crossings are also provided adjacent to mobility impaired parking spaces to allow wheelchairs to access the footpath.

The majority of footpaths within the city are concrete, forming 79.9% of the network.

Most of the concrete footpaths within the City can be aged from the adjoining kerb and channel. It should be noted however, that significant proportions of these paths, were constructed during the State Housing Development of 1944-55 and are expected to have lower lives than modern concrete paths.

The second most prevalent type of footpath is asphaltic concrete forming 18.91% of the network. Most asphaltic concrete footpaths requiring attention for breaks and excessive undulations have been repaired. Asphalt or sealed paths are in general resurfaced when they deteriorate due to age or because of excessive defects. There are few paths older than 20 years.

Interlocking block footpaths are typically relatively new (not greater than 20 years) and make up only 1.18% of the network. Other than a small suburban area in Alicetown they are generally located in the CBD and suburban shopping centres.

A fourth and very minor category is timber. This type of construction has been used occasionally in recent years to avoid the construction of retaining walls in difficult situations (e.g. Days Bay Walkway / Howard Road footpath / Normandale Road footpath / Castle Crescent steps / lower Hill Road Belmont.

	Base lives years	Approx replacement value ($) 2015
Footpaths and cycleways	15-80	95m

Table 8-44: Summary of Footpath and Cycleways

8.5.2 ASSET CONDITION

There are three main types of footpath surfacing; asphaltic concrete, concrete and interlocking paving blocks. While of different structure, material, type and lifespan, the essential nature of deterioration is the same and the same asset condition table has been used to describe all three types. The main reasons for footpath deterioration are:

- Inadequate reinstatement by service authorities.
- Vehicle damage.
- Break-up by root and weed intrusion.
- Settlement of slabs causing dangerous lips

Footpath condition rating surveys are carried out in conjunction with the RAMM road condition surveys and beginning in July 2010 was done on a three yearly cycle. Previous surveys were done on a two yearly cycle.
Each year one third of the footpaths are surveyed. The three areas are:

- Wainuiomata and Harbour Wards
- Western and Central Wards
- Northern and Eastern Wards

July 2018	Northern and Eastern Wards
July 2019	Wainuiomata and Harbour Wards
July 2020	Western and Central Wards

Table 8-45: Planned survey by year.

The footpath survey block lengths are scored on a scale from 1 to 5, where 1 equates to Excellent (no defects) and 5 equates to Very Poor (potentially dangerous). Descriptions for each of the scores are given in Table 8-47. These scores are used in our cyclic renewal programme. The isolated defects needing urgent attention picked up during the surveys are forwarded on to our Maintenance Section for action.

Category	Description	Maintenance status
Excellent	No defects.	No maintenance required
Good	As previous condition but showing some weathering and minor cracking.	
Moderate	Functionally sound but showing some minor uplift or settlement, cracking and surface fretting. May cause pedestrians to trip.	Maintenance required
Poor	Asset usable but showing significant uplift or settlement, cracking, or surface ravelling. Likely to cause pedestrians to trip.	
Very poor	Asset potentially dangerous to use with major uplift or settlement, areas of cracking, or surface ravelling. Very likely to cause pedestrians to trip.	Major rehabilitation or replacement

Table 8-46: Definitions for footpaths and cycleways condition ratings

	Footpath Rating Condition (Km*)*								
Network Category	Urban >10,000	Urban 5,000-10,000	Urban 1,000-5,000	Urban 200-1,000	Urban <200	Rural 1,000-5,000	Rural 200-1,000	Rural 50-200	**Totals**
Excellent									
Good									
Moderate									
Poor									
Very Poor									
Current Condition Totals									

Table 8-47: Footpath Condition Survey Results

Footpath category Excellent, good and moderate equates to 99% of the total footpath length.

Surface Material	
Asphaltic concrete (black)	149,990
Concrete	512,436
Interlocking blocks and Other	17,725
TOTAL	680,151

Table 8-48: Footpath Surface Material

Interlocking block footpaths are generally in good condition in terms of serviceability.

Individual defects remain the key trigger for concrete footpaths in categories 4 and 5. An improved process for identifying these defects through the annual footpath surveys and targeting them in the maintenance programme has been set up. Longer, block lengths are renewed under the Road Reconstruction and cyclic Footpath renewal programmes. The cyclic (replacement) programme has been coordinated with the current Ultra-fast Broadband fibre 'cable' roll-out.

8.5.3 ASSET PERFORMANCE

The city is well catered for with its footpath network. Any minor gaps are remedied through the footpath capital budget. Annual footpath surveys identify maintenance issues and safety concerns. Customer service request also identify faults.

8.5.4 RISK ASSESSMENT

A risk assessment of the network has been undertaken to identify the main risks to the network and enable appropriate mitigation measures to be developed where these exist.

The following high or significant risks have been identified on the road network relating to footpaths and cycleways:

- Uneven lips and broken footpaths resulting in pedestrians tripping and potentially serious injury. A process has been set-up to identify specific types of defects through the annual footpath inspection surveys and target these defects through the maintenance programme e.g. - a 'grinding programme has been introduced to rectify the 'lips'.
- Reduced effective life of footpath due to tree roots from ageing berm trees, resulting in potential injury to pedestrians. These defects are now identified through the footpath surveys and repairs works are coordinated with the Parks Division who arrange for root cutting along with the installation of root guards.
- High road camber and on-going overlays in certain areas require installation of concrete nib type vehicle crossings to avoid scraping damage to vehicles and the pavement surface. This impacts on vehicle crossing maintenance and street cleaning costs.

8.5.5 OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

Planned maintenance is identified and programmed by the maintenance contractor and approved by Council's Infrastructure Contracts Manager. Footpath condition surveys have been incorporated into the annual road condition surveys with approximately one third of the city covered every three years. Areas requiring localised maintenance are identified and referred to the Maintenance Contractor for repair. The overall condition in a particular street is an input into the development of the cyclic renewal road reconstruction programme.

Reactive footpath maintenance, which is mostly in response to public complaints, is responded to with the initial objective of making safe as per the response times specified in the contract by the most economic method available, making temporary repairs if major repairs or renewals are required. Council maintains vehicle crossings from the carriageway to the back of the footpath.

8.5.6 CAPITAL REPLACEMENT AND DEVELOPMENT PROGRAMME

- **Concrete footpaths:** The footpath condition rating surveys have confirmed that the majority of the defects city-wide are isolated faults due to uneven lips, tree roots, settled trenches and vehicle damage that can be targeted through maintenance works as opposed to an extensive cyclic renewal programme.

- **Asphaltic Concrete**: Bitumen maintenance attends to minor repairs, arising from tree roots and vehicle damage. Overlays in future will be determined more by the need to renovate paths due to surface deterioration because of age rather than structural defects. The desirable replacement cycle for asphaltic concrete footpaths is 14- 20 year; renewal works are currently on this cycle.

- **Interlocking Blocks:** Interlocking concrete block footpaths have a considerably higher construction cost than standard concrete footpaths and can be reinstated seamlessly following work on underground services. These footpaths are therefore generally placed in commercial areas with higher foot traffic for environmental enhancement purposes. These footpaths are typically renewed under City Development urban upgrade budgets through projects driven primarily by the need to improve amenity values.

Provision has been made in the 10 year renewal programme for the following programmes:

- **Cyclic renewals**: $205,000 per annum; it is believed that the current footpath cyclic renewal budget of in conjunction with the road reconstruction programme is sufficient to meet current needs over the ten year timeframe.

- **Minor road and footpath construction**: $72,000 per annum for discretionary works approved by Council on a case by case basis:

    - upgrade sub-standard footpaths on parts on the western hills.

    - on-going programme of installing new pedestrian crossings.

The adoption of the Walk and Cycle the Hutt Strategy 2014 - 2019 by Council had the principal aim of encouraging more people in the city to cycle and walk more often and further for commuting and recreational purposes. The priorities are to develop;

- the Wainuiomata Hill Shared Path (*construction planned for 2017/18*) and the Pukeatua Summit Bridge (*completed 2015*)

- the Beltway Cycleway (*the first phase planned for 2018/19*)

- the Eastern Bays Shared Path (*part of the Great Harbour Way, first phase planned for 2018/19*)

- the extension and sealing of the Hutt River Trail to the northern boundary of the city with Upper Hutt City and to connect in with the Beltway (*planned for 2017/18*)

- the continued expansion and development of a protected cycleway and shared path network

The announcement by the government of an Urban Cycleway Fund (UCF) in August 2014 led to an Urban Cycleways Programme (UCP) being implemented from late 2014 to June 2018. The programme provided increased investment to accelerate the delivery of cycling networks in the main urban centres. With this increased assistance the Council has been able to move ahead quickly in progressing the above programmes as part of its commitment to develop a protected cycleway and shared path network, as outlined in the Walk and Cycle the Hutt Strategy 2014-19.

These programmes are a cost share between Council, the Urban Cycleways Fund and NZTA.

Current funding allocations are as follows:

	2017/18	18/19	19/20	20/21	21/22	22/23
Eastern Bays Shared Path	600,000	2,000,000	2,000,000	1,500,000	1,500,000	1,500,000
Wainuiomata Hill Shared Path	2,600,000	2,900,000				
The Beltway Cycleway	1,500,000	2,070,000	1,020,000	1,000,000	400,000	400,000
Continued Network Expansion and Development	$400,000					

Table 8-49: Shared Path & Cycleway Projects

The three Urban Cycleway Projects included in the works programme are:

Eastern Bays Shared Path

The completion of an Eastern Bays Shared Path has been an aspiration for Hutt City Council and its residents for many years. While previous reports and concept designs have been developed for sections of the Eastern Bays, earlier designs were dependant on the replacement of most seawalls rendering the project infeasible.

A key driver for this project is to develop a safe and connected walking and cycling facility to connect communities along Wellington's Eastern Bays, and to provide links to other parts of the network for commuting and recreation. The project forms a key part of the Te Aranui o Pōneke (the Great Harbour Way), a walking and cycling route around the harbour of Wellington.

The main outcomes of the project are to improve pedestrian and cyclist safety and to increase the number of these users on Marine Drive. Stakeholders identified the additional benefit of reducing the incidences of road closures and improve the resilience of the corridor. Opportunities to enhance tourism as an outcome of the project are also recognised.

The recommended design aims to provide a facility that will achieve all of the desired outcomes, while minimising and mitigating the key constraints and challenges. Where possible, a 3.5 metre shared path will be constructed, enabling pedestrians and cyclists to share the space safely. At some locations, the width has been reduced to 2.5 metres to minimise the encroachment of beaches or to accommodate obstacles such as boat sheds. However the new path will provide a substantial improvement on the current facility, and will provide a valued community asset.

Cost estimates of the shared path are expected to be between $10 - $15 million, and will be refined as the detailed design is further developed. The project BCR is expected to be in the range of 1.8-2.0.

Approximately $10 million of funding has been allocated by Council to deliver this project from 2015 to 2022. Subsidies are anticipated from the NZ Transport Agency and through the Urban Cycleway Fund that will also contribute to the construction of the shared path.

Wainuiomata Hill Shared Path

A new separated shared path connecting Wainuiomata, a satellite town of 16,000 people, to the wider Hutt Valley is a key project in providing a safe and integrated network for commuting and recreational purposes under the current Walk and Cycle the Hutt Strategy 2014 – 2019.

Currently this high speed link road over the Wainuiomata Hill poses a high crash risk for cyclists and pedestrians. The project will increase connectivity between Lower Hutt and Wainuiomata giving residents more transport options. The project aims to significantly improve both cyclist and pedestrian safety, reducing injuries and attracting new users.

The completion of the Pukeatua Bridge in 2015 was phase one of the project with the shared path being the second phase.

Approximately $5.5 million of funding has been allocated by Council to deliver this project from 2015 to 2018. Subsidies are anticipated from the NZ Transport Agency and through the Urban Cycleway Fund that will also contribute to the construction of the shared path.

The Beltway Cycleway

This new separated cycle path will connect residential areas to workplaces and employment hubs, the Hutt Hospital, schools, the CBD and shopping areas. The Beltway will be a loop track and will also link to the Wainuiomata Hill cycleway and form an improved section of the Rimutaka cycle trail through the city. The Beltway route will also provide connections to major public transport hubs, including Waterloo and Melling train stations.

This project provides safer and more attractive connected routes for residents wishing to cycle throughout the city. It provides a separated route for around 7000 students to cycle to school, and offers more comfortable routes that will encourage people to cycle to work, shops and recreational facilities throughout the city. This cycling project is expected to attract over 1000 people each day.

Continued Network Expansion and Development

$ 4.2M is budgeted over the 10 year planning period for the development of the cycleway network city wide. The initial focus for this is the continuation of the Hutt River Trail.

