



INFRASTRUCTURE & SERVICES

Three Futures Analysis

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1. Executive Summary

The purpose of this report is to identify existing capacity of Council based infrastructure and services before considering the infrastructure implications resulting from each of the three futures under the Sustainable Futures 30/50 Project. The report represents a desk based analysis of existing and future infrastructure based on growth information provided by Council's Futures Team. Assumptions have been made based on information and technology present at the time of writing and all costings are as at July 2009. Infrastructure and Services have not undertaken a robust cost analysis for this stage of the Sustainable Futures 30/50 Project and as such estimated infrastructure requirements and costs are indicative only. Based on analysis undertaken the report presents the following findings for consideration of Council:

- The total cost of Council's growth related infrastructure provision under future one is estimated at \$978.6 million over the 50 year planning horizon (\$19.57 million per annum) while sustainability for infrastructure provision under this future is rated at 15 out of a possible 60.
- The total cost of Council's growth related infrastructure provision under future two is estimated at \$1001.30 million over the 50 year planning horizon (\$20.03 million per annum) while sustainability for infrastructure provision is rated at 34 out of a possible 60.
- The total cost of Council's growth related infrastructure provision under future three is estimated at \$919.47 million over the 50 year planning horizon (\$18.39 million per annum) while sustainability for infrastructure provision is rated at 43 out of a possible 60.
- Also considered in this report are infrastructure and services at the District level. This consideration covers infrastructure and services that are important for growth but are unlikely to be affected by the pattern that growth takes. Once District costs have been added to each future the total cost of growth related capital infrastructure projects under futures one, two and three is estimated at \$1001.10 million, \$1025.30 million and \$944.97 million respectively. These figures are in current day terms and exclude any increase in operational expenditure associated with capital projects.

2. Introduction

The 'Sustainable Futures 30/50 Project' involves identification of existing or planned infrastructure, land and services required to accommodate projected growth through to 2061.

A Sustainable Futures 30/50 growth model was developed by Council's Futures Team based on Council's Growth Model, business floor area data and peak population surveys in coastal areas. This model underlies analysis of future infrastructure, land and service requirements in this report.

The model provides an estimate of three separate future scenarios for population and land use growth over the 50 year timeframe of the Sustainable Futures 30/50 Project.

Each 'Future' is dependant upon potential planning based mechanisms for controlling the extent of growth and development within specifically identified meshblock 'nodes' of the Whangarei sub-region. The three futures modelled are as follows:

Future 1	Lightly Regulated/ Market Led Development (status quo)
Future 2	Twin City/ Urban and Coastal Spread
Future 3	Satellite Town/Rural and Coastal Villages

Each of the three 'Future' scenarios provides challenges and opportunities for the provision of Council based infrastructure and services.

Council's Infrastructure and Services Group holds the responsibility of planning for and providing the following infrastructure:

- Water Services
- Stormwater
- Waste Water
- Roading
- Parks
- Libraries
- Solid Waste

In addition Council's Property and Community Services Department has a role in the provision of District wide infrastructure, such as the airport.

The purpose of this report is twofold:

1. To identify existing capacity of Council based infrastructure and services.
2. To consider the implications of each 'Future' on Council based infrastructure and services.

3. Methodology

The Sustainable Futures 30/50 growth model provides an estimate of population growth across the sub-region. For each of the three futures this growth has been allocated to meshblock defined nodes dependant on the pattern of growth identified under that future (refer to the December 2008 Whangarei District Growth Strategy Project Outline for discussion of the wider Sustainable Futures 30/50 project).

In order to get a full picture of the impact of growth business floor area and peak coastal population figures for each node have also been extrapolated out to 2061. As extrapolation was based on a limited dataset, business floor area and peak coastal population information must be treated with caution. Where anomalies have been identified moderation of the business floor area and/or peak coastal population figures has been undertaken by Council's Futures Team. For

example, in the Marsden Point – Ruakaka node future one business floor area and population figures were specifically revised due to significant anomalies being identified. Under future two, peak population figures for this node were also revised due to the relative effect of creating a second city.

When viewed at a high level, infrastructure covered by this report can be grouped into two categories, infrastructure at a nodal level and infrastructure at a District level.

Financial Infrastructure Analysis at a Nodal Level

For the purposes of this report, infrastructure at a nodal level covers potable water (Water Services) stormwater and wastewater (Wastes and Drainage), roading, parks and libraries. Council's Infrastructure and Services Group has reviewed infrastructure requirements on a node by node/future by future basis with this analysis forming the body of this report.

Analysis begins in section 4 of this report where existing services and constraints for each node are briefly outlined. The report then considers the node by node financial implications of growth on these services under each future (sections 5.1, 6.1 and 7.1). As the exact timing of infrastructure provision cannot be accurately identified all estimates are in current dollar terms. In order to simplify assumptions in this early 'high level' stage of the project analysis has been based only on those capital projects required to accommodate growth. While there is a corresponding increase in operational expenditure associated with ongoing maintenance of capital projects this will not be considered until more detailed analysis is undertaken in an implementation plan for the preferred future.

In considering financial implications the following assumptions have been made by each department;

- Water Services: Population and business floor area figures have been used by Water Services to determine a 2061 household unit equivalent (HUE) figure for each node (note; due to the essential nature of water provision peak/holiday population figures have been used for coastal nodes). From these figures it has been possible to estimate potable water consumption and in doing so future infrastructure required to accommodate predicted growth. This analysis has been undertaken for each node under each of the three futures.
- Wastes and Drainage (Stormwater): In alignment with current best practice future stormwater management is envisaged to be a continuation of current stormwater policies (through the Environmental Engineering Standards). Under these policies a developer is required to undertake onsite attenuation and treatment of stormwater generated by their development. This generally results in little impact to the existing Council stormwater network. Upgrades required are undertaken by the developer with possible Council contribution where an existing asset has limited remaining life. The primary financial impact of this strategy is where new assets are vested in Council and ongoing operational expenditure is required to maintain functionality (this cost will be captured at the time of more detailed analysis for the preferred future and will not be covered in this report). Under this approach Council does not itself undertake projects involving creation of new stormwater infrastructure. The key exception to this is the Waipu node where specific constraints exist. Stormwater in the Waipu node is specifically discussed under each of the three futures.
- Wastes and Drainage (Wastewater): For wastewater population and business floor area figures have again been used to determine a 2061 HUE figure for each node (note; due to the essential nature of wastewater management peak/holiday population figures have been used for coastal nodes). From these figures it has been possible to estimate future infrastructure required to accommodate predicted growth. This analysis has been undertaken for each node under each of the three futures.
- Roading: Similarly Roading have used population and business floor area figures to determine a 2061 HUE figure for each node (note; as there is existing road capacity and infrastructure in place non peak population figures have been used for all nodes). This has then been

converted into a number of vehicle movements per day and from this figure it has been possible to estimate future infrastructure required to accommodate predicted growth. This analysis has been undertaken for each node under each of the three futures.

- Parks: As Parks do not cater for business use business floor area figures have not been considered by the department. Population figures have been used to determine 2061 HUE for each node (note; due to the seasonal nature of coastal facilities such as boat ramps peak population figures have been used for coastal nodes). Three core categories of parks have been defined ('Neighbourhood', 'Sports' and 'Other') with a best practice 'hectare per capita indices being used to determine land required under each category. This data has then been analysed against land acquisition costings in order to estimate the average cost of parks under each node (note where surplus parks of a particular category have been identified within a node the potential to use this land to supplement shortages in another category has been explored). This analysis has been undertaken for each node under each of the three futures.
- Library: While libraries have recommended standards regarding facility size and the number of items held per capita (the current recommendation is three items per capita) these are difficult to apply at a nodal level as it is not reasonable or cost effective to provide a branch library for population resident in each node. Instead the Library Department took a two tier approach. The first tier consisted of central libraries providing for the city and nodes in close proximity. The second tier consisted of branch libraries in areas that cannot reasonably be serviced by the central library. Branch library provision was based on the presence of existing facilities, perceived demand from the community, accessibility of users and distance from the central library.

Infrastructure at a District level

Infrastructure at a District level covers infrastructure that is important for growth but is unlikely to be affected by the pattern that growth takes. This considers District wide infrastructure such as the solid waste network, the airport, the District water supply, the central library and the central business district. This infrastructure is specifically discussed in section 8 of this report. More detailed analysis will be undertaken in an implementation plan to be commenced once the preferred future has been identified.

Sustainability Analysis at a Future Level

Supplementing financial analysis is a sustainability analysis of each of the three futures. This analysis is based on the overarching sustainability principles for the Sustainable Futures 30/50 Project;

- Sustainable Culture
- Sustainable Economy
- Sustainable Society
- Sustainable Environment

Each department has developed three criteria for each of these principles in order to rank the sustainability of infrastructure provision under each of the futures. This analysis has been undertaken at a future (rather than node) level and is covered under sections 5.2, 6.2 and 7.2 of this report.

Disclaimer

It is important to note that this report constitutes a desk based analysis of existing and future infrastructure based on growth information provided by Council's Futures Team. Assumptions have been made based on information and technology present at the time of writing and all costings are based on prices as at July 2009. Infrastructure and Services have not undertaken a robust cost analysis for this stage of the project and as such estimated infrastructure requirements and costs are indicative only. Likewise a robust constraints analysis has not been undertaken in any of the nodes and information contained in this report should not be viewed as a comprehensive resource. Once a preferred future has been identified, a more detailed analysis

of infrastructure requirements for each node under that future will be undertaken with information, projects and ultimately costs being revised to reflect this.

4 Existing Services and Constraints by Node

4.1 Hikurangi

Water Services

The Hikurangi node is currently reticulated, a summary of the network is "*Whau V Water Treatment Plant (WTP) - Fairway Drive Reservoir (Res) - Kamo Pumps - Dip Road Res - Vinegar Hill Res - Waitara Rd Pumps - Upper Vinegar Hill Res - Hikurangi Res*".

Final storage is via the Hikurangi reservoir with limiting factors being Waitara pumps and the Hikurangi link.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – The waste water treatment plant (WWTP) has recently been upgraded. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 8,934 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.75, 9.27 and 5.91 hectares of existing capacity respectively. It is considered that if necessary spare capacity at the existing sports area could be converted to Neighbourhood Park and playgrounds in order to meet future needs. This relies on development being within the existing urban boundary.

Libraries

Node currently has a small branch library serving a 1,572 population.

4.2. Kamo

Water Services

The Kamo node is currently reticulated, a summary of the network is "*Whau V WTP - Fairway Drive Res*".

Final storage is via the Dip Road reservoir with limiting factors being the Kamo pumps and line.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is sufficient to service a 1 in 5 year event, some property flooding occurs at more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of the network are currently at capacity with known areas of surcharge during rain events. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 49,499 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found -5.52, -0.35 and -27.50 hectares of capacity respectively.

Libraries

Node currently has a branch library serving a population of 11,223.

4.3. Marsden Point – Ruakaka

Water Services

The Marsden Point - Ruakaka node is currently reticulated, a summary of the network is "*Ruakaka WTP - Ruakaka Res*".

Final storage is via the Ruakaka reservoir with the limiting factor being the 450 line.