8.5.1 DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable value.

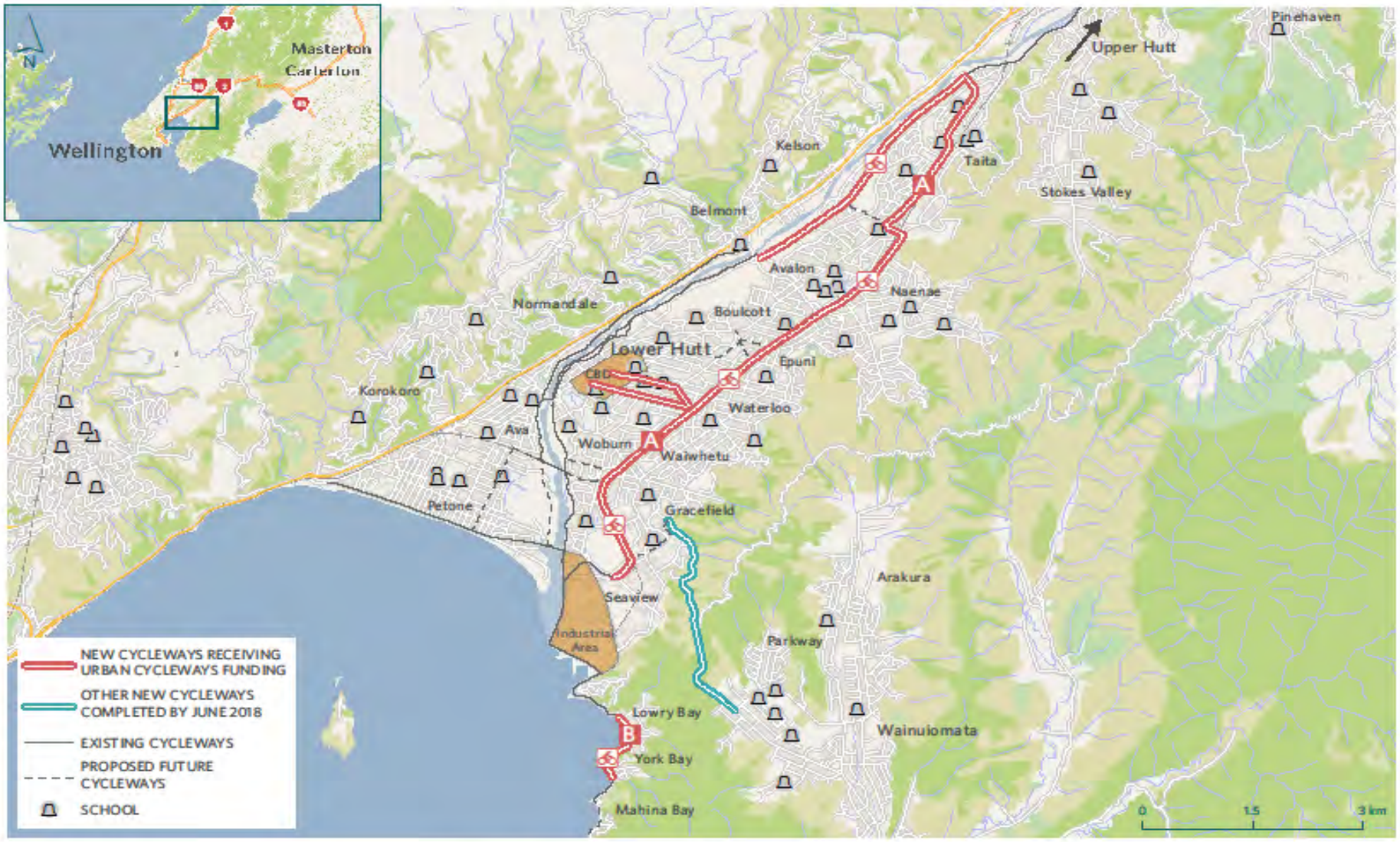


Figure 8-15: Urban Cycleway Funded Projects

8.6 TRAFFIC SIGNALS

The asset group includes:

- Traffic lights
- Traffic monitoring cameras
- Level crossing warning devices
- Traffic counters

These assets are provided to:

- Improve road safety for all marks
- Improve traffic flow and therefore economic activity
- Gather data to effectively manage roads

8.6.1 ASSET DESCRIPTION

The purpose of traffic signals is to reduce the potential for collisions and optimise traffic flows at intersections with high traffic volumes. A programme has also been developed to signalise particular pedestrian crossings with poor crash records.

	Base asset life	Approx replacement value
Traffic Signals	10 years	$ 430,000

Table 8-50: Traffic Signal Summary

Council has installed traffic signals at 14 intersections and 10 pedestrian 'puffin' crossings in the City. All have been converted to LED technology.

Recent connections to the NZTA WTOC SCAT System means that the signals are now state of the art and monitored by NZTA WTOC. A joint venture maintenance contract with NZTA, UHCC, PCC & KCDC ensures they are well maintained. Five CCTV cameras connected to the WTOC monitoring system. All new signalised intersections are required to be CCTV monitored by WTOC.

UPS backup systems have been installed for key locations where the local network meets the State Highway (2-8 hour back-up).

There is also one Red Light Abuse Camera operated by Council.

8.6.2 ASSET CONDITION

All 24 traffic signal intersections and pedestrian crossings are classified as good to excellent condition.

Network category	Excellent	Good	Moderate	Poor	Very Poor	Totals
Arterial	9	4				13
Primary Collector	0	8				8
Secondary Collector		2				2
Access roads		1				1
Totals	9	15				24

Table 8-51: Traffic signal condition profile

Category	Description	Maintenance status
Excellent	Sound structure well designed. Well maintained	No maintenance required
Good	As previous condition showing wear and tear and minor deterioration of components. Needs to be inspected in the medium term. Deterioration causing minimal influence on performance	No maintenance required
Moderate	Functionally sound structure but appearance affected by minor defects. Deterioration beginning to be reflected in performance	Maintenance required
Poor	Structure functioning but with problems due to significant defects. Likely to cause a marked deterioration in performance in the medium term. Some asset rehabilitation needed within the medium term.	Some asset rehabilitation needed within the medium term.
Very poor	Structure has serious problems and has failed or is about to fail in the near future resulting in unacceptable performance. Minimal life expectancy, requiring urgent replacement or rehabilitation	Major rehabilitation or replacement

Table 8-52: Definitions for condition ratings

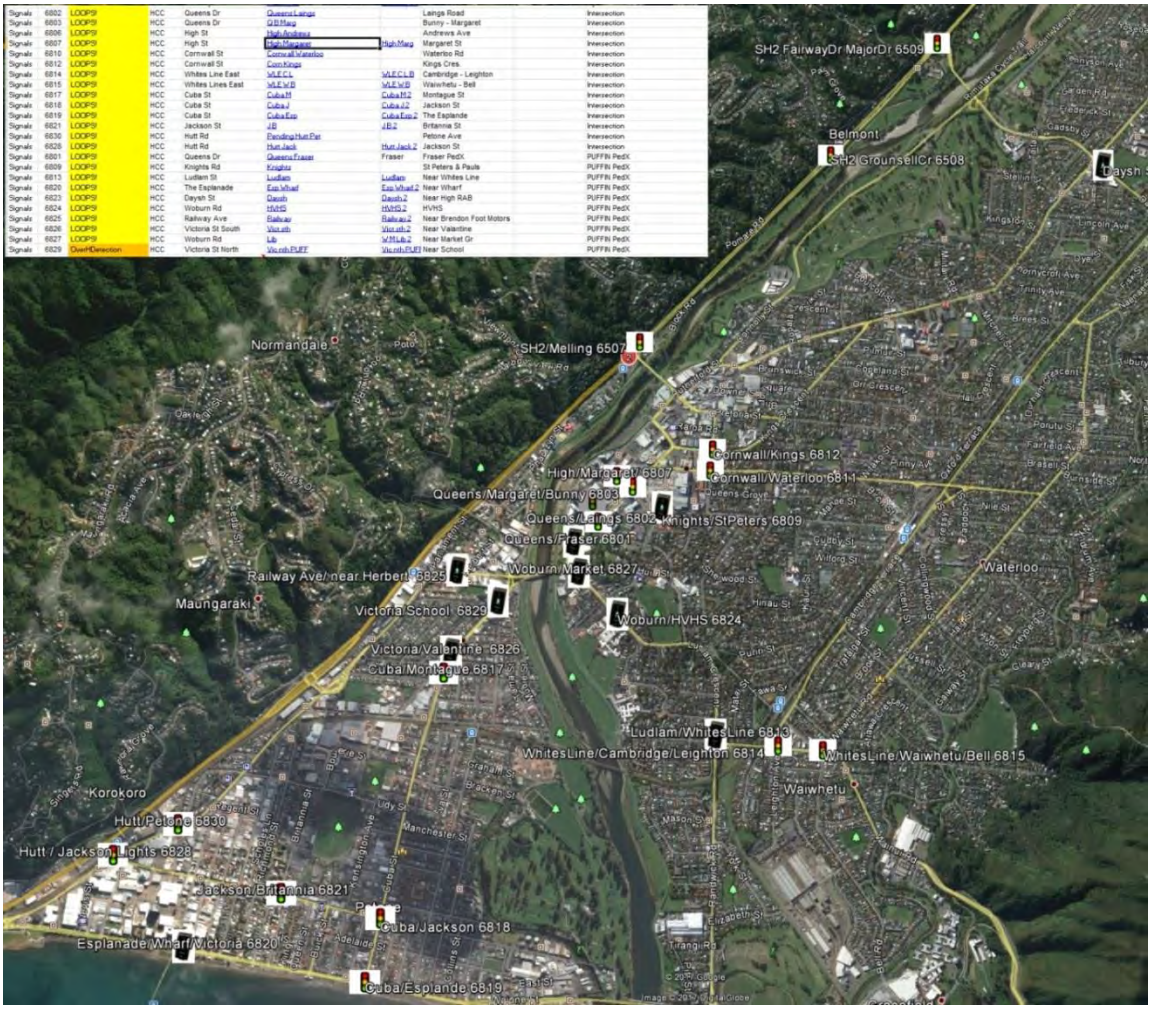


Figure 8-16: Traffic Signal Locations

8.6.3 RISK ASSESSMENT

There is negligible risk from failure of traffic signals as the road rules prevail. However, congestion is likely to ensue.

8.6.4 OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

The maintenance strategy adopted is:

- Unplanned Maintenance: damaged or failed signal components are repaired on demand and within specified time frames under a performance based maintenance contract. An immediate response to hazards can be requested where deemed necessary.

- Planned Maintenance: The maintenance contract includes the periodic inspection and cleaning of lamps, checking and cleaning of electrical components and adjustment of lanterns and poles.

The maintenance contractor brings any deterioration to the attention of the Council.

Maintenance expenditure for traffic signals for is shown below**.**

Activity	2017/18	2018/19	2019/20	2020/21	Comment
Traffic signals - Electricity	$23,000	$23,000	$23,000	$23,000	
Traffic signals - Maintenance	$100,000	$100,000	$100,000	$100,000	
Total	$123,000	$123,000	$123,000	$123,000	

Table 8-53: Traffic Signals operations and maintenance budget

8.6.5 CAPITAL REPLACEMENT IMPROVEMENT PROGRAMME

The service delivery strategy for traffic signals is to renew components on demand as component technology and condition dictate. This work is carried out as cyclic maintenance.

$1,700,000 is budgeted over the 10 year planning period for traffic signal replacement ($170,000 per year).

Future capital projects for the installation of new traffic signals are expected as follows:

- The Eastern Access Route $3.5m programmed for 2020/21; and

- NZTA's SH2 / Melling Intersection Optimisation Project (this is likely to involve the signalisation of 2 intersections on the eastern side of the river at no cost to Council).

Possible isolated future signalisation projects for local intersections are expected as traffic volumes increase, however none are currently specifically budgeted for in Council's LTP.

8.6.6 DISPOSALS – TRAFFIC SIGNALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable valve.

8.6.7 TRAFFIC COUNTING

- HCC has 6 permanent 24/7 continuous counting stations including 2 full classifiers plus three dedicated cycle count stations. These are state of the art and in excellent condition.

- All are fully functional using the NZTA TMS system for in depth analysis AADT corrections and in excellent condition being constantly monitored.

8.7 CAR PARKS AND PARKING METERS

This asset group includes the following assets:

- On road carparks
- Off street carparks
- Mobility carparks and permits
- Pay and display meters

Parking is provided to:

- Encourage economic activity by allowing for customer turnover
- Enables disables residents to gain access to services
- Control parking to improve safety and traffic flow

8.7.1 ASSET DESCRIPTION

Off street carparks are provided to meet the reasonable demands for public parking typically in areas where the community benefits from public parking provision, such as shopping areas, libraries and within walking distance to the CBD.

Pay and Display parking meters are provided to collect fees paid by users of car parks in accordance with Council's Car Parking Policy for the CBD. Approximately 1800 pay and display parking spaces are provided including on and off road spaces.

The park and ride carparks at rail stations are managed by GWRL and are additional to those provided by HCC.
In 2017 Council implemented a parking mobile app (PayMyPark) to make it easier for regular pay and display users.

Some of the current key life-cycle issues relating to parking are;

- Providing adequate spaces for parking demand, and managing conflicting demands between residents, commuters, customers etc.;
- Reliability of pay and display parking machines;
- Maintaining parking areas to acceptable standards,
- Vandalism of parking meters and associated equipment.

Location	Spaces	Area m2	Owner	Type of car park
Beach St Car Park	20	480	Hutt City	Off street car park
Senior Citizens Car Park	32	1,800	Hutt City	Off street car park
Naenae Shopping Centre	46	1,200	Hutt City	Off street car park
Fraser St Carpark	7	400	Hutt City	Off street car park
Taita Shopping Centre	53	2,370	Hutt City	Off street car park
Korokoro Road (West Side)	35	880	Hutt City	Off street car park
Pavillion Car Park	11	360	Hutt City	Off street car park
Dowse Car Park	47	2,060	Hutt City	Off street car park
Fountain Car Park	42	950	Hutt City	Off street car park

Location	Spaces	Area m2	Owner	Type of car park
Osborne Place	21	800	Hutt City	Off street car park
Eastern Hutt Rd	30	880	Hutt City	Off street car park
Riverbank Car Park	889	26,040	Hutt City	Off street car park
The Strand Car Park	30	1,560	Hutt City	Off street car park
Hillary Court Car Park	76	2,130	Hutt City	Off street car park
Naenae Hotel Car Park	40	880	Hutt City	Off street car park
St James Church/Library Car Park	30	1,150	Hutt City	Off street car park
Total	**1409**	**1,409**		

Table 8-54: Off-street car parks

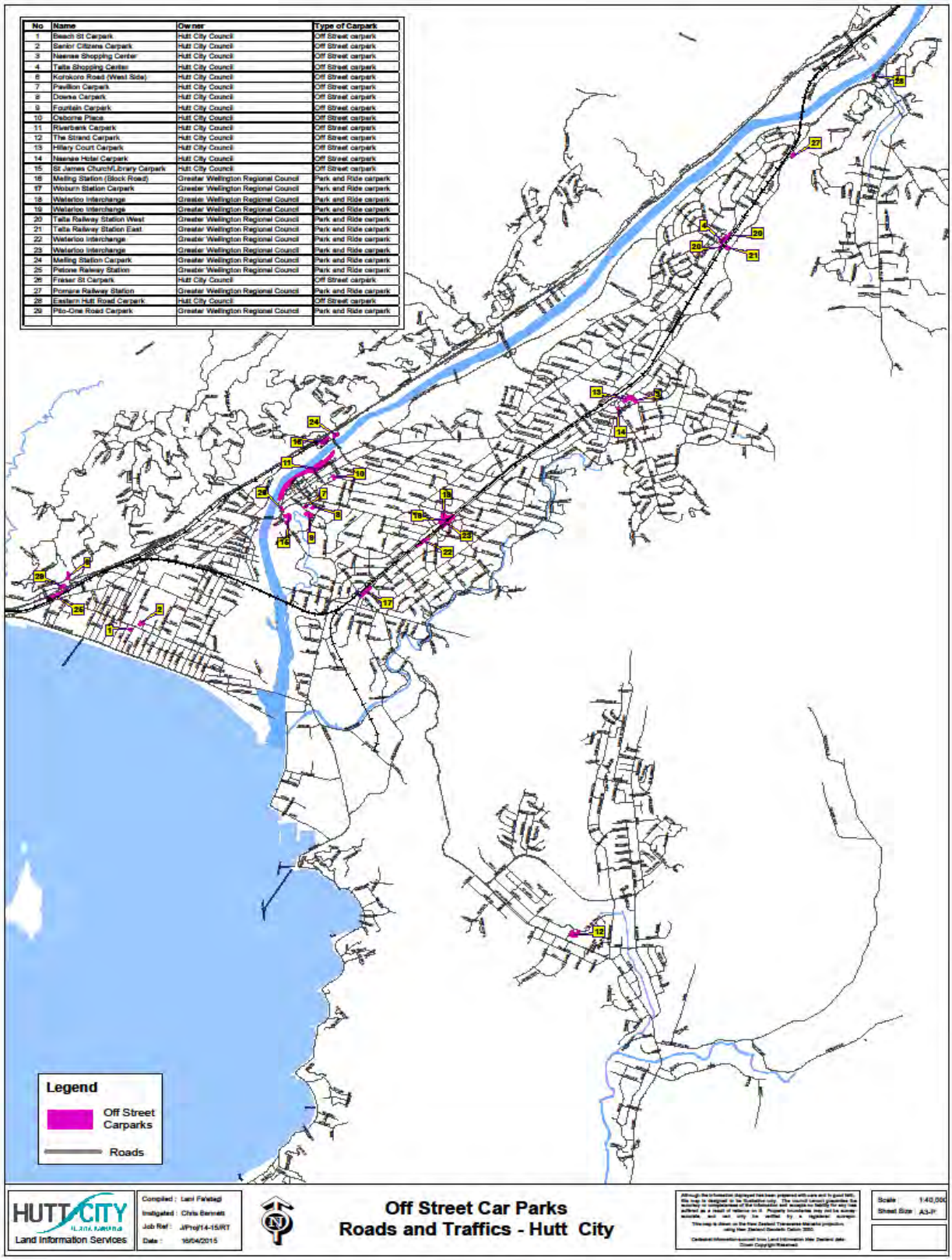


Figure 8-17: Off-street car park location in Hutt City

151 Pay and display parking meters are located on 22 streets within the City;

- Andrews Avenue Hutt Central
- Bloomfield Terrace Hutt Central
- Cornwall Street Hutt Central
- Daly Street Hutt Central
- Dudley Street Hutt Central
- High Street Hutt Central
- Kings Crescent Hutt Central
- Knights Road Hutt Central
- Laings Road Hutt Central
- Fraser Street
- Cornwall Street/ Pretoria Street
- Margaret Street Hutt Central
- Myrtle Street
- Market Grove
- Osborne Place Hutt Central
- Queens Drive Hutt Central
- Raroa Road Hutt Central
- Rutherford Street Hutt Central
- Stevens Grove Hutt Central
- Waterloo Road Hutt Central
- Ward Street

8.7.2 ASSET CONDITION

The latest condition ratings are shown in Tables 8-58 and 8-59. Definitions for condition ratings are shown below.

Category	Description	Maintenance status
Parking spaces		
Excellent	Newly sealed, completely waterproof with no significant deformations.	No maintenance required
Good	Waterproof with no significant deformations.	No maintenance required
Moderate	Waterproof with minor repairs being necessary.	Maintenance required
Poor	Largely waterproof with larger areas requiring rehabilitation.	
Very poor	Newly sealed, completely waterproof with no significant deformations.	Rehabilitation or replacement
Parking meters		
Excellent	Sound structure well designed. Well maintained.	No maintenance required
Good	As previous condition showing wear and tear and minor deterioration of components. Needs to be inspected in the medium term. Deterioration causing minimal influence on performance.	No maintenance required
Moderate	Functionally sound structure but appearance affected by minor defects. Deterioration beginning to be reflected in performance.	Maintenance required
Poor	Structure functioning but with problems due to significant defects. Likely to cause a marked deterioration in performance in the medium term. Some asset rehabilitation needed within the medium term.	
Very poor	Structure has serious problems and has failed or is about to fail in the near future resulting in unacceptable performance. Minimal life expectancy, requiring urgent replacement or rehabilitation.	Overhaul or replacement

Table 8-55: Definitions for parking spaces and meter condition ratings

Asset Component	Excellent	Good	Moderate	Poor	Very Poor	Totals
Pay and display rating condition(No)	151	-	-	-	-	157

Table 8-56: Parking meter condition profile

151 pay and display machines were installed in October and November 2006, following a Council resolution to remove all single space meters and upgrade to modern technology pay and display machines.

All parking meters were upgraded in 2016 to allow Paywave and Snapper card payment. Council expects to upgrade to a Pay by Plate system before 2019.

8.7.3 ASSET PERFORMANCE

After a period of deferred maintenance all carparks have been sealed and no significant maintenance is required. The assets are performing well.

The parking meters are serviced under a maintenance contract and routinely serviced so are performing well.

8.7.4 RISK ASSESSMENT

In the months following installation 6 machines were 'ram raided'. Apart from the loss of takings within each machine, the replacement cost is $9,000 / machine. After several arrests within the region this problem has abated.
Public carparks are subject to thefts from vehicles.

8.7.5 OPERATIONS AND MAINTENANCE PROGRAMME

Maintenance expenditure for car-parks and meters is shown in the table below.

Activity	**2018/19**	**2019/20**	**2020/21**	**Comment**
Carpark Maintenance	$51,000	$51,000	$51,000	Periodic resealing of off street car parks
Carpark Lighting	$18,000	$18,000	$18,000	
Parking meter operational costs	$330,000	$330,000	$330,000	Maintenance, security etc.
Total	$399,000	$399,000	$399,000	

Table 8-57: Car-parks and meters operations and maintenance budget

8.7.6 CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

The service delivery strategy for car-parks is to resurface every 8 years.
Pay and Display machines were upgraded to latest spec firmware in late 2015 with support capacity for Sensor Based parking.

Provision for cyclic renewal made in the 10 year financial programme is:

- Parking meters
- Software upgrade
- Full renewal: $900k 2023-26
- Car-park resurfacing: $51,000 per annum

No further extension of the area covered by the Pay and Display area is planned within the 10 year planning period however as the River Bank Carpark will be lost when GWRC upgrade the stop bank over the CBD reach of the Hutt River $800k provision has been made for the construction of replacement carparks in 2020/21.

8.7.7 DISPOSALS - CARPARKS AND METERS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable value, the contractor may hold onto meter parts to use in other products.

8.8 ROAD SIGNS AND MARKINGS

This asset group includes:

- Street name blades
- Regulatory road signs
- Advisory road signs
- Parking signs
- Road markings and delineation devices
- Direction signs
- Reflective Raised Pavement Markers
- Fire Hydrant markers
- Active electronic signs

Traffic Signs are provided to:

- Manage traffic flow supporting economic activity and improve safety
- Warn drivers of hazards to improve safety
- Provide direction to road users
- Identify locations for emergency services and residents
- Manage parking to encourage business activity

8.8.1 ASSET DESCRIPTION

The purpose of road marking is to delineate the road/pavement/footpath/service lanes to guide traffic movements and indicate road use restrictions. Signs are provided to aid the safe and efficient movement of traffic throughout the road network

Some of the current life-cycle issues relating to signs are;

- Vandalism.
- Upgrading of street nameplates to the current standards.
- Installation of destination signs to major routes and public amenities.

Generally most signs have a replacement cost less than $1000, consequently they are not classed as a capital asset.

All regulatory signs and markings are approved by NZTA national standards

Advance Direction Signage and School Electronic Signage is held in RAMM 170 units.

8.8.2 ASSET CONDITION

Signs

Low value street signs are a target for vandalism and are also frequently damaged by vehicles. These are rapidly replaced when the Council is notified. The signs are generally in good condition though there has not been an audit.

Markings

The Condition of road markings is not an issue due to the annual remarking programme. Roadmarkings and RRPMs are replaced when roads are resurfaced or repaired.

The causes of premature deterioration of road markings include:

- Damp or greasy surface when sprayed.
- Heavy traffic volumes causing excessive wear.
- Poor application rates.

These are in part addressed by adherence to standards.

8.8.3 ASSET PERFORMANCE

The city is generally well provided for with signs and roadmarkings with no major issues being identified.

8.8.4 RISK ASSESSMENT

Road signs and markings are reviewed to ensure they function as required.

8.8.5 OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

- **Signs:** Installation of new signs and maintenance of existing signs is done under the maintenance contract on unit rates with specified response times. Replacement/upgrade of street name plates is done in the capital replacement programme. Sign maintenance is largely reactive and depends on complaints and routine inspections.

- **Road marking:** All arterial and collector routes are repainted yearly and all other streets are repainted every two years using a roadmarking contractor. Unscheduled (new) road-markings is unit rate with specified response time. All work is scheduled in a timetable. All road marking is classified as maintenance work.

8.8.6 CAPITAL REPLACEMENT AND DEVELOPMENT PROGRAMME

The desired service delivery strategy for signs and marking is:

- Street name plates are replaced approximately every 12 years, depending on reported deterioration levels.
- Other signs are expected to be replaced on a 5 year cycle;
- $20,000 per annum is budgeted for the cyclic replacement of signs;
- Advanced directional signage is planned to be replaced on a 12 year cycle. Replacement is subject to condition.
- $115,000 per annum is budgeted for the cyclic replacement of ADS signs.
- Raised pavement markers are planned to be replaced on a 4 year cycle subject to condition.
- $40,000 per annum is budgeted for road marking renewals (outside of those renewals that occur in conjunction with the pavement maintenance programme).

New signs and road markings are acquired through subdivisional, street upgrading and safety improvement works. No specific provision is made for new signs.

8.8.7 ASSET DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life. The aluminium is usually recycled by contractors.

8.8.8 ACTIVE ELECTRONIC SIGNS

8.8.8.1 ASSET DESCRIPTION

The purpose of the active electronic signs is to supply important information to the travelling public to aid traffic movements, indicate road use restrictions and aid the safe and efficient movement of traffic throughout the road network.

Hutt City Council has:

- 22 schools are covered with 40K school zone signs and four electronic Jack and Jill school signs.
- 14 driver feedback radar speed signs
- 5 speed activated curve warning signs.

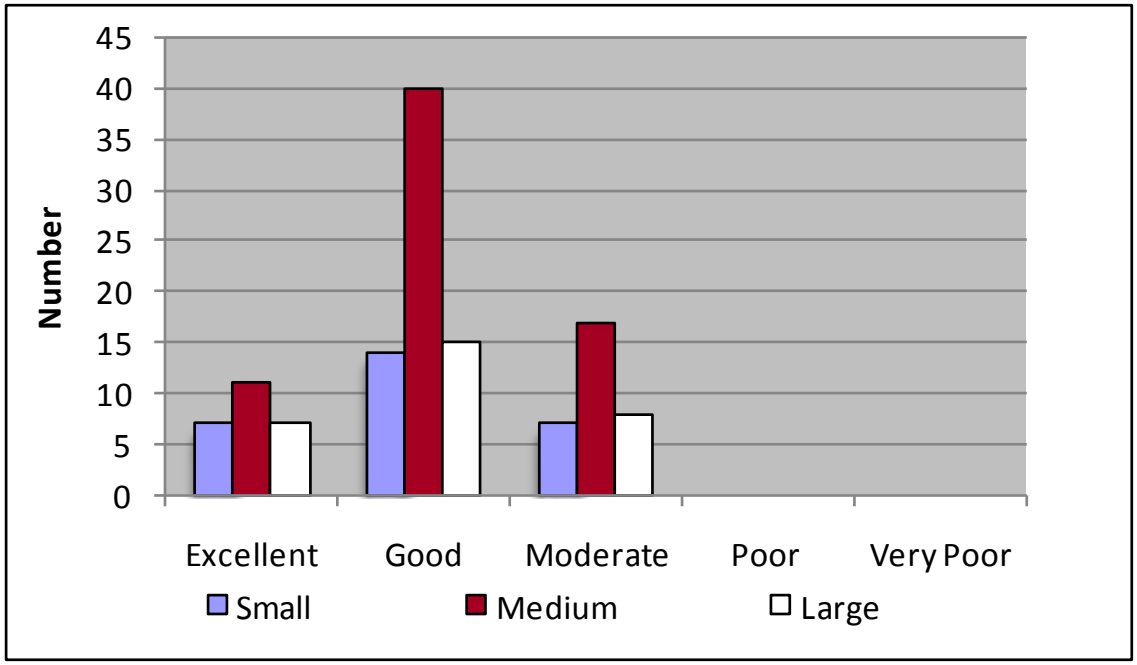
	Base lives years	Approximate replacement value
Electronic Signs	5-6	$10,000

8.8.8.2 ASSET CONDITION

The condition profile for active electronic signs is shown below. Generally these signs have proved to be a maintenance liability with short lives in the order of only 5 years. The solar powered signs have also been problematic requiring a lot of maintenance and for this reason connection to the street light power circuit is preferred for winter reliability.

Condition	Small	Medium	Large	Totals
Excellent	7	11	7	25
Good	14	40	15	69
Moderate	7	17	8	32
Current Condition Totals	**28**	**68**	**30**	**126**

Table 8-58: Active electronic sign condition profile



8.8.8.3 ASSET PERFORMANCE

The city is generally well provided for with electronic information signs.

8.8.8.4 RISK ASSESSMENT

The solar powered active electronic signs have proved to be unreliable particularly through winter. These signs are being linked to the street light circuit whenever feasible.

8.8.8.5 OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

Installation of new signs and maintenance of existing signs is done on contract on unit rates with specified response times. Replacement/upgrade of signs is done in a renewal programme. Sign maintenance is largely reactive and depends on complaints and routine inspections.

Activity	2018/19	2019/20	2020/21	Comment
Electronic Signs	$20,000	$20,000	$20,000	

8.8.8.6 CAPITAL REPLACEMENT AND IMPROVEMENT PROGRAMME

It is proposed that signs are replaced after 5 years $20,000 per annum is provided for the cyclic replacement of signs. New electronic signs will be acquired if and when a need is identified.

8.8.8.7 ASSET DISPOSALS

At the end of their useful life the electronic components are recycled with little residual value.