Waste and Drainage (waste water and storm water)

Stormwater - The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – The WWTP has recently been upgraded. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 57,687 vehicles per day. There is a known backlog of \$18.10 million in roading works that will need to be met in order to provide for current traffic movements.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 1.89, 1.57 and 2.59 hectares of existing capacity respectively. Overall it was considered that field capacity is available but concerns regarding the provision of neighbourhood parks in new urban development were raised.

Libraries

Node currently has a medium sized branch library serving a population of 3,114.

4.4. Matapouri

Water Services

The Matapouri node is not currently reticulated.

Waste and Drainage (waste water and storm water)

Stormwater – WDC has a limited network consisting primarily of open drains.

Wastewater – WDC does not currently have any wastewater network at Matapouri.

Roading (local network only)

Node currently serviced by a network catering for 1,431 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 1.13, -0.41 and 5 hectares of existing capacity respectively.

Libraries

Node currently has a small branch library serving the existing population of 372.

4.5 Maungakaramea

Water Services

The Maungakaramea node is currently reticulated, a summary of the network is "*Maungakaramea WTP*".

Limiting factors for the node are resource consent and storage requirements.

Waste and Drainage (waste water and storm water)

Stormwater – WDC has some stormwater assets but no network.

Wastewater – WDC does not currently have any wastewater network at Maungakaramea.

Roading (local network only)

Node currently serviced by a network catering for 3,865 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0, 3.89 and 2.29 hectares of existing capacity respectively. Development around existing open space is encouraged (i.e. in proximity to existing sports fields.) Satellite development may require additional neighbourhood reserves.

Libraries

Node not currently serviced.

4.6. Maungatapere

Water Services

The Maungatapere node is currently reticulated, a summary of the network is "*Poroti WTP - Poroti Pumps*".

Final storage is via the Poroti CWT with the limiting factor being local reticulation.

Waste and Drainage (waste water and storm water)

Stormwater – WDC has some stormwater assets but no network.

Wastewater – WDC does not currently have any wastewater network at Maungatapere.

Roading (local network only)

Node currently serviced by a network catering for 7,695 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.41, 1.25 and -0.28 hectares of existing capacity respectively. Development around existing open space is encouraged.

Libraries

Node not currently serviced.

4.7. Maunu

Water Services

The Maunu node is currently reticulated, a summary of the network is "*Poroti WTP - Poroti Pumps - Cemetery Rd Res*".

Final storage is via the Cemetery Rd reservoir with the limiting factor being local reticulation.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of the network are currently at capacity with known areas of surcharge during rain events. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 15,640 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.45, -1.45 and 4.07 hectares of existing capacity respectively. It was noted that this node was very expensive for neighbourhood reserve development.

Libraries

Node not currently serviced.

4.8. McLeods Bay

Water Services

The McLeods Bay node is currently reticulated, a summary of the network is "*City WTPs - Mackesys Pumps - Onerahi Reservoir – Scott Road Pumps – Parua Bay Reservoir – McLeods Bay Pumps - McLeods Bay Reservoir*".

Final storage is via the McLeods Bay reservoir with limiting factors being the Parua Bay/McLeods Bay Main, McLeods Pumps and the McLeods Bay Reservoir".

Waste and Drainage (waste water and storm water)

Stormwater – The limited stormwater network is generally sufficient to service a 1 in 5 year event. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Reticulated as part of the Whangarei Heads Sewer Scheme. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 2,238 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.02, -0.64 and -0.44 hectares of existing capacity respectively. Lack of suitable flat land for neighbourhood park and limitations on access to the coast (including parking) are seen as key Parks constraints.

Libraries

Node not currently serviced.

4.9. Ngunguru

Water Services

The Ngunguru node is not currently reticulated.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events and upgrades are being undertaken to resolve issues. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Ngunguru is reticulated through to the Ngunguru WWTP. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 3,296 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.15, 2.07 and 4.72 hectares of existing capacity respectively. While some capacity is present the low indices of neighbourhood parks is of concern.

Libraries

Node currently has a small branch library serving a population of 846.

4.10. Oakura

Water Services

The Oakura node is not currently reticulated.

Waste and Drainage (waste water and storm water)

Stormwater - The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – WWTP has recently been upgraded. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 1,350 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0, 1.61 and 5.05 hectares of existing capacity respectively. Limited land is available in this node for sportsfields and neighbourhood parks and the focus is on coastal access and a central sports park.

Libraries

Node currently has a small branch library serving a population of 351.

4.11. Onerahi

Water Services

The Onerahi node is currently reticulated, a summary of the network is "*City WTPs - Mackesys Pumps - Onerahi Reservoir*"

Final storage is via the Onerahi reservoir with limiting the factor being the Riverside Drive main.

Waste and Drainage (solid waste water and storm water)

Stormwater - The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of the network are currently at capacity with known areas of surcharge during rain events. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 30,861 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.84, -2.88 and -10.33 hectares of existing capacity respectively. There is a general shortfall in capacity with limited space for neighbourhood parks.

Libraries

Node currently has a branch library serving a population of 7,161.

4.12 Otaika

Water Services

The Otaika node is currently reticulated, a summary of the network is "*Ruddles WTP - Ruddles CWT - Anzac Res*".

Final storage is via the Anzac reservoir with limiting factors being local reticulation and the Ruddles raw water line.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of the network are currently at capacity with known areas of surcharge during rain events. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 34,874 vehicles per day. There is a known backlog of \$50 million in roading works that will need to be met in order to provide for current traffic movements.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found -0.09, -3.60 and -2.75 hectares of existing capacity respectively. There is no capacity in this node and all reserve types require land purchase and development.

Libraries

Node not currently serviced.

4.13 Parua Bay

Water Services

The Parua Bay node is currently reticulated, a summary of the network is "*City WTPs - Mackesys Pumps - Onerahi Reservoir - Scott Road Pumps - Parua Bay Reservoir*".

Final storage is via the Parua Bay reservoir with limiting factors being the Heads main, the Parua Bay reservoir and local reticulation.

Waste and Drainage (waste water and storm water)

Stormwater - The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of Parua Bay are reticulated as part of the Whangarei Heads Sewer Scheme. In these instances the system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 4,126 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 4.93, -1.17 and 6.12 hectares of existing capacity respectively. Sportsfields are required in this node to meet existing demand.

Libraries

Node not currently serviced.

4.14 Pataua

Water Services

The Pataua node is not currently reticulated.

Waste and Drainage (waste water and storm water)

Stormwater – WDC have some stormwater assets but no network.

Wastewater – WDC does not currently have any wastewater network at Pataua.

Roading (local network only)

Node currently serviced by a network catering for 1,846 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.52, -0.53 and 4.70 hectares of existing capacity respectively. While sports fields are under represented this is not a priority node for provision in the project timeframe.

Libraries

Node not currently serviced.

4.15 Tikipunga

Water Services

The Tikipunga node is currently reticulated, a summary of the network is "*Whau V WTP - Fairway Drive Res - Kamo Pumps - Dip Road Res - Vinegar Hill Res*".

Final storage is via the Vinegar Hill reservoir with limiting factors being the Station Road trunk main, the Dip Road reservoir, the Vinegar Hill reservoir, Kamo pump Lines, Kamo pumps and local reticulation.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of the network are currently at capacity with known areas of surcharge during rain events. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 30,858 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 1.32, 0.56 and -11.73 hectares of existing capacity respectively. Good neighbourhood and sports field provision is present in this node but 'other' parks (i.e. natural reserves) are limited.

Libraries

Node currently has a branch library serving a population of 7,667.

4.16 Tutukaka

Water Services

The Tutukaka node is not currently reticulated.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Tutukaka is reticulated through to the Tutukaka WWTP. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 2,896 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found -0.70, -0.83 and 5.97 hectares of existing capacity respectively. This node uses the Ngunguru sports fields and has limited suitable land for neighbourhood reserves. Where land is available it is likely to be expensive.

Libraries

Node not currently serviced.

4.17 Urquharts Bay

Water Services

The Urquharts Bay node is currently reticulated, a summary of the network is "*City WTPs - Mackesys Pumps - Onerahi reservoir - Scott Road pumps - Parua Bay reservoir - McLeods Bay pumps - McLeods Bay reservoir*"

Final storage is via the McLeods Bay reservoir with limiting factors being the Parua Bay/McLeods Bay main, McLeods Bay pumps and the McLeods Bay reservoir.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – This node is reticulated as part of the Whangarei Heads Sewer Scheme. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 1,869 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found -0.46, -0.53 and 0.69 hectares of existing capacity respectively. This node has limited existing capacity and challenging geography for any future parks. More carparks on the coast are currently required.

Libraries

Node not currently serviced.

4.18 Waipu

Water Services

The Waipu node is currently reticulated, a summary of the network is "*Ahuroa WTP - Shoemaker Pumps - Waipu reservoir*".

Final storage is via the Waipu reservoir with limiting factors being Waipu reticulation and the Waipu reservoir.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, although some network upgrades have been identified. The recently completed Catchment Management Plan for Waipu and Waipu Cove indicates significant tracts of land that are susceptible to flooding both from extreme storm events and future sea level rise. A number of mitigating options are presented in the report but it largely recommends minimising flood risk to existing development. Future development will probably be limited to the areas not deemed flood susceptible in the Catchment Management Plan resulting in lower population loadings or higher population density.

Wastewater – Waipu is reticulated through to the Waipu WWTP. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 6,251 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.81, 0.69 and 4.79 hectares of existing capacity respectively. Capacity is currently met in this node.

Libraries

Node currently has a medium sized community library serving a population of 1,188.

4.19 Waipu - Langs Beach

Water Services

The Waipu – Langs Beach node is currently reticulated, a summary of the network is "*Ahuroa WTP - Shoemaker Pumps - Waipu reservoir - Waipu Cove Pumps - Langs Beach reservoir*".

Final storage is via the Langs Beach and Waipu reservoirs with limiting factors being Waipu Reticulation, the Waipu reservoir and the Langs Beach Reservoir.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Waipu-Langs Beach is reticulated through to the Waipu WWTP. Reticulation is sufficient to service the existing demand and will require renewal/rehabilitation as necessary.

Roading (local network only)

Node currently serviced by a network catering for 6,251 vehicles per day. There are no known backlog requirements in the node that cannot be met under existing programmes.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 0.55, -0.50 and 8.79 hectares of existing capacity respectively. Sports parks are currently underrepresented in this node and purchasing land for future parks is likely to be expensive.

Libraries

Node not currently serviced.

4.20 Whangarei City

Water Services

The Whangarei City node is currently reticulated with an extensive network that cannot easily be summarised.

Final storage is dependant upon the particular scenario as are the limiting factors.

Waste and Drainage (waste water and storm water)

Stormwater – The stormwater network is generally sufficient to service a 1 in 5 year event, some property flooding occurs in more extreme events. Reticulation will require renewal/rehabilitation as necessary.

Wastewater – Parts of the network are currently at capacity with known areas of surcharge during rain events. The system is reticulated to the main Whangarei WWTP.

Roading (local network only)

Node currently serviced by a network catering for 124,820 vehicles per day. There is a known backlog of \$29 million in roading works that will need to be met in order to provide for current traffic movements.

Parks and Recreation (WDC administered land only)

An analysis of 'Neighbourhood', 'Sports' and 'Other' parks found 5.59, 7.15 and 77.09 hectares of existing capacity respectively.