8.9 ROADSIDE BERMS, GARDENS, AND PLANTING

This asset group includes:

- Grass berms
- Street Trees
- Plantings

Roadside berms are provided to:

- Give pedestrians protection from wayward traffic improving safety
- Enable utility services to use the road corridor away from the carriageways improving safety, reducing disruption and reduce the cost of providing utility services
- Beautify the street and enhance quality of life
- Reduce the carriageway to what is required improving road safety

8.9.1 ASSET DESCRIPTION

Roadside berms are located throughout the city, provide separation from the carriageway and property boundaries, they vary in width and location; there are also many gardens and other plantings, which are used as traffic control features and beautification measures.

8.9.2 ASSET CONDITION

Berms are predominantly maintained by residents. Where this is not the case issues are noted and attended to on a case by case basis. Gardens and plantings are maintained under contract.

8.9.3 ASSET PERFORMANCE

The city is enhanced by the berms, gardens and plantings.

8.9.4 RISK ASSESSMENT

There are a number of minor risks associated with berms including hazardous structures e.g. waratah fences protecting grassed areas, rocks to stop vehicles crossing, vermin and litter where they are not maintained, damage to utilities and footpaths by trees, roadside hazard created and litter problems by trees. Suitable plants are now used in gardens that cause little or no damage to the surrounding carriageway and footpaths. There is an on-going project to remove unsuitable trees from the roading corridor.

8.9.5 OPERATIONS AND MAINTENANCE PROGRAMME

The contract specifications include detailed information on activity description and management, operational service levels, performance measurement, etc.

Activity	2016/17	2017/18	Comment
Berms	$28,000	$28000	
Gardens	N/A	N/A	Parks and Garden Division
Total			

8.9.6 CAPITAL REPLACEMENT AND DEVELOPMENT PROGRAMME

Trees and other plantings are reviewed and replaced as required. $120,000?? per annum is provided for the cyclic replacement of tress and other plantings.

New gardens and trees are usually related to street widening upgrades are usually planned in advance. New berms are vested in the Council from subdivision development. These are required to meet the standards set in the subdivision code.

8.9.1 ASSET DISPOSALS

By their nature and purpose these assets are replaced once they have reached the end of their useful life, they have no recyclable valve.

8.10 STREETLIGHTS

This asset group includes:

- Streetlight columns;
- Utility pole mounted streetlights;
- Pedestrian crossing beacons and floodlights;
- Lighting of off road public areas such as car parks and alleyways.

Parks and gardens and decorative lighting is managed separately and is unsubsidised by NZTA.

Streetlights are provided to:

- Improve pedestrian safety and security;
- Improve community security and encourage active modes of transport;
- Improve road safety by illuminating the route beyond headlights and pedestrians and cyclists on the road.

8.10.1 ASSET DESCRIPTION

Council's streetlight assets include 14,095 columns and 14,478 streetlight lanterns. Streetlight data is not collated within the RAMM database, however spreadsheets do collate information on all lighting assets including type, condition, last service date etc. These spreadsheets are continually updated meaning the quality of the data is high.
All streetlight assets are also geographically located within Council's GIS system.

The streetlight columns are a mixture of steel, concrete and wood columns. Wooden columns are progressively upgraded to steel columns as condition dictates.

Where necessary, streetlights are affixed to power transmission poles owned by and maintained Wellington Electricity. This minimises light column duplication.

The streetlight circuits are owned by Wellington Electricity and maintained under performance based contract.

Streetlight lanterns are a mixture of Sodium, Metal-halide, fluorescent and LED types, however Council is progressively upgrading all lantern types to LED due to the lower energy use and significantly lower maintenance costs.

When older lanterns are removed and replaced by LEDs the old lamps are either retained as replacement fixtures for those still in service, or recycled.

8.10.2 ASSET CONDITION AND PERFORMANCE

Council's streetlights are maintained under a performance based contract which is audited monthly to determine whether operational requirements are being met.

This typically results in very high operational ratios, between 98% and 100% of all lights being operational when audited.

As the existing lights are being progressively replaced with long life LED fittings, the future reliability is expected to increase.

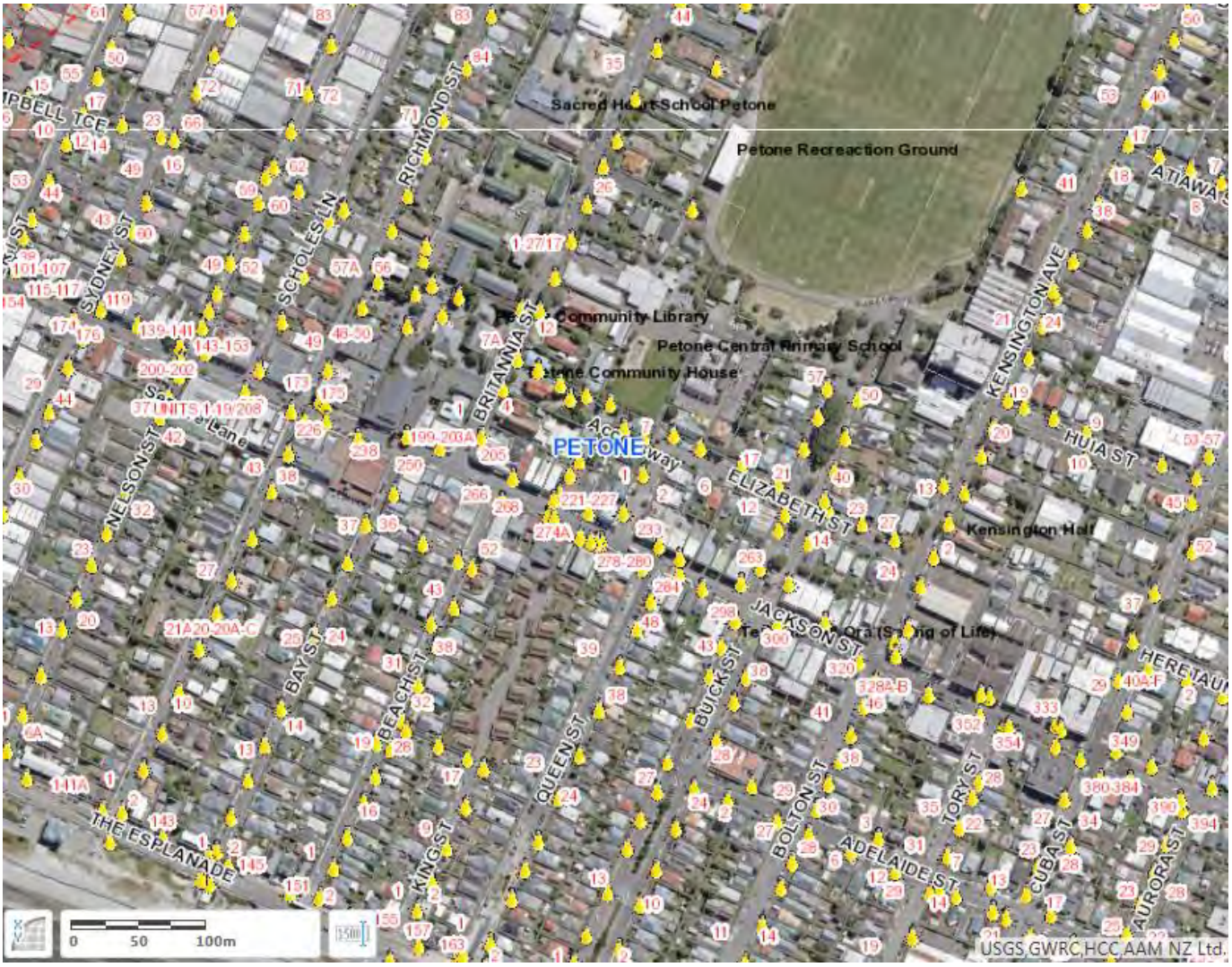


Figure 8-18: Example output from GIS system showing lantern locations

8.10.3 RISK ASSESSMENT

Streetlight standards are typically replaced every 15 to 20 years as a result of normal fatigue and deterioration. The operational life can be reduced by:

- Excessive rust when located near the marine environment;
- Early onset fatigue caused by cyclical wind loading – typically in exposed locations;
- Fatigue caused by non-design loading such as the installation of advertising banners;
- Vehicle damage.

8.10.4 OPERATIONS AND MAINTENANCE PROGRAMME

The non-LED type streetlight lamps are replaced on failure, approximately every 3 ½ to 4 years. No LED installations have currently been in place for long enough to fail.

Where existing 40W MCF, MBF or SON fittings require replacement, other than a simple lamp replacement, the entire fitting is replaced with a 22W LED Betacom GL520P fitting.

Lighting standards and mast arm supports are inspected on a four yearly cycle.

Lighting standards typically have a 15 to 20 year pole life depending on the location. Council's budgets include cyclical replacement of ageing standards.

Any existing 'Spunlite' hexagonal cross section poles are replaced as on a cyclical basis and replaced with the more robust octagonal profile poles.

Whenever the contractor visits a lantern a condition assessment for the lantern, support and standard is undertaken and the rating information updated in ARC GIS.

The current streetlight maintenance budgets are summarised below.

Activity	2018/19	2019/20	2020/21	Comment
Streetlight Electricity	$1,500,000	$1,500,000	$1,500,000	
Park N Ride lighting electricity	$20,000	$20,000	$20,000	Unsubsidised
Repair of damaged services	$105,000	$105,000	$105,000	
Decorative lighting maintenance	$130,000	$130,000	$130,000	Unsubsidised
Streetlight maintenance and replacement	$600,000	$600,000	$600,000	
Pedestrian crossing lighting energy	$62,000	$62,000	$62,000	
Pedestrian crossing lighting maintenance	$30,000	$30,000	$30,000	
Accessway lighting electricity	$36,000	$36,000	$36,000	Unsubsidised
Accessway lighting maintenance	$35,000	$35,000	$35,000	Unsubsidised
Total	$2,518,000	$2,518,000	$2,518,000	

Table 8-59: Streetlight operations and maintenance budget

8.10.5 CAPITAL REPLACEMENT AND DEVELOPMENT PROGRAMME

LED fittings are used to replace existing fittings as they reach the end of their useful life. Council has a budget of $200,000 per year for this lantern capital replacement (approximately 450 lanterns per year).

Council has a budget of $250,000 per annum for streetlight standard capital replacement (approximately 200 light standards per year).

In the 2017/ 2018 financial year Council will be taking advantage of the NZTA's increased FAR rate as part of the LED accelerated replacement programme. The value of the capital replacement has not yet been confirmed.

9 FINANCIAL FORECAST

This Section sets out financial statements, funding strategy, depreciation forecast and charges for roading network services in Hutt City.

9.1 OVERVIEW

The Local Government Act 2002 (Part 6 Subpart 3) requires local authorities to manage their finances "prudently and in a manner that promotes the current and future interests of the community. This implies compliance with Generally Accepted Accounting Practice (GAAP). The Council accounts are prepared in accordance with PBR tier 1 Accounting Standard.

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

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

Asset Management Plans provide the basis for meeting these requirements for infrastructure based activities.

9.2 30 YEAR FINANCIAL FORECAST

9.2.1 HIGHLIGHTS

The Long Term Plan is required to contain financial forecasts extending out at least 10 years. The infrastructure strategy is required to identify funding issues over a 30 year period. The roading network contains assets with economic lives which are typically of the order of 70 years or more. Financial summaries in this plan cover a 30 year planning horizon and are based on financial projections covering the lifecycles of the assets.

Apart from bridges and new roads that roading activity consists of a lot of low cost items done every year. The exception to this is where expenditure is not smoothed and as bow wave is created e.g. in reseals.

The following figures and tables summarise the 10 year financial forecast for roading network assets based on the forecasts for each asset group. Expenditure is identified under the following headings:

- Management , monitoring and asset management costs
- Network operation and maintenance
- Capital expenditure – maintaining services (asset replacement)
- Capital Expenditure – improving services (new asset development)

The long term financial forecast has not been adjusted for inflation. The total costs have been inflation adjusted for comparison.

The forecast is for the total estimated cost of the programme, excluding any subsidy received by Council from NZTA.

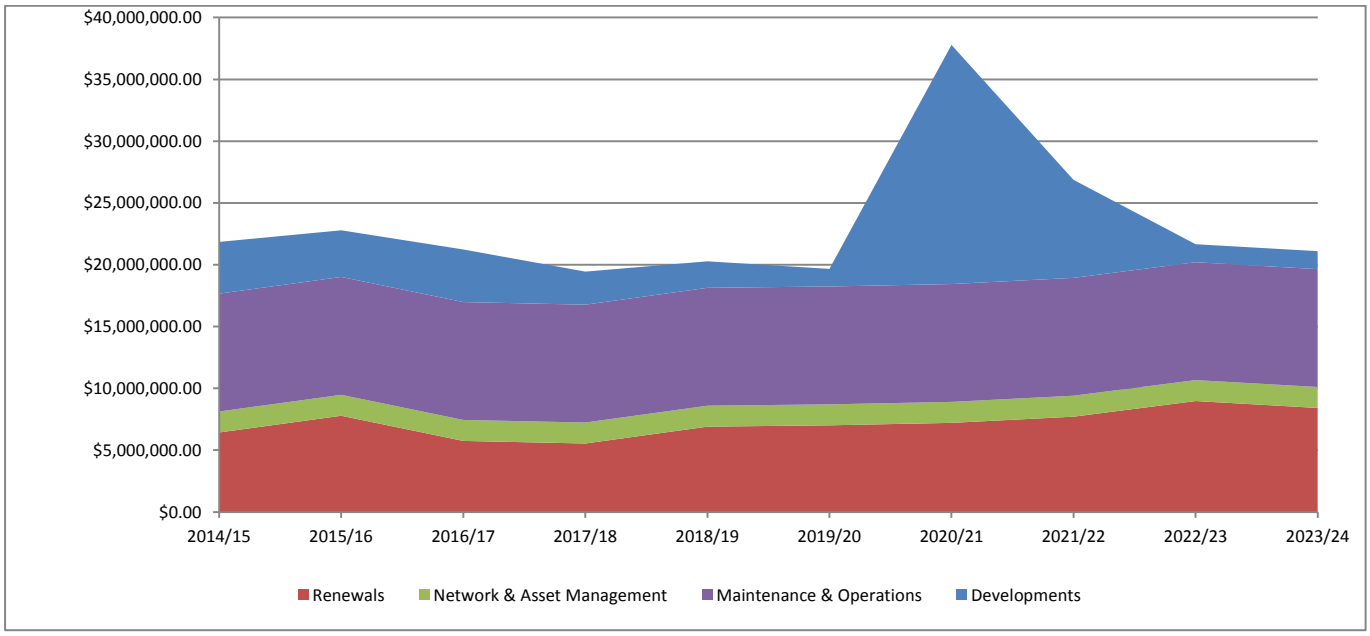


Figure 9-1: Summary long term financial forecast (inflation adjusted)

The significant expected trends in the forecast are:

Maintenance and operations - the asset base is not expected to increase significantly over the planning period, and expenditure in this area remains constant (excluding the inflation adjustment) throughout the 30 year period.

Network and asset management – management activities are expected to remain at current levels over the 30 year planning period.

9.2.2 NETWORK AND ASSET MANAGEMENT COSTS

Management and Monitoring Expenditure of Network and Asset Management Budgets:

Table 9-1: Network and Asset Management lot

9.2.3 LONG TERM FINANCIAL FORECAST – OPERATIONS AND MAINTENANCE

Activity (NZTA Subsidised)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Sealed Pavement Maintenance	852,800	852,800	852,800	852,800	852,800	852,800	852,800	852,800	852,800	852,800
Routine Drainage Maintenance	1,126,000	1,126,000	1,126,000	1,126,000	1,126,000	1,126,000	1,126,000	1,126,000	1,126,000	1,126,000
Structures Maintenance	263,000	263,000	263,000	263,000	263,000	263,000	263,000	263,000	263,000	263,000
Environmental Maintenance	856,200	856,200	856,200	856,200	856,200	856,200	856,200	856,200	856,200	856,200
Traffic Services maintenance	3,012,000	3,012,000	3,012,000	3,012,000	3,012,000	3,012,000	3,012,000	3,012,000	3,012,000	3,012,000
Operational Traffic management	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000
Cycle Path Maintenance	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Level Crossing warning devices	7,200	7,200	7,200	7,200	7,200	7,200	7,200	7,200	7,200	7,200
Network & Asset Management	1,415,729	1,415,729	1,415,729	1,415,729	1,415,729	1,415,729	1,415,729	1,415,729	1,415,729	1,415,729
Total Maintenance & Operations	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**	**7,198,907**
Physical Maintenance (Unsubsidised)										
Accessways	71,000	71,000	71,000	71,000	71,000	71,000	71,000	71,000	71,000	71,000
Accessway Lighting	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Berms	110,500	110,500	110,500	110,500	110,500	110,500	110,500	110,500	110,500	110,500
Bridges	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Carparking	98,000	98,000	98,000	98,000	98,000	98,000	98,000	98,000	98,000	98,000
Footpath Cleaning	1,056,860	1,056,860	1,056,860	1,056,860	1,056,860	1,056,860	1,056,860	1,056,860	1,056,860	1,056,860
Barrow People	0	0	0	0	0	0	0	0	0	0
Forward Planning Traffic	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000
Miscellaneous Works	388,000	388,000	388,000	388,000	388,000	388,000	388,000	388,000	388,000	388,000
Sign Maintenance	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Vehicle Crossings	245,000	245,000	245,000	245,000	245,000	245,000	245,000	245,000	245,000	245,000
Total Unsubsidised Maintenance	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**	**2,336,000**

Table 9-2: Long term financial forecast – Operations and maintenance

9.2.4 LONG TERM FINANCIAL FORECAST – CAPITAL RENEWALS AND IMPROVEMENTS

Project	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Carpark Resurfacing	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000
Corrosion Protection - Port Road and Seaview Road Bridges (Subsidy 51%)		700,000								
Estuary Bridge Corrosion Protection (Subsidy 51%)					959,000				672,000	
Footpath Resurfacing & Replacement	205,000	205,000	205,000	205,000	205,000	210,000	210,000	210,000	210,000	210,000
Minor Road & Footpath Construction	74,000	74,000	74,000	74,000	74,000	74,000	74,000	74,000	74,000	74,000
Minor Safety Works (Subsidy 51%)	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000
Pavement Surfacing (Subsidy 51%)	1,900,000	2,100,000	2,500,000	2,700,000	3,200,000	3,500,000	3,600,000	3,900,000	4,000,000	3,900,000
Pavements - Area Wide Pavement Treatment (Subsidy 51%)	1,380,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000	2,250,000
Pavements - Wainuiomata Hill Rd Safety Seal (Subsidy 51%)	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000
Pay & Display Extension						300,000	300,000	300,000		
Pedestrian Crossing Renewal (Subsidy 51%)	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000	31,000
Road Reconstruction (Out Years) (Subsidy 17%)	407,000		407,000	407,000	407,000	407,000	407,000	407,000	407,000	407,000
Street Name Sign Replacement (Subsidy 51%)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Streetlight Lantern Replacement Programme (Subsidy 51%)	51,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Streetlight Standard Replacement (Subsidy 51%)	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Traffic Signal Replacement (Subsidy 51%)	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000
Total Renewals	**4,983,000**	**6,902,000**	**6,602,000**	**7,209,000**	**7,302,000**	**8,014,000**	**8,114,000**	**8,414,000**	**9,186,000**	**8,414,000**
Bridge Seismic Strengthening (Cuba St. Overbridge) (Subsidy 51%)				820,000						
Broad Band Ducting	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000
CBD Riverbank Replacement Parking		800,000			800,000					
CVL - Investigation / Design (Subsidy 51%)	1,000,000									
Cycleway Network Development (Subsidy 51%) (Existing Provision)	1,000,000	1,000,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
East Access Route (Subsidy 51%)				3,500,000						
Eastern Bays Shared Path (Subsidy 51%) (Existing Provision)	2,400,000	1,500,000	1,500,000	1,500,000	1,500,000					
Land Purchase For Roads	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000

Project	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Local Area Traffic Management (Subsidy 51%)	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000
Melling Bridge Renewal (1/3 share at 51% subsidy)									6,500,000	
Network Resilience - Eastern Hutt Road (Subsidy 51%)				2,900,000						
New Pedestrian Crossings (Subsidy 51%)	53,000	53,000	53,000	53,000	53,000	53,000	53,000	53,000	53,000	53,000
Reconstruction Improvements - Outyears	80,000		80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Road Network Improvements (Subsidy 51%)								2,000	32,000	31,000
School Speed Zone Programme (Subsidy 51%)	60,000	60,000	60,000	60,000	60,000	60,000	60,000			
Substandard Road Upgrading (Subsidy 13%)	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Traffic Safety Improvements (Subsidy 51%)	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
UGS - Wise St Extension - Off Site Development c/o				2,500,000					3,600,000	
UGS - Wise St Extension- On Site Development c/o				900,000					7,300,000	
UGS- Kelson - Off Site Development				500,000	500,000					
UGS- Kelson- On Site Development				6,000,000	6,000,000					
Wainuiomata Hill Shared Path 1/3 HCC.1/3 NZTA 1/3 UCF										
Total Capital Improvements	**5,245,000**	**4,145,000**	**2,745,000**	**19,945,000**	**10,125,000**	**1,325,000**	**1,325,000**	**1,267,000**	**18,697,000**	**1,265,000**

Table 9-3: Long term financial forecast – Capital renewals and improvements (inflation adjusted)

Add figures showing accumulated depreciation vs cumulative renewals

9.3 ACTIVITY MANAGEMENT PLAN ASSUMPTIONS

Improvement projects have been outlined in Section 9 that are intended to result in greater confidence in the forecasts and appropriateness of target levels of service.

The following basic assumptions have been made in preparing the year financial forecasts:

- Service levels are generally assumed to remain the same for the period covered by the Forecast Financial Statements. Minor service level improvements are planned in relation to certain areas of Council activity as a result of capital projects. ONRC performance measures will be captured but are not expected to alter the levels of service in the short term. Once confidence is gained in the accuracy of the data, appropriate targets will be set which may alter the levels of service delivered.
- Population is assumed to increase marginally in line with the objectives of our Urban Growth Strategy and as evidenced in the 2016 census figures.
- Residential and commercial development is assumed to occur as a result of growth strategies and plan changes adopted to deliver the Urban Growth Strategy objectives. Capital expenditure plans in some areas include an allowance for modest future capacity increases to help ensure that service standards remain sustainable.
- Provision has been made in the Long Term Plan for inflation, based on the projections provided by Business and Economic Research Limited (BERL) for the input cost indices used by Council and the Treasury in relation to the Consumers Price Index. The annual inflation projections beyond 2014 are shown below.

2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
1000	1024	1049	1074	1101	1128	1157	1188	1220	1251	1284

- The renewal and capital development programmes identified in this plan are fully funded.
- Maintenance allocations are based largely on historical levels of expenditure.
- Additional energy costs as a result of additional streetlights have, in part, been offset by the greater energy efficiencies of new lanterns.
- Fuel costs are assumed to rise no faster than the rate of inflation.
- The proportion of transportation financial assistance paid by NZTA will not change.
- There will be no significant changes in societal make up, and climate change assumptions have been addressed throughout our Asset Management Plans and Environmental Sustainability Strategy.

None of these assumptions are considered high risk. The most significant potential changes to the financial projections shown will result from the factors below. These costs may be offset slightly by resultant reductions in maintenance costs for the assets involved and savings achieved through full competitive tendering of all roading work.

- Assumptions have been made as to the average useful lives and average remaining lives of the asset groups based on current local knowledge and experience and historical trends. These will be reviewed and the accuracy improved based on real time assessments of asset deterioration. Review of the effective economic life of pavement surfacing and layers has the potential for greatest variance in future cost predictions.
- Changes in development needs associated with the rate and location of growth.
- Changes in the desired level of service and service standards from those identified in this AM plan.
- Significant changes in the cashflows may also result from more detailed evaluation of asset capital projects resulting from future Network Operating Plans.

9.4 CONFIDENCE AND RELIABILITY OF FORECASTS AND DATA

The tables provide an assessment of the confidence in, and the accuracy of the long term financial forecasts and supporting asset data.

The overall confidence level in the financial forecast is 'B – B+ - "reliable/highly reliable". The data is based on sound records, procedures, investigations, and analysis that is properly documented but has some shortcomings and gaps that may impact on the accuracy of the long term financial forecasts.

Activity	Category	Confidence Grade	Accuracy
Operating Costs	Management Costs	B+	+/-5%
	Network Maintenance	B+	+/-5%
	Depreciation	B+	+/-5%
Capital Costs	Asset Renewals	B	+/-10%
	Asset Development	C+	+/-15%
Overall		B – B+	

Table 9-4: Financial data quality assessment

Asset Data	Accuracy	Comment
Asset quantity	1	The HCC road registers are well developed and have been independently reviewed by NZTA. The review found that the registers for the major asset groups were complete, accurate and the subject of reliable data management processes.
Asset type	1	
Asset material	1	
Asset location	2	
Asset condition	2	The condition of all critical assets and pavements is monitored and well understood.
Asset performance	2	The performance of all critical assets and pavements is monitored and well understood.
Unit Costs	1	Accurate unit costs are available in HCC contract schedules for all assets.
Deterioration rates	2	Deterioration rates are understood for all high value assets.

Table 9-5: Asset data quality assessment

9.5 ASSET VALUATIONS

The Local Government Act 2002 requires each local authority to "manage its revenues, expenses, assets, liabilities, investments, and general financial dealings prudently and in a manner that promotes the current and future interests of the community". This implies compliance with Generally Accepted Accounting Practice and more specifically with the New Zealand version of the International Accounting Standard 16 (NZ IAS 16), which has been updated to accounting standards for public benefit entities based on International Public Sector Accounting Standards 17 Property, Plant and Equipment (IPSAS 17 PBE).

Infrastructural asset valuations are an essential part of compliance with accounting requirements and central to asset management processes such as the asset renewal programme. Valuations of the Hutt City roading network are carried out by external valuers with expertise in the valuation of infrastructure.

The result of the most recent full valuation of the Hutt City roading network is summarised by asset group below.

Asset Group	Replacement Cost (2014)	Optimised Replacement Cost (2014)	Optimised Depreciated Replacement Cost (2014)	Annual Depreciation (2014)
Carriageway	$381,657,500	381,657,500	194,645,300	5,166,502
Kerb & Channel	$95,000,505	95,000,505	37,329,900	1,187,215
Footpath-walkway	$111,020,005	111,020,005	46,669,400	1,375,582
Berms	$20,632,200	20,632,200	19,619,500	20,822
Sumps	$22,699,500	22,699,500	9,366,300	283,744
Speed Humps	1,073,915	1,073,915	291,800	62,213
Traffic Islands	1,669,830	1,669,830	731,400	27,781
Vehicle Crossings	52,543,500	52,543,500	20,404,100	656,791
Car Parking	1,940,060	1,940,060	283,300	156,170
Barriers	5,746,530	5,746,530	2,322,400	228,308
Debris Fencing	77,300	77,300	12,800	3,092
Culverts - Subways	9,664,910	9,664,910	4,691,500	96,648
Bridges	91,721,058	91,721,058	59,152,000	746,431
Retaining Walls	14,075,800	14,075,800	9,477,000	144,920
Tree Planters	265,800	265,800	128,600	10,632
Streetlight Lanterns	4,124,200	4,124,200	3,135,900	164,968
Streetlight Supports	9,597,700	9,597,700	5,064,900	191,954
Traffic Signals	4,000,000	4,000,000	2,600,000	202,603
Pedestrian Signals	1,000,000	1,000,000	550,000	0.00
Electronic Traffic Signs	426,000	426,000	332,300	0.00
Traffic Signs	41,400	41,400	12,800	2,071
Parking Meters	1,256,000	1,256,000	904,300	125,600
Pedestrian Crossings	174,150	174,150	86,900	3,641
Bollards	411,500	411,500	181,000	8,230
Cameras	85,000	85,000	68,000	8,480
Traffic Counters	180,000	180,000	72,000	7,155
Various Structures	57,300	57,300	50,700	1,678
Street Rubbish Bins and Seating	75,000	75,000	26,300	7,512
Seawalls	9,971,400	9,971,400	5,185,100	112,354
TOTALS	**$841,188,063**	**$841,188,063**	**$423,395,500**	**$11,003,097**

Table 9-6: Roading infrastructure valuation as at 30 June 2014

Future valuations will be carried out at no more than 5 yearly intervals. The valuation methodology used for the roading network system includes:

- A level of asset component detail intended to produce an optimal outcome in terms of cost of the process and reliability of output
- Asset valuation on the basis of ODRC in accordance with the New Zealand Infrastructural Asset Valuation and Depreciation Guidelines and IPSAS 17 PBE.