Libraries

Node currently has a main central library. This facility serves not only the 14,412 Whangarei City node but the wider district.

4.21 Other

The Other 'node' relates to areas of the District outside of the existing defined settlement pattern. Due to the extent of this 'node' existing Services and Constraints cannot easily be quantified or summarised.

5 Future One: Lightly Regulated/ Market Led Development

Financial implications of infrastructure required by each department under future one are outlined below in section 5.1. Section 5.2 goes on to consider the non financial effects of infrastructure provision under sustainability principles of the 30/50 project (Culture, Economy, Society and Environment). A brief summary of the financial and non financial infrastructure implications of future one will then be provided under section 5.3 of this report.

5.1 Future One: Financial Analysis

5.1.1 Hikurangi

Water Services

Under future one there are no additional Water Services infrastructure requirements for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$0.70 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future one there are no additional library requirements for this node.

Hikurangi future one estimate: \$0.70 million

5.1.2 Kamo

Water Services

Under future one a 5,500 m³ reservoir, pumps and trunk line renewal would be required for this node at an estimated cost of \$5 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$20.64 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 107,302 vehicles per day will be generated for this node. This will require an estimated \$5.20 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 84 hectares requiring an estimated \$42.37 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$4 million.

Kamo future one estimate: \$77.21 million

5.1.3. Marsden Point – Ruakaka

Water Services

Under future one a 2,500 m³ reservoir, reticulation and a minor water treatment plant upgrade would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed in recommendations.

Wastewater – Based on current cost estimates for future WWTP upgrades which correlate well with projected populations, plus an estimated \$2000 per extra HUE for reticulation, the estimate for this node is \$33.90 million.

Roading (local network only)

Under future one 141,419 vehicles per day will be generated for this node. This will require an estimated \$66.10 million of additional WDC administered roading expenditure.

Note; the Marsden Point - Ruakaka vehicles per day figure reflects vehicle movements generated from estimated future business floor area. As this estimate is based on historic growth rates which experienced a significant spike between 1991 and 1996 figures should be viewed with caution.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 29 hectares requiring an estimated \$19.08 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$3 million.

Marsden Point - Ruakaka future one estimate: \$125.08 million

5.1.4. Matapouri

Water Services

Under future one a 6,000 m³ reservoir and reticulation would be required for this node at an estimated cost of \$5 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$104 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future one only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 44 hectares requiring an estimated \$39.21 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Matapouri future one estimate: \$148.21 million

5.1.5 Maungakaramea

Water Services

Under future one a connection to the city and a 3,000 m³ reservoir would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$38 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future one only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 8 hectares requiring an estimated \$4.43 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Maungakaramea future one estimate: \$45.43 million

5.1.6 Maungatapere

Water Services

Under future one a new 2,500 m³ reservoir would be required for this node at an estimated cost of \$1.8 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$57 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 19 hectares requiring an estimated \$12.17 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Maungatapere future one estimate: \$70.97 million

5.1.7 Maunu

Water Services

Under future one a new 2,000 m³ reservoir would be required for this node at an estimated cost of \$1.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$7.48 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 16 hectares requiring an estimated \$11.59 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$4 million.

Maunu future one estimate: \$24.57 million

5.1.8 McLeod Bay

Water Services

Under future one a new 1,000 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$0.70 million.

Waste and Drainage (waste water and storm water)

Stormwater - Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$5.92 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 16 hectares requiring an estimated \$13.90 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

McLeod Bay future one estimate: \$20.51 million

5.1.9 Ngunguru

Water Services

Under future one a new 4,000m³ reservoir and connection to the city would be required for this node at an estimated cost of \$18 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$11.88 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 9,658 vehicles per day will be generated for this node. This will require an estimated \$1.40 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 23 hectares requiring an estimated \$22.73 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Ngunguru future one estimate: \$54.01 million

5.1.10 Oakura

Water Services

Under future one there are no additional Water Services infrastructure requirements for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$2.97 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined surplus of 1 hectare. The node is significantly under represented in Neighbourhood and Sports parks however requiring an estimated \$3.04 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Oakura future one estimate: \$6.01 million

5.1.11 Onerahi

Water Services

Under future one minor pump work would be required for this node at an estimated cost of \$0.10 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$3.08 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 20 hectares requiring an estimated \$6.23 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$4 million.

Onerahi future one estimate: \$13.41 million

5.1.12 Otaika

Water Services

Under future one minor reticulation would be required for this node at an estimated cost of \$0.30 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$4.61 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 172,231 vehicles per day will be generated for this node. This will require an estimated \$116.40 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 10 hectares requiring an estimated \$4.20 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$4 million.

Otaika future one estimate: \$129.51 million

5.1.13 Parua Bay

Water Services

Under future one a new 1,000 m³ reservoir and pumps would be required for this node at an estimated cost of \$1.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$7.95 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 16,305 vehicles per day will be generated for this node. This will require an estimated \$0.50 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 10 hectares requiring an estimated \$3.78 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Parua Bay future one estimate: \$13.74 million

5.1.14 Pataua

Water Services

Under future one there would be no services for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation is \$17.73 million, based on connection to the Whangarei Heads Scheme. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 22 hectares requiring an estimated \$20.98 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Pataua future one estimate: \$38.71 million

5.1.15 Tikipunga

Water Services

Under future one a new 2,700 m³ reservoir and reticulation would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$9.78 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 58,917 vehicles per day will be generated for this node. This will require an estimated \$2.50 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 34 hectares requiring an estimated \$12.46 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$4 million.

Tikipunga future one estimate: \$31.74 million

5.1.16 Tutukaka

Water Services

Under future one a new 3,000 m³ reservoir and connection to the city would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$10.07 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 21 hectares requiring an estimated \$26.37 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$3 million.

Tutukaka future one estimate: \$42.44 million

5.1.17 Urquharts Bay

Water Services

Under future one a new 700 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$0.70 million.

Waste and Drainage (waste water and storm water)

Stormwater- Addressed under 'Methodology'

Wastewater- Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$4 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined surplus of 10 hectares. The node is significantly under represented in Neighbourhood and Sports parks however requiring an estimated \$11.57 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Urquharts Bay future one estimate: \$16.27 million

5.1.18 Waipu

Water Services

Under future one a New 1,500 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$2 million.

Waste and Drainage (waste water and storm water)

Stormwater – The recently completed Catchment Management Plan for Waipu and Waipu Cove indicates significant tracts of land that are susceptible to flooding both from extreme storm events and future sea level rise. A number of mitigating options are presented in the report but they largely address minimising flood risk to existing development. Future development will probably be limited to the areas not deemed flood susceptible in the Catchment Management Plan, resulting in lower population loadings or higher population density than that currently forecast.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$7.18 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 15,667 vehicles per day will be generated for this node. This will require an estimated \$1.20 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 11 hectares requiring an estimated \$8.50 million of additional land.

Libraries

Under future one a branch library would be required for this node at an estimated cost of \$2 million.

Waipu future one estimate: \$20.88 million

5.1.19 Waipu - Langs Beach

Water Services

Under future one a 2,500 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$2 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$12.78 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 4,715 vehicles per day will be generated for this node. This will require an estimated \$2.10 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found a combined deficit of 23 hectares requiring an estimated \$23.05 million of additional land.

Libraries

Under future one there are no additional library requirements for this node.

Waipu – Langs Beach future one estimate: \$39.93 million

5.1.20 Whangarei City

Water Services

Under future one a new 5,000 m³ storage and reticulation would be required for this node at an estimated cost of \$8 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$11.89 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future one 348,993 vehicles per day will be generated for this node. This will require an estimated \$39.40 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future one there are no additional library requirements for this node.

Whangarei City future one estimate: \$59.29 million

5.1.21 Other

Water Services

Under future one there are no additional Water Services infrastructure requirements for this node as it would not be serviced. However, regardless of the future adopted a new city water source and an upgrade of Whau Valley would be required as District Services. Costs associated with these projects in future one are discussed under the District Services – Water section of this report (section 8.3).

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – It has been assumed that lots are larger than 2000 m² and soakage is adequate. Individual onsite wastewater treatment and disposal systems will therefore be the responsibility of the developer.

Roading (local network only)

Under future one only minor WDC Roding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future one found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future one there are no additional library requirements for this node.

Other future one estimate: \$0 million

5.2 Future One: Non Financial Analysis

In order to consider the non financial effects of infrastructure provision the overarching sustainability principles of the 30/50 project (Culture, Economy, Society and Environment) were used to analyse each of the three futures. Each department developed three criteria for each of the principles with criteria forming a baseline against which the sustainability of infrastructure provision under each future could be ranked. By necessity this analysis has been undertaken at a future (rather than node) level. The results of future one analysis are outlined by department below and a summary will be provided under section 5.3 of this report.

5.2.1 Water Services Future One Sustainability Consideration

Overview

Future one represents the status quo. The outcomes of the Water Services future one assessment against sustainability criteria is as follows:

Sustainable Culture

- Effects on historical areas of significance, little negative effects on historical sites are expected.
- Contribution to recreation culture, no benefits to recreational culture are expected.
- Contribution to cultural links to natural environment, no benefits to cultural links to natural environment are expected.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy

- The cost of new infrastructure is expected to be higher as the system is pulled along with development rather than consolidating and utilising existing capacity.
- The running cost, will again be higher with more reliance on pumping.
- The reliability of the water supply developed, where serviced the community would have a reliable supply.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Society

- The ability to supply the growing community with a MoH accredited water supply, difficulties will be faced in ensuring the water supply reaches the community as it spreads out. It may be that the system does not cover all of the expected growth.
- The ability to continue to provide for the existing community, the existing community will continue to be supplied.
- The fire fighting coverage supplied to the community, difficulties will be faced in ensuring the water supply reaches the community as it spreads out, it may be that the system does not cover all of the expected growth.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Environment

- Likely negative effects on water abstraction points, a new water source will be needed.
- Energy requirements for running the system and raw materials quantities for construction, likely to be the most expensive option in terms of operating budget.

- Benefits offered in land protection, reforestation or habitat protection, possibly some benefits in catchment protection.

Summary; Criteria are met to level = Low (or 1/3)

Water Services future one sustainability summary: Low (4/12)

5.2.2 Wastes and Drainage Future One Sustainability Consideration

Overview

Future one represents the status quo. The outcomes of Wastes and Drainage future one assessment against sustainability criteria is as follows:

Sustainable Culture

- Future one represents many challenges in identifying and considering historical sites on a far broader scope and would therefore command more complex planning and operational resources.
- Development spreading along coastal, previously uninhabited, areas increases the potential for effects of cultural based conflict for construction of stormwater management assets.

Summary; Criteria are met to level = Low (or 0/3)

Sustainable Economy

- Development may by chance happen in areas where stormwater management can be achieved cheaply due to lower land prices (e.g. for attenuation ponds).
- The average price for purchase of land for stormwater management varies widely depending on location and therefore costs are unpredictable in future one.
- More stormwater assets dispersed more widely are more expensive to maintain, especially along the coast.
- Development costs increase with distance from resources and with challenging geography.
- Widely dispersed and unpredictable development does not protect the values currently associated with key tourist locations.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Society

- Development density may be decreased meaning that flood damages are less for areas that are heavily impacted by a storm event (corollary below).
- Decreased development density means that in the event of severe flooding logistics of civil defence become more complicated.