- The use of base lives generally consistent with industry guidelines. Departures from industry guidelines are noted together with supporting reasons.
- Asset condition and not performance is used as a factor for calculating remaining asset lives. This is a departure from some other valuation processes. Asset performance is often an indicator of asset condition and is considered to be captured in asset condition where this is relevant to remaining life.
- Unit costs are derived by the valuer, with Hutt City Council contract data being used to supplement the valuer's unit-cost setting process and database of national unit costs and to calibrate the valuer's unit costs to local circumstances..
- Determining depreciation on a straight line basis over the remaining assessed economic life of a depreciable asset. Residual values have been assessed as zero throughout. .
- No significant optimisation is used.

The development of systems for modelling asset condition/remaining life and asset unit rates within the asset management system as part of a process for carrying out future asset valuations within the asset management system have been identified as projects in the improvement plan (Projects 6 and 7).

9.6 ASSET CAPITALISATION AND FIXED ASSET REGISTER

Local Authorities are required to maintain a Fixed Assets Register. This is at a higher level than the more detailed asset registers used for asset management and asset valuation purposes. An interface exists between the Fixed Assets Register (FAR) and the AM planning process. This involves accurately reflecting the formal asset valuations in the Hutt City Council financial system fixed asset register, and capturing the ongoing renewal, acquisition and disposal of assets between full asset valuations.

Action	Process
Capturing ODRCs in the FAR	The FAR is reconciled with formal asset valuations. The data stored in the FAR is consolidated to a roading network level.
Adjusting the FAR for residual value	Residual values accounted for in the FAR in the next valuation.
Capturing asset renewals	'Renewal' works are captured in RAMM from work records. Relevant attribute data will also be captured. Asset managers provide contract costs (via WIP accounts) and base lives and quantities for all capital either as projects are completed or at the end of each financial year. These are input into the FAR
Asset additions and disposals	These are captured or deleted in RAMM (and any supporting data-bases) by GIS staff from "as built" plans. Relevant attribute data is also captured. Asset managers provide contract costs (via WIP accounts) and base lives and quantities for all capital either as projects are completed or at the end of each financial year. These are input into the FAR.
Calculating annual depreciation	The depreciation charge is derived from the asset valuation adjusted for additions and deletions.

Table 9-7: Fixed asset valuation process

9.7 FUNDING ROADING NETWORK ACTIVITIES

The focus of this AMP is on identifying the optimum (lowest lifecycle) cost for roading network assets necessary to produce the desired level of service.

The New Zealand Transport Agency is the Central Government Agency which distributes financial assistance, collected primarily from fuel tax and road user charges, for roading works. Council aims to maximise financial assistance from NZTA for eligible operations, maintenance and capital works. Procedures are defined in the NZTA Knowledge Base. The procedure requires the annual preparation of a District Roading Programme (DRP) which details funding sought. Funding for approved DRP works are subject to confirmation through the Annual Plan process.

Council's minimum annual assistance rates are currently:

Roading - Operations and Maintenance Works	51%
Roading - Capital Works and Pavement Rehabilitation Works	51%
Public Transport Facilities Operations and Maintenance Works (via Greater Wellington Regional Council).	100%

All capital and pavement rehabilitation works are supported by benefit cost analysis. Standard benefit/cost analysis procedures are detailed in NZTA's Economic Analysis Manual. Council runs the RAMM treatment selection algorithm with a benefit-cost (B/C) ratio of 4 as a first step in identifying required pavement work. Reduced road user costs are a key factor in B/C calculations used to identify sites that warrant reductions in pavement roughness.

NZTA's "major drainage control" and "area wide pavement treatment" work categories which relate to the cyclic kerb renewal programme and pavement strengthening work respectively, require economic justification. That is, the projects put forward are shown to be the long term, least cost option to Council calculated in terms of net present value.

9.8 PROCUREMENT

All procurement is undertaken in accordance with the Hutt City Council Procurement Policy. All procurement undertaken for activities or assets subsidised by the New Zealand Transport Agency is in accordance with the NZTA Procurement Manual.

9.8.1 SMART BUYER SELF-ASSESSMENT

Assessment Statement. Our organisation:	1	2	3	4	5
1. Fully understands the different contracting models available. Our organisation understands the various contracting models although we don't have practical experience with them all. eg Alliances.					✓
2. Holds meetings that update the contracting industry on the forward works programme and any changes in approach, and proactively engages with the contracting industry to ensure it gains optimal value from any changes being implemented. Changes in approach are infrequent but contractors are informed as and when it is relevant to ensure optimal value is delivered.				✓	
3. Has sufficient robust data (or is in the process of gathering robust data) on our networks to enable optimal integrated decision-making. We have good coverage of our network by RAMM data, FWD strength data and a comprehensive traffic counting programme. DTIMS is used to test and refine investment decisions.				✓	
4. Has access to expertise that fully enables best use of the data available. We engage external specialists to optimise the use of data available. Data-led decision making is part of how we do business.					✓
5. Is open to alternative solutions to those proposed in the contract documents. We encourage innovation and include this in our non-price attribute assessment in the pursuit of achieving best value. Alternative tenders are					✓

also encouraged.					
6. Understands risk and how to allocate and manage it. Risk is always a consideration when making investment decisions. Key risks are identified and mitigated in our procurement planning process.				✓	
7. Has a Council that is prepared to pay more now to achieve a lower whole of life cost. Council is always conscious of cost, and the impact on rates, but does invest in optimising whole of life costs. Examples include the upgrading of streetlights to LED and pavement treatment selections.				✓	
8. Actively pursues value for money & does not always award contracts to the lowest price. Non-price attributes are considered on many contracts as part of the Price Quality methodology in pursuit of value rather than least cost.					✓
9. Is able to manage supplier relationships/contracts to ensure optimal expenditure, which sustains infrastructural assets at appropriate levels of service. Excellent relationships are maintained with suppliers through regular formal and informal meetings at various levels within the respective organisations.					✓
10. Supports ongoing skill and competency training and development for staff. Staff are encouraged to pursue training opportunities and regularly attend industry events. Training courses are notified by either HR or our external consultant and staff also identify relevant training through the internet.					✓
11. Actively shares and gains knowledge within the sector. Various staff are active in sector initiatives such as REG, TAG, Transport Analytics Review and the IPENZ Transportation group.				✓	
12. Is effective in keeping up with best practice in procurement, including best practice RFP/contract documentation. As per the knowledge sharing referenced in 11.				✓	
13. Regularly seeks and receives candid feedback from suppliers on its own performance as a client and consistently looks to improve its performance. We receive feedback from suppliers informally and formally and have made improvements to our processes in the past as a consequence.					✓

14. Explores opportunities for collaboration by either sharing in-house resources with neighbours, or by procuring together or tendering together. That exploration could be through an LGA s17A evaluation of transport function delivery options. We have an active TAG in the Wellington region which facilitates collaboration and we have a joint Procurement Agreement with Upper Hutt City Council.					✓
Number of Ticks in each column Multiplying Factor Total Score in Column	0 X1 0	0 X2 0	0 X3 0	6 X4 24	8 X5 40
Total Score					64

9.9 FINANCIAL POLICIES

Local authorities are required by the Local Government Act 2002 to manage their financial dealings prudently. This implies compliance with generally accepted accounting practice. The Local Government Act requires user pays and intergenerational equity issues to be taken into account when determining how different activities will be funded. In funding the roading network activity Hutt City Council applies the following principles:

Funding of Operating Expenditure	• Operating expenditure is funded from operating revenue. This reflects intergenerational equity principles by recognising that the benefits from operating expenditure are short term.
Funding of Capital Expenditure	• Capital expenditure will be primarily funded from loans. This recognises that the benefits of capital expenditure are generally medium to long term and provides and ability to smooth the impact of variations in capital expenditure over time. Other sources of capital funding will be capital subsidies.
Depreciation	• Assets are depreciated on a straight line basis over their remaining life with depreciation recognised as an operating expense.
Provision for Asset Renewal/Replacement	• Provision for asset renewal will be funded from revenue at a rate equal to depreciation. This reflects intergenerational equity principles by spreading the cost of the use of assets over their lifecycle. The cost of asset renewal works will be funded from loans with asset renewal funding being applied to loan repayments. Loan funding therefore becomes a mechanism to smooth the cash funding impacts of variations between short to medium term asset renewal requirements and long term average renewal requirements.
Interest on Loans	• Interest on loans is recognised as an operating expense.
Operating Revenue	• Operating revenue comprises rates, user charges and operating subsidies.
Operating Surpluses	• Operating surpluses will be applied to loan repayment.
Provision for Inflation	• An allowance has been made for general inflation in the financial projections. Where specific future cost changes (increases or decreases apart from general inflation) can be identified and where these are likely to be at significant variance with the expected rate of inflation then allowance for the difference between expected cost changes and the rate of inflation has been made in cost projections.
Capitalisation of Repairs	• Repairs to assets are treated as an expense unless they materially alter the value of the asset base provided for in the asset valuation. Repairs are capitalised where they enable the remaining life of an asset to be extended beyond the remaining life allowed for in the asset valuation (and not simply restored) or where the repair is recognised in the asset register as an asset in its own right.
Asset Revaluations	• Full asset revaluations are carried out at intervals not exceeding 5 years and generally 3 yearly. Adjustments to the asset valuation resulting from asset capitalisation and asset write-offs are carried out as they occur or at the end of each financial year.

Financial practices are in accordance with generally accepted accounting practice (GAAP) and more specifically with new accounting standards for public benefit entities based on International Public Sector Accounting Standards 17 Property, Plant and Equipment (IPSAS 17 PBE).

9.10 AM PLAN MONITORING

The effectiveness of the AM Plan and associated AM practices in achieving Council's objectives is monitored through the roading network activity standards and performance measures. These are the primary indicators of the effectiveness of the roading network planning processes. These indicators reflect Hutt City Council Strategic Goals which in turn reflect the strategic Framework within which land transportation operates.
Reporting areas cover the following dimensions:

- Product/Service Quality
- Cost Effectiveness
- Customer Approval
- Environmental Performance
- Legal Compliance

Document name	Location	Comment
Fixed asset register	Managed by Finance Division – Hutt City Council	Reconciled to Asset Valuation – updated annually for asset additions and deletions
Asset Register	Held electronically in RAMM and linked GIS	RAMM & GIS data basis for Asset Valuation
AM Plans	Electronic and hard copies -	
Improvement Plan	Electronic and hard copies -	

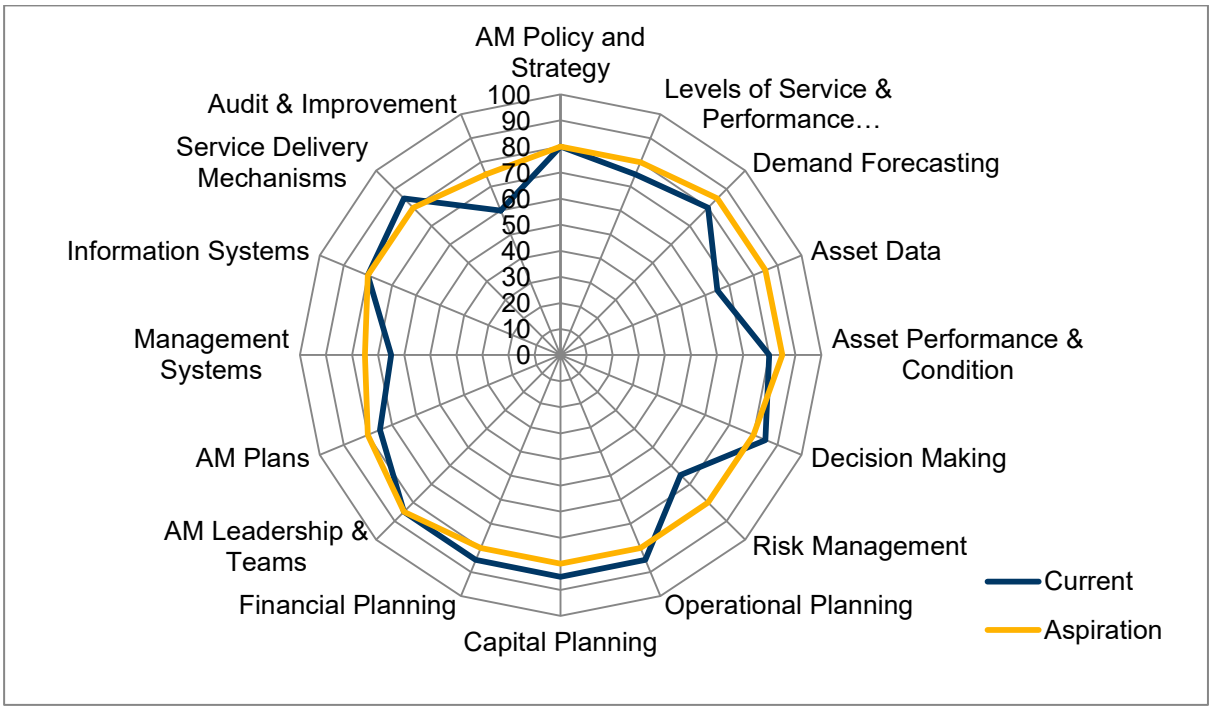
Table 9-8: AMP Information Stage

10 IMPROVEMENT PLANNING

Hutt City Council is committed to continually improving the quality of this Activity Management Plan and has made an assessment of asset management maturity to ensure our asset management practices are able to meet the current and future needs of the organisation. This assessment is a lead indicator of future performance in this area.

10.1 ASSET MANAGEMENT MATURITY ASSESSMENT

The assessment is based on the 17 core elements of the International Infrastructure Management Manual and identifies where there is a gap between current and desired performance. An Improvement Plan has been developed to address these gaps in a timely and responsible manner.



10.2 IMPROVEMENT PLAN

The Asset Management Maturity assessment has identified significant gaps between the current and aspirational levels of performance in Asset Data, Risk Management, Management Systems and Audit & Improvement areas.

An Improvement Plan has been developed to address these gaps and ensure the desired performance levels are maintained for all the core elements. Issue owners and timelines are defined as appropriate in this Improvement Plan.

This Improvement Plan will be reviewed and adjusted as necessary to align with the Government Policy Statement when this is finalised.

TRANSPORT ACTIVITY MANAGEMENT PLAN – IMPROVEMENT PLAN

IIMM ELEMENT	ACTION	RESPONSIBILITY	TIMING	PRIORITY	STATUS
ASSET DATA	• Surfacing costs into RAMM • Treatment Length/Surfacing Length alignment • Accuracy/Timeliness of Maintenance work/costs entry • ONRC data collection/entry • Travel Time Reliability data collection	ROAD ASSET MANAGER ROAD ASSET MANAGER INF. MAINT. MANAGER INF. MAINT. MANAGER TRAFFIC ASSET MANAGER	2Q 2018 2Q 2018 1Q 2018 1Q 2018 2Q 2018	High Medium High High High	
RISK MANAGEMENT	• Review and update the Transport risks recorded in the HCC Risk Register	TRANSPORT MANAGER	1Q 2018	Medium	
MANAGEMENT SYSTEMS	• Systems developed to incorporate ONRC concept	TRANSPORT MANAGER	2Q 2018	High	
AUDIT & IMPROVEMENT	• Formalise the improvement planning activity	TRANSPORT MANAGER	2Q 2018	Medium	
AM POLICY & STRATEGY	• Align AMP with the 2018 GPS	TRANSPORT MANAGER	2Q 2018	High	
LEVELS OF SERVICE & PERFORMANCE MANAGEMENT	• Incorporate ONRC levels of service and performance measures into decision making and business planning processes	TRANSPORT MANAGER	4Q 2018	High	

10.3 IMPLEMENTATION

The Hutt City Council Transport and Infrastructure Maintenance teams have the resource and capability to implement this Improvement Plan in the timeframes targeted. The actions are realistic and necessary to ensure the continued delivery of the Activity Management Plan objectives.

APPENDICES

APPENDIX A – REFERENCES

1. Government Policy Statement on Land Transport 2015
2. Wellington Regional Land Transport Plan 2015
3. Safer Journeys Strategy 2010-2020
4. HCC Long Term Plan 2015 – Shaping Our City
5. HCC Infrastructure Strategy 2015-2045
6. HCC Urban Growth Strategy 2012-2032
7. An Integrated Vision for Hutt City
8. Environmental Sustainability Strategy 2015-2045
9. Leisure and Wellington Strategy 2015-2045
10. ONRC Performance Measures and Reporting Tool 2016

APPENDIX B - GLOSSARY OF TERMS

AADT	Annual Average Daily Traffic
Activity	An activity is the work undertaken on an asset or group of assets to achieve a desired outcome.
Advanced asset management (AAM)	Asset management practice that has evolved to a state that matches business needs. AAM employs predictive modelling, risk management and optimised renewal decision making techniques to establish asset lifecycle treatment options and related long term cashflow predictions. (See Core asset management).
Annual plan	The Annual Plan provides a statement of the direction of Council and ensures consistency and co-ordination in both making policies and decisions concerning the use of Council resources. It is a reference document for monitoring and measuring performance for the community as well as the Council itself.
Asset	A physical component of a facility which has value, enables services to be provided and has an economic life of greater than 12 months.
Activity management (AM)	The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the desired customer or technical outcome.
Activity management plan	A plan developed for the management of one or more infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the lifecycle of the asset in the most cost effective manner to provide a specified customer or technical outcome
Activity management strategy	A strategy for activity management covering, the development and implementation of plans and programmes for asset creation, operation, maintenance, renewal, disposal and performance monitoring to ensure that the desired levels of service and other operational objectives are achieved at optimum cost.
Asset register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each.
BCA	Business case approach seeks at the earliest stage of a project to clearly define the problems and context with engagement of stakeholders. The early engagement is to agree on cause consequences and benefits of addressing the problems. This will determine whether or not the project is worth progressing.
Benefit cost ratio (B/C)	The sum of the present values of all benefits (including residual value, if any) over a specified period, or the life cycle of the asset or facility, divided by the sum of the present value of all costs.
Berm	The area of a road reserve between the kerb or surface water channel and property boundary exclusive of footpath.
Business plan	A plan produced by an organisation (or business units within it) which translate the objectives contained in an Annual Plan into detailed work plans for a particular, or range of, business activities. Activities may include marketing, development, operations, management, personnel, technology and financial planning
Capital expenditure (CAPEX)	Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of an asset.
Carriageway	The portion of road devoted particularly to the use of wheeled vehicles, including shoulders
Cash flow	The stream of costs and/or benefits over time resulting from a project investment or ownership of an asset.
Components	Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality.
Condition monitoring	Continuous or periodic inspection, assessment, measurement and interpretation of resulting data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action
Core asset management	Asset management which relies primarily on the use of an asset register, maintenance history, condition assessment, defined levels of service, and simple risk and benefit/ cost assessments in order to establish work priorities and long term cashflow predictions.
Corridor maintenance	Maintenance of physical items not directly associated with prolonging the life of the

	road pavement or road surfing. It includes pavement marking, edge mowing, signage, safety barriers/rails, traffic signals, lighting, landscape maintenance, grading of unsealed roads. Generally related to safety factors
Critical assets	Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation. Critical assets have a lower threshold for action than non-critical assets.
Current replacement cost	The cost of replacing the service potential of an existing asset, by reference to some measure of capacity, with an appropriate modern equivalent asset.
Deferred maintenance	The shortfall in rehabilitation work required to maintain the service potential of an asset.
Demand management	The active intervention in the market to influence demand for services and assets with forecast consequences, usually to avoid or defer CAPEX expenditure. Demand management is based on the notion that as needs are satisfied expectations rise automatically and almost every action taken to satisfy demand will stimulate further demand.
Depreciated replacement cost (DRC)	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
Depreciation	The wearing out, consumption or other loss of value of an asset whether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for by the allocation of the historical cost (or revalued amount) of the asset less its residual value over its useful life.
Disposal	Activities necessary to dispose of decommissioned assets.
dTIMS	Deighton Total Infrastructure Management System is an off-the-shelf software application which has been designed for multi-year programming of road rehabilitation works. It primarily enables a user to find the optimal set of maintenance strategies to apply to a network under a given set of constraints, usually cost.
Economic life	The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. The economic life is at the maximum when equal to the physical life however obsolescence will often ensure that the economic life is less than the physical life.
Geographic information system (GIS)	Software which provides a means of spatially viewing, searching, manipulating, and analysing an electronic data-base.
Infrastructure assets	Stationary systems forming a network and serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components. The network may include normally recognised 'ordinary' assets as components.
Level of service	The defined service quality for a particular activity (i.e. roading) or service area (i.e. street-lighting) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.
NZTA	New Zealand Transport Agency. The government agency responsible for funding roading and transportation works. Previously Transfund New Zealand and Land Transport Safety Authority.
Level of Service	Level of Service is a qualitive measure used to measure the performance for asset to meet customer and technical requirements.
Life	A measure of the anticipated life of an asset or component; such as time, number of cycles, distance intervals etc.
Life cycle	Life cycle has two meanings: The cycle of activities that an asset (or facility) goes through while it retains an identify as a particular asset i.e. from planning and design to decommissioning or disposal. The period of time between a selected date and the last year over which the criteria (e.g. costs) relating to a decision or alternative under study will be assessed.
Life cycle cost	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.
Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal.

Maintenance plan	Collated information, policies and procedures for the optimum maintenance of an asset, or group of assets.
Maintenance standards	The standards set for the maintenance service, usually contained in preventive maintenance schedules, operation and maintenance manuals, codes of practice, estimating criteria, statutory regulations and mandatory requirements, in accordance with maintenance quality objectives.
Net present value (NPV)	The value of an asset to the organisation, derived from the continued use and subsequent disposal in present monetary values. It is the net amount of discounted total cash inflows arising from the continued use and subsequent disposal of the asset after deducting the value of the discounted total cash outflows.
Objective	An objective is a general statement of intention relating to a specific output or activity. They are longer term aims and are not necessarily outcomes that managers can control.
ONRC	One Network Road Classification is a standardised system for classifying the function of a road that is used by all Council's. This will enable peer comparisons across a range of performance measures.
Operation	The active process of utilising an asset which will consume resources such as manpower, energy, chemicals and materials. Operation costs are part of an assets life cycle costs..
Optimised renewal decision making (ORDM)	An optimisation process for considering and prioritising all options to rectify performance failures of assets. The process encompasses NPV analysis and risk assessment.
Performance indicator (PI)	A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction.
Performance monitoring	Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.
Planned maintenance	Planned maintenance activities fall into 3 categories : Periodic - necessary to ensure the reliability or sustain the design life of an asset. Predictive - condition monitoring activities used to predict failure. Preventive - maintenance that can be initiated without routine or continuous checking (e.g. using information contained in maintenance manuals or manufacturers' recommendations) and is not condition-based.
RAMM	Road Assessment and Maintenance Management System; Roading AMS, developed as an asset inventory and treatment selection tool.
Rehabilitation	Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally involves repairing the asset using available techniques and standards to deliver its original level of service (i.e. heavy patching of roads, slip-lining of sewer mains, etc.) without resorting to significant upgrading or replacement.
Renewal	Works to upgrade, refurbish, rehabilitate or replace existing facilities with facilities of equivalent capacity or performance capability.
Repair	Action to restore an item to its previous condition after failure or damage.
Replacement	The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service.
Remaining economic life	The time remaining until an asset ceases to provide service level or economic usefulness.
Risk cost	The assessed annual cost or benefit relating to the consequence of an event. Risk cost equals the costs relating to the event multiplied by the probability of the event occurring.
Risk management	The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.
Routine maintenance	Day to day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventative maintenance.
SCATS	A computer linked system of traffic signal control, the purpose of which is to enhance traffic flows. SCATS stands for Sydney Co-ordinated Adaptive Traffic System

Service potential	The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset.
Strategic plan	Strategic planning involves making decisions about the long term goals and strategies of an organisation. Strategic plans have a strong external focus, cover major portions of the organisation and identify major targets, actions and resource allocations relating to the long term survival, value and growth of the organisation.
Unplanned maintenance	Corrective work required in the short term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.
Traffic volume	The number of vehicles flowing in both directions past a particular part in a given time (for example, vehicles per hour or vehicles per day).
Upgrading	The replacement of an asset or addition/ replacement of an asset component which materially improves the original service potential of the asset.
Valuation	Estimated asset value which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels or market value for life cycle costing.

APPENDIX C - MANAGEMENT SERVICE STANDARDS

Target Service Levels – Pavements

Overall Asset Objective:	Roadways smoothed to provide users with a safe and comfortable ride. Road surfaces sealed to maintain waterproofness and skid resistance.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
External Measures				
Customer Satisfaction	Overall satisfaction with standard and safety of Hutt City roads.	> 80% of residents are satisfied	84%	Communitrak & Key Research Surveys
Quality	Completion of maintenance, renewals and capital programmes	All work completed to specified standard and within budget (100% success).	98%	Management reports
Responsiveness	Time taken to correct fault from time of notification (95% success)	Unsafe roads / road works - Made safe within 24 hours Potholes on arterial roads < 1 day Potholes on other roads < 3 days Excavations in carriageway resurfaced < 72 hours Trees blown onto road respond immediately	95%	Audit of contractor performance / customer service request records.
		Small slips that do not impact on roads or footpaths cleared same day Major slips cleared – immediate response Litter removed from roads - reported litter removed within 1 day Flooding due to sump block clear < 1 day Problems with utility work made safe the same day	95%	
	Timeliness of response to public enquiries.	Substantive response within 5 working days (95% success)	95%	Audit of customer service records.
Cost	Cost of delivering roading services to required standard.	= $2.78 resident / week	$2.75	Analysis of financial records.
Internal Measures				

Overall Asset Objective:	Roadways smoothed to provide users with a safe and comfortable ride. Road surfaces sealed to maintain waterproofness and skid resistance.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Quality Roughness Measures	See NZTA Maintenance Guidelines items 1 & 2 See NZTA Maintenance Guidelines Item 18	See NZTA Maintenance Guidelines items 1 & 2 See NZTA Maintenance Guidelines Item 18	1.2	RAMM data retrieval Analysis of RAMM rating survey
Safety	See NZTA Maintenance Guidelines item 10.	See NZTA Maintenance Guidelines item 10.	139	

Target Service Levels - Footpaths

Overall Asset Objective:	Footpaths kept in a safe and usable condition to separate pedestrians from other road users and provide foot access to properties.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
External Measures				
Customer Satisfaction / Safety	Overall satisfaction with cleanliness, standard and safety of Hutt City footpaths.	> 80% of residents are satisfied	80%	Communitrak & Key Research Surveys
Quality	Completion of maintenance, renewals and capital programmes	All work completed to specified standard within budget (100% success)).	98%	Management reports
Responsiveness	Time taken to correct fault from time of notification (95% success)	Dangerous footpath defects are attended to immediately: Temporary repairs of other defects are attended to within 72 hours. Permanent repairs of footpaths in high use areas 2 weeks Permanent repairs of other footpaths - < 4 weeks	90%	Audit of customer service request records and contractor performance.
Internal Measures				
Quality	Condition of footpaths / kerbs and channels	Maintain established level of service	Recent surveys showed loss of condition. Additional budget allocated to address this.	Analysis of footpath survey Improved survey results

Target Service Levels - Sign and Markings

Overall Asset Objective:	Road signs and road markings provided to reduce the number and severity of accidents and to facilitate the accessibility and efficiency of the network for users.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Efficiency	Effectiveness of road marking and street signs	Compliance with appropriate standards	Full compliance with standards	Annual Audit
Responsiveness	Time taken to repair / replace damaged / missing signs from time of notification (90% success)	Regulatory and warning signs < 24 hours	100%	Audit contractor performance.
Safety	Number of injury accidents	Maintaining 10yr reducing trend in injury accidents	Reducing trend	NZTA data
Quality	Visibility of signs, markings and RPM's	Programmes carried out to time and budget	100%	Annual inspections Management Reports
	All Renewals, maintenance and capital works (> 90% success)	to specified standard		

Target Service Levels - Streetlighting

Overall Asset Objective:	Street lighting provided to enhance road user and pedestrian safety and security.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Efficiency	Effectiveness of Street lighting	Compliance with New Zealand street lighting standards	Full compliance with standards	Design review
Responsiveness Safety	Time taken to correct fault from time of notification (100% success)	See NZTA Maintenance Guidelines No. 16	> 80%	Audit of contractor performance.
Quality	Glare, discomfort, night-time visibility, pedestrian security	Level of resident satisfaction > 80%	92%	Communitrak & Key Research Surveys
	All maintenance, renewal and capital works	Programmes carried out to time and budget (> 90% success), and to specified standard (> 90% success)	100% 100%	Management Reports