Summary; Criteria are met to level = Low (or 1/3).

Sustainable Environment

- Dispersed development in this future compromises the ability to effectively manage the impacts of stormwater on the receiving environment.
- Stormwater management under this future would result in extensive modification of waterways currently in a natural or largely undeveloped condition with undesirable and potentially unsustainable environmental and hydrological effects.

Summary; Criteria are met to level = Low (or 0/3).

Wastes and Drainage future one sustainability summary: Low (2/12)

5.2.3 Roding Future One Sustainability Consideration

Overview

Future one represents the status quo. The outcomes of the Roding future one assessment against sustainability criteria is as follows:

Sustainable Culture

- Future one represents many challenges in identifying and considering historical sites on a far broader scope and would therefore command more complex planning and operational resources.
- Development spreading along coastal, previously inhabited areas increases the potential for effects of cultural based conflict with roading developments.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy

- More roading assets dispersed more widely serving lower density developments are more expensive to develop and maintain, especially along coastal areas due to the topography.
- Development costs increase with distance from resources and with challenging topography.
- Widely dispersed and unpredictable development does not protect or support the values currently associated with key business and tourist locations.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Society

- Unregulated development encourages the use of lands that are not cost effective to provide infrastructure to.
- Widely dispersed and low density development compromises the ability to provide and maintain access to isolated communities. Emergency response such as civil defence also becomes more complicated.
- Dispersed development in this future environment limits the ability to provide alternative transport modes and infrastructure in an economic manner.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable environment

- Ecological values would be difficult protect as the location of development is unknown and it is therefore difficult to identify natural areas for protection in a structured way.
- Dispersed development in this future compromises the ability to effectively manage the impacts of roading developments on the natural environment.
- Ecological corridor and restoration programming is ad-hoc as development is sporadic.
- Environmental risks to Roading assets are increased due to increased development around rivers and the coast.

Summary; Criteria are met to level = Low (or 1/3)

Roading future one sustainability summary: Low (4/12)

5.2.4 Parks and Recreation Future One Sustainability Consideration

Overview

Future one represents the status quo. The outcomes of the Parks and Recreation future one assessment against sustainability criteria is as follows:

Sustainable Culture

- Future one represents challenges in identifying and considering historical sites on a far broader scope and would therefore command more complex planning and operational resources.
- Development spreading along coastal, previously inhabited areas increases the potential for effects of cultural based conflict for use of parks.
- Recreation culture is adversely affected by longer travel times due to locations of reserves.
- Random development does not support cultural links to the natural environment as urban boundaries are likely to be widespread and parks located away from urban development.

Summary; Criteria are met to level = Low (or 0/3)

Sustainable Economy

- Development may by chance happen in areas where parks and can be purchased cheaply.
- The average price for purchase of land for parks varies widely depending on location and therefore costs are unpredictable in future one.
- More parks, dispersed more widely are more expensive to maintain, especially along the coast.
- Development costs increase with distance from resources and with challenging geography.
- Widely dispersed and unpredictable development does not protect the values currently associated with key tourist locations.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Society

- Development may occur around a park which already exists, enhancing use (see flipside below).
- Development may be inappropriate near an existing reserve and contribute to diminishing the values inherent.
- Location is less likely to be favourable. Difficulties may exist in both the quality and the location of parks, thus potentially making parks of dissimilar quality district wide.
- Widespread development may mean people have to drive to parks, reducing the exercise opportunity.
- Multiple-use is reduced where size of parks is likely to decrease in areas where geography is more challenging, given the geographical nature of future one development.

Summary: Criteria are met to level = Low (or 0/3)

Sustainable environment

- Conservation values would be difficult protect as the location of development is unknown and it is therefore difficult to identify natural areas for protection in a structured way.
- Privately owned ecologically significant areas would be subject to non-park development.
- Ecological corridor and restoration programming is ad-hoc as development is sporadic.
- Environmental risks to parks assets are increased due to increased development around rivers and the coast.

Summary; Criteria are met to level = Low (or 0/3)

Parks and Recreation future one sustainability summary: Low (1/12)

5.2.5 Library Future One Sustainability Consideration

Overview

Future one represents the status quo. The outcomes of the Library future one assessment against sustainability criteria is as follows:

Sustainable Culture

- Library as a cultural space, the delivery of library services requires planning and at least some indication of the cultural dynamics of the community. Future one of development does not attempt to address cultural differences.
- Ability to meet community needs, as above planning for the resources needed by communities of tomorrow ensures a more equitable delivery of service.
- Barrier free access, libraries should be easily and readily accessible by all. The future of libraries lies in their role as a 'centre of culture'. Planning to realise this is unlikely under future one.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy

- Economic climate, libraries can be viewed as a 'nice to have' and are therefore one of the areas subject to financial constraints in times of economic difficulty. On the other hand libraries commonly undergo an upsurge in use during these times as people with less discretionary spending see libraries as a free source of entertainment, education and information.
- Political climate, depending on the political direction of the time future one can result in haphazard library development.
- Cost of land and buildings, the building of new libraries is often deferred with the result being more spent on maintaining substandard buildings and the cost when buildings are eventually built is greater.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Society

- Location, ideally libraries should be located close to major destinations or alternatively as destinations in themselves. This type of development does not lend itself to planning for placement.
- Accessibility, libraries should be readily accessible with adequate parking and proximity to public transport. Ad hoc development may result in a failure to provide for the needs of the community.
- Trends, prediction of future trends should be researched in order to adequately provide for the society of tomorrow. Future one appears to place minimum emphasis on this.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Environment

- Sustainable design, libraries should be designed using the principle of sustainable design including water use and reuse, material selection and waste reduction.
- Location, site ecology and proximity to other amenities (including transport) are important factors in decision making.
- Building endurance, the design of new buildings needs to be focused on meeting the future needs of the community and planning for enduring facilities lasting many years, future one does not achieve this.

Summary; Criteria are met to level = Low (or 1/3)

Library future one sustainability summary: Low (4/12)

5.3 Future One: Summary

A summary of the estimated growth related costs of Council infrastructure provision under future one has been provided as table 1 (note this does not include the infrastructure of external agencies which will be considered separately from this report by Council's Futures Team). For ease of reading a full scale copy of the table has been provided as Appendix 1.

Table 1: Future one Council administered infrastructure cost summary

Nodes	2061 Business Floor Area	2061 Population Projections		Water	Library	Waste Water	Roading	Parks	Total Infrastructure and Services Estimate (\$M)
		Resident Population	Peak Population	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	
Hikurangi	63,101	1,742	N/A	0.00	0.00	0.70	0.00	0.00	0.70
Kamo	169,410	21,732	N/A	5.00	4.00	20.64	5.20	42.37	77.21
Marsden Point / Ruakaka	800,410	7,634	10,315	3.00	3.00	33.90	66.10	19.08	125.08
Matapouri	N/A	1,571	10,862	5.00	0.00	104.00	0.00	39.21	148.21
Maungakaramea	N/A	3,957	N/A	3.00	0.00	38.00	0.00	4.43	45.43
Maungatapere	42,466	5,861	N/A	1.80	0.00	57.00	0.00	12.17	70.97
Maunu	1,441	7,934	N/A	1.50	4.00	7.48	0.00	11.59	24.57
McLeod Bay	N/A	1,004	3,658	0.70	0.00	5.92	0.00	13.90	20.51
Ngunguru	361	2,498	7,023	18.00	0.00	11.88	1.40	22.73	54.01
Oakura	N/A	288	1,896	0.00	0.00	2.97	0.00	3.04	6.01
Onerahi	59,355	8,698	N/A	0.10	4.00	3.08	0.00	6.23	13.41
Otaika	1,072,202	5,752	N/A	0.30	4.00	4.61	116.40	4.20	129.51
Parua Bay	6,958	3,986	5,190	1.50	0.00	7.95	0.50	3.78	13.74
Pataua	N/A	2,330	6,004	0.00	0.00	17.73	0.00	20.98	38.71
Tikipunga	73,391	12,647	N/A	3.00	4.00	9.78	2.50	12.46	31.74
Tutukaka	N/A	1,639	5,989	3.00	3.00	10.07	0.00	26.37	42.44
Urquharts Bay	N/A	925	2,568	0.70	0.00	4.00	0.00	11.57	16.27
Waipu	43,061	2,506	4,781	2.00	2.00	7.18	1.20	8.50	20.88
Waipu - Langs Beach	N/A	1,226	7,095	2.00	0.00	12.78	2.10	23.05	39.93
Whangarei City	2,001,546	17,882	N/A	8.00	0.00	11.89	39.40	0.00	59.29
Other	N/A	21,151	N/A	0.00	0.00	0.00	0.00	0.00	0.00
Total	N/A	132,963	N/A	58.60	28.00	371.56	234.80	285.65	978.60

The total cost of Council's growth related infrastructure provision (including backlog required to meet growth projections) is estimated at \$978.6 million over the 50 year planning horizon (\$19.57 million per annum). However, it is important to note that this does not include residential development that cannot be serviced by Council due to the dispersed nature of development under this future (i.e. the provision of on site tank water and waster water treatment facilities). If the cost of these systems could be taken into consideration of the actual cost of infrastructure under future one would be higher.

A summary of the non financial effects of future one infrastructure provision under sustainability principles of the 30/50 project (Culture, Economy, Society and Environment) has been provided as table 2.

Table 2: Future one sustainability principles summary

Sustainability Principle	Water Services Score	Library Score	Wastes and Drainage Score	Roading Score	Parks and Recreation Score	Future 1 Score
Culture	1 out of 3	1 out of 3	0 out of 3	1 out of 3	0 out of 3	3 out of 15
Economy	1 out of 3	1 out of 3	1 out of 3	1 out of 3	1 out of 3	5 out of 15
Society	1 out of 3	1 out of 3	1 out of 3	1 out of 3	0 out of 3	4 out of 15
Environment	1 out of 3	1 out of 3	0 out of 3	1 out of 3	0 out of 3	3 out of 15
Total	4 out of 12	4 out of 12	2 out of 12	4 out of 12	1 out of 12	15 out of 60

A common theme raised across departments was the difficulty in meeting sustainability principles in light of the unplanned nature of development under future one. Given the unplanned nature of development under this future there is significant risk of services not being provided, provided or at a lower level of service or being provided in a manner that does not meet best practice requirements. This risk is reflected in the future one sustainability score of 15 out of a possible 60.

6. Future Two: Twin City/ Urban and Coastal Spread

Financial implications of infrastructure required by each department under future two are outlined below in section 6.1. Section 6.2 goes on to consider the non financial effects of infrastructure provision under sustainability principles of the 30/50 project (Culture, Economy, Society and Environment). A brief summary of the financial and non financial infrastructure implications of future two will then be provided under section 6.3 of this report.

6.1 Future Two: Financial Analysis

6.1.1 Hikurangi

Water Services

Under future two a 500 m³ reservoir would be required for this node at an estimated cost of \$0.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$1.90 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$2 million.

Hikurangi future two estimate: \$4.40 million

6.1.2 Kamo

Water Services

Under future two a 4,500 m³ reservoir, pumps and trunk line renewal would be required for this node at an estimated cost of \$4.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$16.37 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two 86,014 vehicles per day will be generated for this node. This will require an estimated \$5.20 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 74 hectares requiring an estimated \$36.83 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$4 million.