Target Service Levels - Bridges, Culverts and Structures

Overall Asset Objective:	Bridges and subways maintained to ensure continuity of link between geographically isolated areas. Retaining walls and sea walls provided to maintain roadway stability.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Quality	Maintenance standards	Compliance with NZTA standards	Full compliance with NZTA standards	Cyclic inspection programme in place
Capacity Efficiency	Bridge carriageway width	Compliance with appropriate LA standards 99%	99%	RAMM database
	Bridge structural capacity	Class one loading 99%	99%	Audit of design records
	Bridge vertical clearance	Adequate clearance for legal vehicle 99%	99%	RAMM database
	All other structures	Designed and constructed to appropriate standards 100%	100%	Audit of design records
Safety	Maintenance of hazard-free structures	Compliance with NZTA standards		Cyclic inspection programme in place
	Response time to assess damaged structures	Within 2 hours of notification	99%	Audit of customer service records and contractor performance

Target Service Levels - Kerb and Channels and Drainage Facilities

Overall Objective:	Roads drained to protect the pavement structure and to control surface water.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Efficiency	Effectiveness of carriageway surface drainage of the pavement	> 80% customers satisfied	More than 78% customers satisfied	Communitrak & Key Research Surveys Internal Audits

Target Service Levels - Traffic Signals and Controls

Overall Objective:	Intersection controls to reduce number and severity of accidents. Barriers to control errant vehicles. Islands to define user paths. Traffic signals to improve safety and convenience at junctions with a high numbers of conflicts.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Efficiency and Safety	Visibility and effective operation of traffic signals.	Compliance of with NZ standards	Full compliance with the standards i.e. light output and reliability of settings 100%	Random audit
	Barriers located in high risk areas.	Provided to industry standard	Full compliance with Standard	Random Audit
	Traffic islands located where needed	Constructed to HCC Standards	Full compliance with Standard	Random Audit
	Trend of injury accidents	Reducing 10 year rolling average	Satisfied	NZTA data

Target Service Levels – Streetscapes

Overall Objective:	Berms provided to ensure space for utility services and for aesthetics and beautification.			
Service Criteria	Performance Measure	Target Level of Service	Current Level of Service	Measurement Procedure
Environment	Cleanliness of residential streets and shopping centres.	Resident assessment of the amount of litter (> 80% satisfied)	More than 84% of residents satisfied	Communitrak Survey Internal audits
	Appearance of street landscape	Landscaping and vegetation control maintained to the required standard > 80%.	90% compliance with specified grass lengths and programmed cyclic maintenance. More than 85% satisfied with the cleanliness of streetscapes	Random auditing of street landscaping condition.
Safety	Location of utility poles and maintenance of sight lines.	Maintain appropriate clearances between poles and edge of carriageway Vegetation control	As detailed in NZTA's road programme agreement	Audit of new installations
Efficiency	Use of space by service authorities	Adequate clearances to be provided between underground services in the road reserve	Approximately 95% of underground installations have adequate clearances	Audit of new installations

APPENDIX D - DEFICIENCY DATABASE

Deficiency Database – Completed Traffic Improvement Works:

The database is the NZTA developed Deficiency Database Prioritisation Process (DDPP); the database identifies traffic deficiencies and prioritises them on the basis of risk. The database is updated as new deficiencies are identified, works completed and in April/May the crash data, costs and traffic counts are updated. The outcomes of the DDPP are then exported into the various work categories, allowing the budgets for these categories to be spent on a prioritised basis.

Many of the database columns have been hidden to allow a sample of the database to fit within this document. Only the first 30 of approximately 400 database lines are included.

Deficiency_ID	Route ID	Road Name	Deficiency Description	Baseline description of the problem	Short description of its location	How identified	Current Traffic Volume	Total Fatal Crashes	Total Serious Crashes	Total Minor Crashes	Total Non-injury Crashes	Total All Crashes	Crash Rate	Likelihood of a crash	Likelihood Code	Likelihood Description	Consequence_Code	Consequence of the crash	Consequence Description	Risk	Risk Description	Recommended option (based on your weightings)	Risk Ranking
263	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Derwent Lee Cr	Safety Inspections	15,000	0	1	3	6	10	1.300E-07	Likely	D	Crashes occur more than 1-2 times per annum. Crash likely in the next year	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	128	High	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	1
597	433	KINGS CR (433)	Poor / Absent lighting	10 of 21 crashes (or %) at night	At [illegible] signals	CAS Analysis	20,000	0	0	4	5	9	8.000E-08	Likely	D	Crashes occur more than 1-2 times per annum. Crash likely in the next year	b	Minor	Could cause minor injury. Minor safety impact on small number of people	64	Moderate	Street lighting (reduction in night crashes only); improve lighting – intersections. Risk after measure: Reduction. Cost: [illegible]	2
598	105	CUBA ST (105)	Poor / Absent lighting	11 of 26 crashes at night	At Jackson St	CAS Analysis	17,000	0	0	0	12	12	1.000E-07	Likely	D	Crashes occur more than 1-2 times per annum. Crash likely in the next year	b	Minor	Could cause minor injury. Minor safety impact on small number of people	64	Moderate	Street lighting (reduction in night crashes only); improve lighting – intersections. Risk after measure: Reduction. Cost: [illegible]	3
226	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at Hopes Cres	Safety Inspections	15,000	0	1	0	9	10	1.300E-07	Likely	D	Crashes occur more than 1-2 times per annum. Crash likely in the next year	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	128	High	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	4
267	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at Boulcott St	Safety Inspections	15,000	0	1	4	9	14	1.000E-07	Likely	D	Crashes occur more than 1-2 times per annum. Crash likely in the next year	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	128	High	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	5
401	556	WAINUI RD (556)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	o/s Our Lady of the Rosary school	Other Analysis	15,000	0	1	2	2	5	6.540E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	6
52	186	EASTERN HUTT RD (186)	Potential for head on crashes or to leave road	Unbarriered 80kph zone. Potential to cross into oncoming traffic	North of Stokes Valley Rd for 600m	Safety Study	15,000	0	1	1	1	3	3.020E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	d	Major	Could cause a fatality or several fatalities, severe injuries or significant safety impacts	256	High	Install central barrier - guardrail wire rope. Risk after measure: Reduction. Cost: $100,000	7
545	433	QUEENS DR (433)	Vulnerable road users are at risk because of road features/lack of features	Pedestrians crossing headless to/from Westfield within 20m of traffic signals	Queens/Bunny/Margaret traffic signals	CAS Analysis	10,000	0	1	5	0	6	1.170E-07	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Install guardrail / wire-rope barrier along median strip. Risk after measure: Reduction. Cost: [illegible]	8
144	552	RANDWICK RD (552)	Vulnerable road users are at risk because of road features/lack of features	Investigate options for cycle lanes	east side	Other Analysis	18,000	0	0	3	0	3	3.270E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Provide on or off road cycle lanes. Risk after measure: Reduction. Cost: [illegible]	9
50	186	EASTERN HUTT RD (186)	Potential for head on crashes or to leave road	Unbarriered 80kph zone. Potential to cross into oncoming traffic	North of High St for 300m	Safety Study	15,000	0	0	2	4	6	7.620E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	d	Major	Could cause a fatality or several fatalities, severe injuries or significant safety impacts	256	High	Install central barrier - guardrail wire rope. Risk after measure: Reduction. Cost: $100,000	10
87	666	WHITES LINE EAST (666)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at Ludlam Cres	Safety Inspections	19,000	0	0	1	7	8	8.200E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	11
171	100	HUTT ROAD (PETONE) (100)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	At Ridders rdt	Safety Inspections	18,000	0	0	0	2	2	2.181E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	12
172	100	HUTT ROAD (PETONE) (100)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	At Ridders rdt	Safety Inspections	18,000	0	0	1	2	3	3.270E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	13
173	100	HUTT ROAD (PETONE) (100)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	At Te Mome	Safety Inspections	18,000	0	0	0	5	5	5.450E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	14
88	552	RANDWICK RD (552)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	At York St	Safety Inspections	17,000	0	0	5	3	8	9.250E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	15
86	552	RANDWICK RD (552)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	At Randwick School	Safety Inspections	17,000	0	0	1	2	3	3.640E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	16
264	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Athlone Cres	Safety Inspections	15,000	0	0	1	1	2	2.510E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	17
589	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Daysh/Fairway	Other Analysis	15,000	0	0	2	2	4	5.250E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	18
81	556	WAINUI RD (556)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at Whites Line East	Safety Inspections	15,000	0	0	1	3	4	5.250E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	19
202	180	KNIGHTS RD (180)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	east of Penrose St	Safety Inspections	14,000	0	0	0	2	2	2.800E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	20
535	457	RUTHERFORD ST (457)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	At Queens Dr	Other Analysis	14,000	0	0	0	1	1	1.400E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	21
269	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Queens Dr (McD)	Safety Inspections	13,000	0	0	1	4	5	7.500E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	22
262	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at 81 - 111 St Thorneycroft Ave	Safety Inspections	13,000	0	0	2	4	6	9.000E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	23
411	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at Taita shops	Other Analysis	13,000	0	0	1	0	1	1.510E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	24
588	173	HIGH ST (173)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Gordon St	Other Analysis	13,000	0	0	6	1	7	1.020E-07	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	25
627	173	HIGH ST (173)	Poor / Absent lighting	4/10 crashes (40%) in dark	At Taita Drive	CAS Analysis	15,000	0	0	1	2	3	3.900E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	b	Minor	Could cause minor injury. Minor safety impact on small number of people	32	Moderate	Street lighting (reduction in night crashes only); improve lighting – intersections. Risk after measure: Reduction. Cost: [illegible]	26
265	416	WAIWHETU RD (416)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	St [illegible] (nr Birdwood)	Safety Inspections	12,000	0	0	0	3	3	6.800E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	27
268	416	WAIWHETU RD (416)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	o/s school	Safety Inspections	12,000	0	0	2	3	5	8.100E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	28
266	416	WAIWHETU RD (416)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at St Ronans Ave	Safety Inspections	12,000	0	1	0	6	7	1.100E-07	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	29
264	416	WAIWHETU RD (416)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	at Malone Rd	Safety Inspections	12,000	0	0	0	3	3	6.000E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	30
261	433	KINGS CR (433)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Eastern Hutt School	Safety Inspections	12,000	0	0	0	1	1	1.600E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	31
296	453	WATERLOO RD (453)	Vulnerable road users are at risk because of road features/lack of features	Upgrade ped xing	Witako St	Safety Inspections	12,000	0	1	1	1	3	4.200E-08	Possible	C	Crashes occur more than 1-5 times in past 5 years. 1 - 5 crashes possible in next 5 years	c	Moderate	Could possibly cause serious injury. Serious safety impact on small number or minor impact on large number of people.	64	Moderate	Upgrade existing ped xing & flush/kerb to standard, colour surfacing & TGSIs. Risk after measure: Reduction. Cost: [illegible]	32

APPENDIX E - OPERATIONAL RISK PROFILE

Service Description	New Zealand Transport Agency (NZTA) Funding Management	Operations Maintenance Contracts	Capital Projects	Roading Management Strategy
Internal/External	Internal & External	Internal & External	Internal & External	Internal & External
Business Process	Funding Application and Management of NZTA Money; Technical and Procedural Audits	Scheduled Maintenance; Ad-hoc Minor Works; Emergency Maintenance and RFS Responses	Projects Identification & Approval. Projects managed by external consultants	Strategic Planning and Funding.
Platform. IT System	MS Office; Finance One; Confirm and RAMM; d'Tims	MS Office; Finance One; Confirm and RAMM	MS Office; Finance One; Confirm and RAMM	MS Office; Finance One; Confirm, dTIMS (long term payment deterioration model)
Infrastructure	Phone/Internet/Desktop/Network	Phone/Internet/Desktop/Network	Phone/Internet/Desktop/Network	Phone/Internet/Desktop/Network
Priority	Medium	High	Medium	Low
Relative Priority	4 (four)	1 (one)	2 (two)	4 (four)
Target Recovery Time	Funding Application and (annually) Management of NZTA Money (monthly) d'Tims (5 days)	Scheduled Maintenance (1 month) Ad-hoc Minor Works (weekly) Emergency Maintenance (1 day) and RFS Responses (5 days)	Progress payment processing (1 month)	Strategic Planning and Funding - annual update of Asset Management Plan.
Plan for Extended Disruption	Manual process for monthly subsidy claims to NZTA. Delayed management of funds. Work in progress proceeds as scheduled. Access RAMM off site via web.	Manual contractor liaison for scheduled and emergency works.	Delayed initiation and approval of Capital Projects. Existing projects proceed as scheduled. Access RAMM off site via web.	Delay planning process and work with available resources and information (e.g. offsite development of backup plans)
Statutory Requirements	Local Government Act 2002; Land Transport Act 1998	Local Government Act 2002; Land Transport Act 1998	Local Government Act 2002; Land Transport Act 1998	Local Government Act 2002; Land Transport Act 1998
Division	Transport	**Contact**	John Gloag/ John Middleton/ Damon Simmons	

Service Description	Service Risk Description	Impact (H,M,L) Timing	Impact Description	Contingencies / Work-Arounds	Action / Testing
Communications Failure	Both cell phones, landlines and email	(High) 1 Week	Cables serving Building Un-Scheduled Work – At Risk and Emergency Work At Risk Customer Enquiries unable to be received Loss of internal links to external agencies. LTPON/RAMM with CJ Technologies	Scheduled work carry on as per normal by Contractors / Consultants	Residents RFS's at the counter Spreading the news to community. (Corporate Level) Media Prompt External Contractors – Daily Meetings and Couriers
Computer System Failure	Fire IT area	(High) 1 Week	Email Communication and loss of IT Agencies, Financial Systems Review, Confirm, RAMM.		Communications to public – External: Media Release Mail or Public Counter Internal: Review revert to Manual Plans / Financial Reports - Access hard copy. Confirm: Revert to manual forms e.g.: Fix-a-grams, Counter Enquiries
All above scenarios is beyond control.				Identify critical resources to be retrieved, duplicate on either memory stick or Manual Documents, Emergency Plan.	
Staff Shortage	Flu	50% missing for 1 month	Prioritising Tasks and extra hours by internal staff		External: Partnering with Consultants e.g.: GHD Internal: Extended for extra hours. Priorities work load
No Access to Building	Earthquake	6 months	All of the above	Access to Office Resources	Staff Report to Pavilion Gaining access and Attempt to gain access with Trained Safety Officers for resources from Office Daily meetings at tentative (Dowse Museum).

APPENDIX F –OVERWEIGHT VEHICLE ROUTE