Kamo future two estimate: \$66.90 million

6.1.3 Marsden Point - Ruakaka

Water Services

Under future two a 30,000 m³ reservoir, water treatment plant upgrade, reticulation and pumps would be required for this node at an estimated cost of \$17 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on current cost estimates for future WWTP upgrades which correlate well with projected populations, plus an estimated \$2000 per extra HUE for reticulation, the cost estimate for this node is \$108.58.

Roading (local network only)

Under future two 463,122 vehicles per day will be generated for this node. This will require an estimated \$117.40 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 123 hectares requiring an estimated \$86.40 million of additional land.

Libraries

Under future two a central library would be required for this node at an estimated cost of \$10 million.

Marsden Point - Ruakaka future two estimate: \$339.38 million

6.1.4 Matapouri

Water Services

Under future two a 3,000 m³ reservoir and reticulation would be required for this node at an estimated cost of \$4 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$54 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 19 hectares requiring an estimated \$18.33 million of additional land.

Libraries

Under future two there are no additional library requirements for this node.

Matapouri future two estimate: \$76.33 million

6.1.5 Maungakaramea

Water Services

Under future two a 500 m³ reservoir and a waste water treatment upgrade would be required for this node at an estimated cost of \$1 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$17 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future two only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future two there are no additional library requirements for this node.

Maungakaramea future two estimate: \$18 million

6.2.6 Maungatapere

Water Services

Under future two there are minimal additional Water Services infrastructure requirements for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$28 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future two only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 5 hectares requiring an estimated \$2.02 million of additional land.

Libraries

Under future two there are no additional library requirements for this node.

Maungatapere future two estimate: \$30.02 million

6.2.7 Maunu

Water Services

Under future two a new 1,500 m³ reservoir would be required for this node at an estimated cost of \$1 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$5.25 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 10 hectares requiring and estimated \$7.88 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$4 million.

Maunu future two estimate: \$18.12 million

6.2.8 McLeod Bay

Water Services

Under future two a new 1,000 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$0.80 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$6.3 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 17 hectares requiring an estimated \$14.74 million of additional land.

Libraries

Under future two there are no additional library requirements for this node.

McLeod Bay future two estimate: \$21.84 million

6.2.9 Ngunguru

Water Services

Under future two a new 2,000 m³ reservoir, reticulation and a connection to the city would be required for this node at an estimated cost of \$16 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$5.97 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 8 hectares requiring an estimated \$9.24 million of additional land.

Libraries

Under future two there are no additional library requirements for this node.

Ngunguru future two estimate: \$31.21 million

6.1.10 Oakura

Water Services

Under future two a 4,000 m³ reservoir, water treatment plant and reticulation would be required for this node at an estimated cost of \$10 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$10.01 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 18 hectares requiring an estimated \$18.38 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$2 million.

Oakura future two estimate: \$40.39 million

6.1.11 Onerahi

Water Services

Under future two a 3,500 m³ reservoir and trunk line would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$8.36 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 33 hectares requiring an estimated \$13.43 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$4 million.

Onerahi future two estimate: \$28.79 million

6.1.12 Otaika

Water Services

Under future two minor reticulation would be required for this node at an estimated cost of \$0.20 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$6.10 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two 58,638 vehicles per day will be generated for this node. This will require an estimated \$55.30 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 21 hectares requiring an estimated \$10.29 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$4 million.

Otaika future two estimate: \$75.89 million

6.1.13 Parua Bay

Water Services

Under future two a new 750 m³ reservoir would be required for this node at an estimated cost of \$0.70 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$3.51 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future two there are no additional library requirements for this node.

Parua Bay future two estimate: \$4.21 million

6.1.14 Pataua

Water Services

Under future two there would be no services for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation is \$11.14 million, based on connection to the Whangarei Heads Scheme. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 5 hectares requiring an estimated \$7.07 million of additional land

Libraries

Under future two there are no additional library requirements for this node.

Pataua future two estimate: \$18.21 million

6.1.15 Tikipunga

Water Services

Under future two a new 2,500 m³ reservoir and reticulation would be required for this node at an estimated cost of \$2.80 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$8.68 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two 49,114 vehicles per day will be generated for this node. This will require an estimated \$2.50 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 31 hectares requiring an estimated \$11.30 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$4 million.

Tikipunga future two estimate: \$29.28 million

6.1.16 Tutukaka

Water Services

Under future two a new 3,000 m³ reservoir and a connection to the city would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$10.50 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 22 hectares requiring an estimated \$27.40 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$3 million.

Tutukaka future two estimate: \$43.90 million

6.1.17 Urquharts Bay

Water Services

Under future two a New 600 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$0.60 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$3.85 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 10 hectares requiring an estimated \$11.18 million of additional land

Libraries

Under future two there are no additional library requirements for this node.

Urquharts Bay future two estimate: \$15.63 million

6.1.18 Waipu

Water Services

Under future two a New 1,500 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$2 million.

Waste and Drainage (waste water and storm water)

Stormwater – The recently completed Catchment Management Plan for Waipu and Waipu Cove indicates significant tracts of land that are susceptible to flooding both from extreme storm events and future sea level rise. A number of mitigating options are presented in the report but they largely address minimising flood risk to existing development. Future development will probably be limited to the areas not deemed flood susceptible in the Catchment Management Plan, resulting in lower population loadings or higher population density than that currently forecast.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$6.89 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two 26,311 vehicles per day will be generated for this node. This will require an estimated \$1.20 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 11 hectares requiring an estimated \$8.28 million of additional land.

Libraries

Under future two a branch library would be required for this node at an estimated cost of \$2 million.

Waipu future two estimate: \$20.37 million

6.1.19 Waipu - Langs Beach

Water Services

Under future two a new 4,000 m³ reservoir, reticulation, pumps and a water treatment plant upgrade would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$17.43 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two 6,327 vehicles per day will be generated for this node. This will require an estimated \$2.10 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found a combined deficit of 35 hectares requiring an estimated \$32.34 million of additional land.

Libraries

Under future two there are no additional library requirements for this node.

Waipu – Langs Beach future two estimate: \$54.87 million

6.1.20 Whangarei City

Water Services

Under future two a new 5,000 m³ storage and reticulation would be required for this node at an estimated cost of \$8 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$16.16 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future two 201,623 vehicles per day will be generated for this node. This will require an estimated \$39.40 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found capacity to accommodate future growth, there are no additional Parks land requirements for this node

Libraries

Under future two there are no additional library requirements for this node.

Whangarei City future two estimate: \$65.56 million

6.1.21 Other

Water Services

Under future two there are no additional Water Services infrastructure requirements for this node as it would not be serviced. However, regardless of the future adopted a new city water source and an upgrade of Whau Valley would be required as District Services. Costs associated with these projects in future two are discussed under the District Services – Water section of this report (section 8.3).

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – It has been assumed the lots are larger than 2000 m² and soakage is adequate. Individual onsite wastewater treatment and disposal systems will therefore be the responsibility of the developer.

Roading (local network only)

Under future two only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future two found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future two there are no additional library requirements for this node.

Other future two estimate: \$0 million

6.2 Future Two: Non Financial Analysis

In order to consider the non financial effects of infrastructure provision the overarching sustainability principles of the 30/50 project (Culture, Economy, Society and Environment) were used to analyse each of the three futures. Each department developed three criteria for each of the principles with criteria forming a baseline against which the sustainability of infrastructure provision under each future could be ranked. By necessity this analysis has been undertaken at a future (rather than node) level. The results of future two analysis are provided by department below.

6.2.1 Water Services Future Two Sustainability Consideration

Overview

Future two represents a twin city. The outcomes of the Water Services future two assessment against sustainability criteria is as follows:

Sustainable Culture

- Effects on historical areas of significance, little negative effects on historical sites are expected.
- Contribution to recreation culture, no benefits to recreational culture are expected.
- Contribution to cultural links to natural environment, no benefits to cultural, links to natural environment are expected.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy

- The cost of new infrastructure, most major infrastructure is in place or planned for this scenario in the short to medium term.
- The running cost of the future scenarios, this scenario is expected to be significantly cheaper than future one and slightly cheaper than future three, due to the centralised nature of development.
- The reliability of the water supply developed, this will be high.

Summary; Criteria are met to level = High (or 3/3)

Sustainable Society

- The ability to supply the growing community with a MoH accredited water supply, this scenario would allow a compliant water supply to be provided to most new lots developed within the district.
- The ability to continue to provide for the existing community, there is likely to be little or no drop in the levels of service offered to the existing community.
- The fire fighting coverage supplied to the community, most new lots would have full fire fighting protection.

Summary; Criteria are met to level = High (or 3/3)

Sustainable Environment

- Likely negative effects on water abstraction points, a water source will be needed.
- Energy requirements for running the system and raw materials quantities for construction, this is likely to be the least energy intensive option for water supply with most of the infrastructure already in place.
- Benefits offered in land protection, reforestation or habitat protection, possibly some benefits will accrue through catchment protection.

Summary; Criteria are met to level = Medium (or 2/3)

Water Services future two sustainability summary: High (9/12)

6.2.2 Wastes and Drainage Future Two Sustainability Consideration

Overview

Future two represents a twin city. The outcomes of Wastes and Drainage future two assessment against sustainability criteria is as follows:

Sustainable Culture

- Future two has some challenges in identifying and considering historical sites and would therefore require some complex planning and operational resources.
- Development spreading along the coastal, previously uninhabited areas increases the potential for effects of cultural based conflict for construction of stormwater management assets.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy

- Large scale development is focused mainly in existing areas and large scale developer funded stormwater facilities are more viable.

- Some stormwater assets along the coast may be smaller and dispersed more widely requiring a greater operational expenditure to maintain.
- Development costs increase with distance from resources and with challenging geography.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Society

- More concentrated development means stormwater solutions for entire communities can be planned and implemented more easily compared to dispersed settlement solutions.
- Higher density settlement could incur significantly higher damages in an extreme flood event.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Environment

- Higher density development allows for stricter control, monitoring and treatment of stormwater management.
- Most development occurs in areas already significantly modified from their natural state and environmental impact is reduced.

Summary; Criteria are met to level = Medium (or 2/3)

Wastes and Drainage future two sustainability summary: Medium (6/12)

6.2.3 Roding Future Two Sustainability Consideration

Overview

Future two represents a twin city. The outcomes of the Roding future two assessment against sustainability criteria is as follows:

Sustainable Culture

- Future two represents challenges in identifying and considering historical sites and would therefore command complex planning and operational resources.
- Development spreading along coastal, previously inhabited areas increases the potential for effects of cultural based conflict with roading developments.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy

- Concentrating development in the two main centres makes the pattern of development more predictable.
- Development costs increase with distance from resources and with challenging topography.
- Widely dispersed and unpredictable development along some coastal areas does not protect or support the values currently associated with key business and tourist locations.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Society

- Development encourages the use of coastal lands that are not cost effective to provide infrastructure to.
- Dispersed and low density coastal development compromises the ability to provide and maintain access to isolated communities, emergency response such as civil defence becomes more complicated.
- Concentrating development in this future environment improves the ability to provide alternative transport modes and infrastructure in an economic manner

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable environment

- Ecological values would be less difficult to protect as the location of development is known and it is therefore easier to identify natural areas for protection in a structured way.
- Concentrating development in this future improves the ability to effectively manage the impacts of roading developments on the natural environment
- Ecological corridor and restoration programming is improved as development is more concentrated.
- Environmental risks to Roading assets are reduced due to reduced development around rivers and the coast.

Summary; Criteria are met to level = Low (or 1/3)

Roading future two sustainability summary: Medium (6/12)

6.2.4 Parks and Recreation Future Two Sustainability Consideration

Overview

Future two represents a twin city. The outcomes of the Parks and Recreation future two assessment against sustainability criteria is as follows:

Sustainable Culture

- Future two represents many challenges in identifying and considering historical sites on a broader scope in some coastal areas and would therefore command more complex planning and operational resources.
- Development spreading along coastal, previously inhabited areas increases the potential for effects of cultural based conflict for use of parks.
- Recreation culture is adversely affected by longer travel times and locations of reserves in spreading coastal areas.
- Does not support cultural links to the natural environment as urban boundaries are likely to be widespread and parks located away from urban development in coastal spread areas.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Economy

- Development is concentrated in two centres making the pattern more predictable
- The average price for purchase of land for parks is high in the Ruakaka area.
- Possibility of intra city competition for recreation resources.
- Widely dispersed and unpredictable development along some coastal areas does not protect the values currently associated with key tourist locations.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Society

- Future two allows early, considered integration of parks networks.
- Development may occur around a park which already exists, enhancing use (see flipside below).
- Development may be inappropriate near an existing reserve and contribute to diminishing the inherent values.
- Widespread development in coastal areas may mean people have to drive to parks, reducing the exercise opportunity.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Environment

- Conservation values would be less difficult protect as the location of development is mostly known allowing identification of natural areas for protection in a structured way.
- Privately owned ecologically significant areas would be subject to non-park development, especially in the spreading coastal areas of future two.

- Ecological corridor and restoration programming is difficult in spreading coastal areas as development is sporadic.
- Environmental risks to parks assets are increased to a lesser extent (than future one) due to increased development around rivers and the coast.

Summary; Criteria are met to level = Medium (or 2/3)

Parks and Recreation future two sustainability summary: Medium (7/12)

6.2.5 Library Future Two Sustainability Consideration

Overview

Future two represents a twin city. The outcomes of the Library future two assessment against sustainability criteria is as follows:

Sustainable Culture

- Library as a cultural space, there may be cultural differences between the two cities which could result in a differentiation in service levels and an inequality of resources. On the other hand it may result in each library catering to particular needs rather than a 'one size fits all' approach.
- Ability to meet community needs, unless the community needs were substantially different there would be little point in duplication.
- Barrier free access, this should apply regardless of the type of development.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Economy

- Economic climate, economic development would need to be sufficient to support the increased financial resources required.
- Political climate, this future raises the possibility of a competitive rather than cooperative approach toward development with each city competing for resources.
- Cost of land and buildings, double the central library resources would result in double the cost.

Summary: Criteria are met to level = Low (or 1/3)

Sustainable Society

- Location, the two central libraries would need to be within close proximity of other community amenities all of which would be duplicated
- Accessibility, libraries should be readily accessible with adequate parking and proximity to public transport.
- Trends, the prediction of future trends should be researched in order to adequately provide for the society of tomorrow. This future planning is incorporated in Future two.

Summary: Criteria are met to level = Medium (or 2/3)

Sustainable Environment

- Sustainable design, libraries should be designed using the principle of sustainable design including water use and reuse, material selection and waste reduction.
- Location, site ecology and proximity to other amenities (including transport) are important factors in decision making.
- Building endurance, the design of new buildings needs to be focused on meeting the future needs of the community and planning for enduring facilities lasting many years.

Summary: Criteria are met to level = Low (or 1/3)

Library future two sustainability summary: Medium (6/12)

6.3 Future Two: Summary

A summary of the estimated growth related costs of Council infrastructure provision under future two is provided as table 3 (note this does not include the infrastructure of external agencies which will be considered separately from this report by Council's Futures Team). For ease of reading a full scale copy of the table has been provided as Appendix 2.

Table 3: Future two Council administered infrastructure cost summary

Nodes	2061 Business Floor Area	2061 Population Projections		Water	Library	Waste Water	Roading	Parks	Total Infrastructure and Services Estimate (\$M)
		Resident Population	Peak Population	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	
Hikurangi	32,914	2,508	N/A	0.50	2.00	1.90	0.00	0.00	4.40
Kamo	73,644	19,683	N/A	4.50	4.00	16.37	5.20	36.83	66.90
Marsden Point / Ruakaka	2,621,203	25,000	30,000 (reduced from 59,172 due to anomalies from limited data)	17.00	10.00	108.58	117.40	86.40	339.38
Matapouri	N/A	814	5,627	4.00	0.00	54.00	0.00	18.33	76.33
Maungakaremea	N/A	1,790	N/A	1.00	0.00	17.00	0.00	0.00	18.00
Maungatapere	18,793	2,868	N/A	0.00	0.00	28.00	0.00	2.02	30.02
Maunu	893	6,774	N/A	1.00	4.00	5.25	0.00	7.88	18.12
McLeod Bay	N/A	1,059	3,859	0.80	0.00	6.30	0.00	14.74	21.84
Ngunguru	465	1,405	3,950	16.00	0.00	5.97	0.00	9.24	31.21
Oakura	N/A	845	5,556	10.00	2.00	10.01	0.00	18.38	40.39
Onerahi	38,900	11,480	N/A	3.00	4.00	8.36	0.00	13.43	28.79
Otaika	196,203	8,104	N/A	0.20	4.00	6.10	55.30	10.29	75.89
Parua Bay	279	2,220	2,891	0.70	0.00	3.51	0.00	0.00	4.21
Pataua	N/A	1,001	2,579	0.00	0.00	11.14	0.00	7.07	18.21
Tikipunga	16,229	12,179	N/A	2.80	4.00	8.68	2.50	11.30	29.28
Tututkaka	N/A	1,700	6,211	3.00	3.00	10.50	0.00	27.40	43.90
Urquharts Bay	N/A	895	2,485	0.60	0.00	3.85	0.00	11.18	15.63
Waipu	24,977	2,469	4,711	2.00	2.00	6.89	1.20	8.28	20.37
Waipu - Langs Beach	N/A	1,645	9,516	3.00	0.00	17.43	2.10	32.34	54.87
Whangarei City	829,943	22,212	N/A	8.00	0.00	16.16	39.40	0.00	63.56
Other	N/A	3,036	N/A	0.00	0.00	0.00	0.00	0.00	0.00
Total	N/A	129,687	N/A	78.10	39.00	345.98	223.10	315.12	1001.30

The total cost of Council's growth related future two infrastructure provision (including backlog required to meet growth projections) is estimated at \$1001.30 million over the 50 year planning horizon (\$20.03 million per annum). This is some \$22.7 million greater than future one due to both the inclusion of additional areas for servicing (as a result of consolidated growth) and the expense of duplication services for a second city of 25,000 people (the Marsden Point/Ruakaka node).

A summary of the non financial effects of future two infrastructure provision under sustainability principles of the 30/50 project (Culture, Economy, Society and Environment) has been provided as table 4.

Table 4: Future two sustainability principles summary

Sustainability Principle	Water Services Score	Library Score	Wastes and Drainage Score	Roading Score	Parks and Recreation Score	Future 2 Score
Culture	1 out of 3	2 out of 3	1 out of 3	1 out of 3	2 out of 3	7 out of 15
Economy	3 out of 3	1 out of 3	2 out of 3	2 out of 3	1 out of 3	9 out of 15
Society	3 out of 3	2 out of 3	1 out of 3	2 out of 3	2 out of 3	10 out of 15
Environment	2 out of 3	1 out of 3	2 out of 3	1 out of 3	2 out of 3	8 out of 15
Total	9 out of 12	6 out of 12	6 out of 12	6 out of 12	7 out of 12	34 out of 60

Common themes raised across departments included the duplication of services, potential competition for resources as a result of this and the effects of relatively dispersed coastal development. While both positive and negative effects were identified the consolidated/planned nature of development was seen by all as resulting in a more sustainable outcome. These factors resulted in a future two sustainability score of 34 out of a possible 60.

7. Future Three: Satellite Town/Rural and Coastal Villages

Financial implications of infrastructure required by each department under future three are outlined below in section 7.1. Section 7.2 goes on to consider the non financial effects of infrastructure provision under sustainability principles of the 30/50 project (Culture, Economy, Society and Environment). A brief summary of the financial and non financial infrastructure implications of future three will then be provided under section 7.3 of this report.

7.1 Future Three: Financial Analysis

7.1.1 Hikurangi

Water Services

Under future three a 2000 m³ reservoir would be required for this node at an estimated cost of \$1.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$6.98 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 28,416 vehicles per day will be generated for this node. This will require an estimated \$1 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 0 hectares. The node is significantly under represented in Neighbourhood parks however requiring an estimated \$0.87 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$2 million.

Hikurangi future three estimate: \$12.35 million

7.1.2 Kamo

Water Services

Under future three a 4,500 m³ reservoir, pumps and trunk line renewal would be required for this node at an estimated cost of \$4.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$16.37 million. If some lots are larger than 2000 m² and soakage is adequate then individual

onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 86,014 vehicles per day will be generated for this node. This will require an estimated \$5.20 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 74 hectares requiring an estimated \$36.83 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$4 million.

Kamo future three estimate: \$66.90 million

7.1.3 Marsden Point - Ruakaka

Water Services

Under future three a 17,000 m³ reservoir and reticulation would be required for this node at an estimated cost of \$9 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on current cost estimates for future WWTP upgrades which correlate well with projected populations, plus an estimated \$2000 per extra HUE for reticulation, the cost estimate for this node is \$73.63 million

Roading (local network only)

Under future three 277,873 vehicles per day will be generated for this node. This will require an estimated \$66.10 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 65 hectares requiring an estimated \$45.36 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$3 million.

Marsden Point - Ruakaka future three estimate: \$197.09 million

7.1.4 Matapouri

Water Services

Under future three a 3,000 m³ reservoir and reticulation would be required for this node at an estimated cost of \$4 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$54 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that

minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future three only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 19 hectares requiring an estimated \$18.33 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Matapouri future three estimate: \$76.33 million

7.1.5 Maungakamea

Water Services

Under future three a 500 m³ reservoir and water treatment plant upgrade would be required for this node at an estimated cost of \$1 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$17 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future three only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future three there are no additional library requirements for this node.

Maungakamea future three estimate: \$18 million

7.1.6 Maungatapere

Water Services

Under future three there are no additional Water Services infrastructure requirements for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater - Estimated cost of providing reticulation and treatment is \$28 million, based on current Development Contribution estimates which reflect recent costs of providing reticulation and treatment facilities to currently non-reticulated communities. Alternately, if zoning is such that

minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future three only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 5 hectares requiring an estimated \$2.02 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Maungatapere future three estimate: \$30.02 million

7.1.7 Maunu

Water Services

Under future three a New 1,500 m³ reservoir would be required for this node at an estimated cost of \$1 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$5.25 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 10 hectares requiring an estimated \$7.88 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$4 million.

Maunu future three estimate: \$18.12 million

7.1.8 McLeod Bay

Water Services

Under future three a New 1,000 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$0.80 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$6.30 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite

wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 17 hectares requiring an estimated \$14.74 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

McLeod Bay future three estimate: \$21.84 million

7.1.9 Ngunguru

Water Services

Under future three a new 2,000 m³ reservoir, reticulation and a connection to the city would be required for this node at an estimated cost of \$16 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$5.97 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 8 hectares requiring an estimated \$9.24 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Ngunguru future three estimate: \$31.21 million

7.1.10 Oakura

Water Services

Under future three a 4,000 m³ reservoir, a water treatment plan and reticulation would be required for this node at an estimated cost of \$10 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$10.01 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater

treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 18 hectares requiring an estimated \$18.38 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$2 million.

Oakura future three estimate: \$40.39 million

7.1.11 Onerahi

Water Services

Under future three a 4,000 m³ reservoir and trunk Line would be required for this node at an estimated cost of \$3.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$8.36 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 33 hectares requiring an estimated \$13.43 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$4 million.

Onerahi future three estimate: \$29.29 million

7.1.12 Otaika

Water Services

Under future three minor reticulation would be required for this node at an estimated cost of \$0.20 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$6.10 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite

wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 58,638 vehicles per day will be generated for this node. This will require an estimated \$55.30 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 21 hectares requiring an estimated \$10.29 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$4 million.

Otaika future three estimate: \$75.89 million

7.1.13 Parua Bay

Water Services

Under future three a new 1,000 m³ reservoir and pumps would be required for this node at an estimated cost of \$1.50 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$10.47 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 19,319 vehicles per day will be generated for this node. This will require an estimated \$0.50 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 16 hectares requiring an estimated \$7.50 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Parua Bay future three estimate: \$19.96 million

7.1.14 Pataua

Water Services

Under future three there would be no services for this node.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Estimated cost of providing reticulation and treatment is \$11.14 million based on connection to the Whangarei Heads Scheme. Alternately, if zoning is such that minimum section sizes are restricted to 2000 m² then the current practice of individual onsite wastewater treatment and disposal systems may prove acceptable.

Roading (local network only)

Under future three only minor WDC Roading works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 5 hectares requiring an estimated \$7.07 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Pataua future three estimate: \$18.21 million

7.1.15 Tikipunga

Water Services

Under future three a new 2,500 m³ reservoir and reticulation would be required for this node at an estimated cost of \$2.80 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$8.68 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 49,114 vehicles per day will be generated for this node. This will require an estimated \$2.50 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 31 hectares requiring an estimated \$11.30 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$4 million.

Tikipunga future three estimate: \$29.28 million

7.1.16 Tutukaka

Water Services

Under future three a new 3,000 m³ reservoir and connection to the city would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$10.50 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 22 hectares requiring an estimated \$27.40 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$3 million.

Tutukaka future three estimate: \$43.90 million

7.1.17 Urquharts Bay

Water Services

Under future three a new 600 m³ reservoir and minor reticulation would be required for this node at an estimated cost of \$0.60 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$3.85 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three only minor WDC Rooding works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 10 hectares requiring an estimated \$11.18 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Urquharts Bay future three estimate: \$15.63 million

7.1.18 Waipu

Water Services

Under future three a new 4,000 m³ reservoir, reticulation, pumps and a water treatment plant upgrade would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – The recently completed Catchment Management Plan for Waipu and Waipu Cove indicates significant tracts of land that are susceptible to flooding both from extreme storm events and future sea level rise. A number of mitigating options are presented in the report but they largely address minimising flood risk to existing development. Future development will probably be limited to the areas not deemed flood susceptible in the Catchment Management Plan, resulting in lower population loadings or higher population density than that currently forecast.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$16.39 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 12,993 vehicles per day will be generated for this node. This will require an estimated \$1.20 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 34 hectares requiring an estimated \$23.72 million of additional land.

Libraries

Under future three a branch library would be required for this node at an estimated cost of \$4 million.

Waipu future three estimate: \$48.31 million

7.1.19 Waipu - Langs Beach

Water Services

Under future three a new 4,000 m³ reservoir, reticulation, pumps and a water treatment plant upgrade would be required for this node at an estimated cost of \$3 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$20.20 million. There may also be remaining treatment plant capacity that reduces this cost. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 6,327 vehicles per day will be generated for this node. This will require an estimated \$2.10 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found a combined deficit of 42 hectares requiring an estimated \$37.87 million of additional land.

Libraries

Under future three there are no additional library requirements for this node.

Waipu – Langs Beach future three estimate: \$63.17 million

7.1.20 Whangarei City

Water Services

Under future three a new 5,000 m³ storage and reticulation would be required for this node at an estimated cost of \$8 million.

Waste and Drainage (waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – Based on an estimated \$5000 per extra HUE the cost estimate for this node is \$16.16 million. If some lots are larger than 2000 m² and soakage is adequate then individual onsite wastewater treatment and disposal systems may prove acceptable with a subsequent reduction in the cost and need for council asset upgrades.

Roading (local network only)

Under future three 201,623 vehicles per day will be generated for this node. This will require an estimated \$39.40 million of additional WDC administered roading expenditure.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future three there are no additional library requirements for this node.

Whangarei City future three estimate: \$63.56 million

7.1.21 Other

Water Services

Under future three there are no additional Water Services infrastructure requirements for this node as it would not be serviced. However, regardless of the future adopted a new city water source and an upgrade of Whau Valley would be required as District Services. Costs associated with these projects in future three are discussed under the District Services – Water section of this report (section 8.3).

Waste and Drainage (solid waste, waste water and storm water)

Stormwater – Addressed under 'Methodology'.

Wastewater – It has been assumed the lots are larger than 2000 m² and soakage is adequate so individual onsite wastewater treatment and disposal systems are the responsibility of the developer.

Roading (local network only)

Under future three only minor WDC Roothing works are required for this node, these will be covered under existing programmes.

Parks and Recreation (WDC administered land only)

Analysis of 'Neighbourhood', 'Sports' and 'Other' parks under future three found capacity to accommodate future growth, there are no additional Parks land requirements for this node.

Libraries

Under future three there are no additional library requirements for this node.

Other future three estimate: \$0 million

7.2 Future 3: Non Financial Analysis

In order to consider the non financial effects of infrastructure provision the overarching sustainability principles of the 30/50 project (Culture, Economy, Society and Environment) were used to analyse each of the three futures. Each department developed three criteria for each of the principles with criteria forming a baseline against which the sustainability of infrastructure provision under each future could be ranked. By necessity this analysis has been undertaken at a

future (rather than node) level. The results of future three analysis are provided by department below.

7.2.1 Water Services Future Three Sustainability Consideration

Overview

Future three represents a satellite town and rural coastal villages. The outcomes of the Water Services future three assessment against sustainability criteria is as follows:

Sustainable Culture:

- Effects on historical areas of significance, little negative effects on historical sites are expected.
- Contribution to recreation culture, no benefits to recreational culture are expected
- Contribution to cultural links to natural environment, no benefits to cultural links to natural environment are expected.

Summary; Criteria are met to level = Low (or 1/3)

Sustainable Economy:

- The cost of new infrastructure, some fairly expensive infrastructure will be required to connect existing infrastructure to the coastal communities that are currently unserved.
- The running cost of the future scenario, it is expected that the operating cost of this option would be lower than future one but greater than future two.
- The reliability of the water supply developed, there would be a reliable water supply to most people in the district.

Summary; Criteria are met to level =Low (or 1/3)

Sustainable Society

- The ability to supply the growing community with a MoH accredited water supply, most new lots would be serviced with a compliant water supply.
- The ability to continue to provide for the existing community, the existing community would be positively effected by reducing the number of properties relying on private supplies.
- The fire fighting coverage supplied to the community, most new lots would have a fire supply and many existing lots would be covered

Summary; Criteria are met to level = High (or 3/3)

Sustainable Environment

- Likely negative effects on water abstraction points, a new water source would be needed
- Energy requirements for running the system and raw materials quantities for construction, there would be some reasonably high energy requirements in constructing and supplying for this future.
- Benefits offered in land protection, reforestation or habitat protection, possibly some benefit in habitat protection.

Summary; Criteria are met to level = Low (or 1/3)

Water Services future three sustainability summary: Medium (7/12)

7.2.2 Wastes and Drainage Future Three Sustainability Consideration

Overview

Future three represents a satellite town and rural coastal villages. The outcomes of Wastes and Drainage future three assessment against sustainability criteria is as follows:

Sustainable Culture

- Future three has reduced challenges in identifying and considering historical sites as development largely occurs in existing areas and would therefore require little complex planning and operational resources.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Economy

- Large scale development is focused mainly in existing areas and hence large scale developer funded stormwater facilities are more viable.
- High density and infill housing potentially creates operational and compliance issues around small-lot attenuation.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Society

- More concentrated development means stormwater solutions for entire communities can be planned and implemented more easily compared to dispersed settlement solutions
- Higher density settlement could incur significantly higher damages in an extreme flood event.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Environment

- Higher density development allows for stricter control, monitoring and treatment of stormwater management
- Most development occurs in areas already significantly modified from the natural state so environmental impact is reduced.

Summary; Criteria are met to level = Medium (or 2/3)

Wastes and Drainage future three sustainability summary: Medium (8/12)

7.2.3 Rooding Future Three Sustainability Consideration

Overview

Future three represents a satellite town and rural coastal villages. The outcomes of the Rooding future three assessment against sustainability criteria is as follows:

Sustainable Culture

- Future three represents fewer challenges in identifying and considering historical sites due to more precise development boundaries
- Development in concentrated rural and coastal nodes increases the potential for managing the effects of cultural based conflict with rooding developments.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Economy

- Development in identified nodes is more predictable.
- Concentrating development in defined nodes may require the development of less suitable and more expensive land.
- Concentrated development promotes values currently associated with key business and tourist locations.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Society

- Concentrating development may encourage the use of marginal lands that are not cost effective to develop.
- Concentrating development improves ability to provide and maintain access to isolated communities, emergency response such as civil defence also becomes easier.
- Concentrating development in this future environment improves ability to provide alternative transport modes and infrastructure in an economic manner.

Summary; Criteria are met to level = High (or 3/3)

Sustainable environment

- Ecological values would be less difficult to protect as the location of development is known and it is therefore easier to identify natural areas for protection in a structured way.
- Concentrating development in this future improves ability to effectively manage the impacts of roading developments on the natural environment
- Ecological corridor and restoration programming is improved as development is more concentrated.
- Environmental risks to roading assets are reduced due to reduced development around rivers and the coast.

Summary; Criteria are met to level = Medium (or 2/3)

Roading future three sustainability summary: High (9/12)

7.2.4 Parks and Recreation Future Three Sustainability Consideration

Overview

Future three represents a satellite town and rural coastal villages. The outcomes of the Parks and Recreation future three assessment against sustainability criteria is as follows:

Sustainable Culture

- Future three represents fewer challenges in identifying and considering historical sites due to more precise development boundaries.
- Recreation culture is supported by shorter travel times and locations of reserves in nodes with predictable growth trends.
- Supports cultural links to the natural environment as urban boundaries are likely to be identified and parks located within a suitable distance from urban settlement, integrated to future planning.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Economy

- Development in the identified nodes is somewhat predictable.
- The average price for purchase of land for parks is high in the Ruakaka area.
- Identification of coastal development nodes requires development of land which may be unsuitable and/or expensive.

Summary; Criteria are met to level = Low (or 2/3)

Sustainable Society

- This approach allows considered integration of parks networks.
- Development may occur around a park which already exists, enhancing its' use (see flipside below)
- Development may be inappropriate near an existing reserve and contribute to diminishing values.
- Identification of growth allows for multi use planning of reserves and facilities (centralised).

Summary; Criteria are met to level = High (or 3/3)

Sustainable Environment

- Conservation values would be less difficult protect as the location of development is known. It is therefore less difficult to identify natural areas for protection in a structured way.
- Privately owned ecologically significant areas would less likely be subject to non-park development.

- Ecological corridor and restoration programming is easier in identified coastal areas as development is predictable and esplanade reserves contiguous throughout.
- Environmental risks to parks assets are decreased due to reduced development around rivers and the coast.

Summary; Criteria are met to level = High (or 3/3)

Parks and Recreation future three sustainability summary: High (10/12)

7.2.5 Library Future Three Sustainability Consideration

Overview

Future three represents a satellite town and rural coastal villages. The outcomes of the Library future three assessment against sustainability criteria is as follows:

Sustainable Culture

- Library as a cultural space, the cultural diversity of a community may change significantly depending on the economic and social environment and the availability of other facilities within the community.
- Ability to meet community needs, adequate planning and provision will secure sufficient resources to ensure future needs are met.
- Barrier free access, this should apply regardless of the type of development.

Summary; Criteria are met to level = Medium (or 2/3)

Sustainable Economy

- Economic climate, the quality of library services is closely linked to the economic prosperity of the region and is a reflection of an appreciation of the educational and recreational value of library services to the community.
- Political climate, a stable political environment which recognises the importance of a managed approach to development will bring continuity to services.
- Cost of land and buildings, a commitment toward future planning will ensure funding is secure and costs do not escalate due to deferred building projects.

Summary; Criteria are met to level = High (or 3/3)

Sustainable Society

- Location, ideally libraries should be located close to other community amenities and may be a part of the delivery of information, recreation and education to the community at large.
- Accessibility, libraries should be readily accessible with adequate parking and proximity to public transport.
- Trends, the prediction of future trends will facilitate the structured development of services.

Summary; Criteria are met to level = High (or 3/3)

Sustainable Environment

- Sustainable design, libraries should be designed using the principle of sustainable design including water use and reuse, material selection and waste reduction.
- Location, planning the location of libraries in relation to projected population growth will ensure they are part of a holistic approach to community facilities and are located appropriately.
- Building endurance, once again adequate planning for the future will ensure buildings are sited in areas which will serve the area for the greatest length of time.

Summary; Criteria are met to level = Medium (or 2/3)

Library future three sustainability summary: High (10/12)

7.3 Future 3: Summary

A summary of the estimated growth related costs of Council infrastructure provision under future three is provided as table 5 (note this does not include the infrastructure of external agencies which will be considered separately from this report by Council's Futures Team). For ease of reading a full scale copy of the table has been provided as Appendix 3.

Table 5: Future three Council administered infrastructure cost summary

Nodes	2061 Business Floor Area	2061 Population Projections		Water	Library	Waste Water	Roading	Parks	Total Infrastructure and Services Estimate (\$M)
		Resident Population	Peak Population	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	
Hikurangi	65,611	5,000	N/A	1.50	2.00	6.98	1.00	0.87	12.35
Kamo	73,644	19,683	N/A	4.50	4.00	16.37	5.20	36.83	66.90
Marsden Point / Ruakaka	1,572,722	15,000	35,503	9.00	3.00	73.63	66.10	45.36	197.09
Matapouri	N/A	814	5,627	4.00	0.00	54.00	0.00	18.33	76.33
Maungakarema	N/A	1,790	N/A	1.00	0.00	17.00	0.00	0.00	18.00
Maungatapere	18,793	2,868	N/A	0.00	0.00	28.00	0.00	2.02	30.02
Maunu	893	6,774	N/A	1.00	4.00	5.25	0.00	7.88	18.12
McLeod Bay	N/A	1,059	3,859	0.80	0.00	6.30	0.00	14.74	21.84
Ngunguru	465	1,405	3,950	16.00	0.00	5.97	0.00	9.24	31.21
Oakura	N/A	845	5,556	10.00	2.00	10.01	0.00	18.38	40.39
Onerahi	38,900	11,480	N/A	3.50	4.00	8.36	0.00	13.43	29.29
Otaika	196,203	8,104	N/A	0.20	4.00	6.10	55.30	10.29	75.89
Parua Bay	627	5,000	6,511	1.50	0.00	10.47	0.50	7.50	19.96
Pataua	N/A	1,001	2,579	0.00	0.00	11.14	0.00	7.07	18.21
Tikipunga	16,229	12,179	N/A	2.80	4.00	8.68	2.50	11.30	29.28
Tutukaka	N/A	1,700	6,211	3.00	3.00	10.50	0.00	27.40	43.90
Urquharts Bay	N/A	895	2,485	0.60	0.00	3.85	0.00	11.18	15.63
Waipu	50,572	5,000	9,539	3.00	4.00	16.39	1.20	23.72	48.31
Waipu - Langs Beach	N/A	1,645	9,516	3.00	0.00	20.20	2.10	37.87	63.17
Whangarei City	829,943	22,212	N/A	8.00	0.00	16.16	39.40	0.00	63.56
Other	N/A	5,234	N/A	0.00	0.00	0.00	0.00	0.00	0.00
Total	N/A	129,688	N/A	73.40	34.00	335.34	173.30	303.43	919.47

The total cost of Council's growth related future three infrastructure provision (including backlog required to meet growth projections) is estimated at \$919.47 million over the 50 year planning horizon (\$18.39 million per annum). This is significantly less than the estimated cost for either future one or two (a respective \$59.13 and 81.83 million reduction). This is due to consolidation of growth through use of the five tier satellite town and rural/coastal village's settlement pattern. While allowing for greater servicing of growth than under future one this pattern has the added benefit of avoiding the duplication of services and minimising infrastructure associated with coastal spread. In doing this future three provides a financially efficient growth pattern for the provision of infrastructure.

A summary of the non financial effects of future three infrastructure provision under sustainability principles of the 30/50 project (Culture, Economy, Society and Environment) has been provided as table 6.

Table 6: Future three sustainability principles summary

Sustainability Principle	Water Services Score	Library Score	Wastes and Drainage Score	Roading Score	Parks and Recreation Score	Future 3 Score
Culture	1 out of 3	2 out of 3	2 out of 3	2 out of 3	2 out of 3	9 out of 15
Economy	1 out of 3	3 out of 3	2 out of 3	2 out of 3	2 out of 3	10 out of 15
Society	3 out of 3	3 out of 3	2 out of 3	3 out of 3	3 out of 3	14 out of 15
Environment	1 out of 3	2 out of 3	2 out of 3	2 out of 3	3 out of 3	10 out of 15
Total	6 out of 12	10 out of 12	8 out of 12	9 out of 12	10 out of 12	43 out of 60

Common themes raised across departments again emphasised the effect of consolidated/planned growth. With elimination of the duplication of services effects were primarily positive with future three resulting in the most sustainable form of infrastructure provision in relation to growth. This was reflected in a future three sustainability score of 43 out of a possible 60.

8. District Services

Infrastructure at the District level covers infrastructure that is important for growth but is unlikely to be affected by the pattern that growth takes. This considers District wide infrastructure such as

the solid waste network, the airport and District wide water supply. More detailed analysis of this infrastructure will be undertaken in the implementation plan for the preferred future.

8.1 Property Portfolio

Council's Property and Community Services Manager identified limited effect of the three futures on the property portfolio. One infrastructure upon which growth is dependant regardless of the future taken is the airport. In terms of the terminal recent world cup announcements and potential changes in airport security are likely to result in requirement for a larger terminus within the next 5-10 years. This is estimated at \$1 million.

The current runway reseal and extension has added approximately 15-20 years to the asset allowing more modern plans such as the Q300 to land. In future the frequency of flights is likely to be as important as the size of planes landing and apart from minor maintenance work the asset is unlikely to change prior to 2061 due to restricting factors such as runway length. While an alternative site may be investigated at a later date this cannot be foreseen at this time.

8.2 Solid Waste

Solid waste facilities and services offered are landfills, transfer stations and rubbish/recycling collections. Generally these are in place District wide and would not require alteration or any major expenditure over the planning period regardless of the growth option considered. The proposed Puwera landfill will service the district for up to 50 years, and will be a Joint Venture between Council and the private sector. This should be in place by October 2010. The transfer station network including the urban Re:Sort facility is designed to cater for the District, nominally providing a facility within 15 kilometres of 95% of the population. Whananaki may require a facility in future and should the twin city option be chosen a second southern transfer station to serve the Ruakaka Marsden Point area would probably be required. Both combined would cost less than \$1 million and are insignificant low in terms of the wider 30/50 infrastructure costs. With population growth some transfer stations may require expansion to meet service demands (through provision of additional bulk refuse bins for example). Once again costs would be relatively low and in present day terms \$1-2 million would cover the expected site expansion needs across the 8 existing sites. Refuse and recycling collection services are in place on a district wide basis and regardless of growth option should not require major changes except scaling up as required. As a result of the above discussion a total flat cost of \$3 million has been allocated to solid waste at a district level under each of the three futures.

8.3 Water

Regardless of the future adopted a new city water source and an upgrade of Whau Valley are required to provide for district growth estimates. The costs for these projects are expected to be \$21.50 million under futures one and three and \$20 million under future two (the discrepancy is due to a different upgrade option being preferred under future two). Due to the District wide nature of these services they have been accounted for separately both within this report and in summary spreadsheets.

8.4 Library

A simplifying assumption made under the methodology section of this report was that the central library would primarily provide for the Whangarei City node and other nodes in close proximity. In reality the central facility is likely to be used by residents throughout the district at some time or another. Provision of a central facility that provides for growth in population is therefore essential.

While an upgrade of the central library will be required in order to meet growth requirements at some stage over the 50 year planning horizon the cost and timing of this could not be estimated at the time of writing. This matter will be given further consideration in the implementation plan for the preferred future adopted by Council.

8.5 Central Business District

A functioning, vibrant central business district (CBD) is also critical in providing for district growth projections. This includes not only essential facilities such as public parking and public transport but wider amenity based considerations such as the central mall and pedestrian friendly access. Again while an upgrade of the CBD will be required in order to meet growth requirements at some stage over the 50 year planning horizon the cost and timing of this could not be estimated at the time of writing. This matter will also be given further consideration in the implementation plan for the preferred future adopted by Council.

9. Conclusion

This report identifies existing capacity of Council based infrastructure and services before considering infrastructure implications resulting from each of the three futures under the Sustainable Futures 30/50 Project.

The total cost of Council's growth related infrastructure provision under future one is estimated at \$978.6 million over the 50 year planning horizon (\$19.57 million per annum) while sustainability for infrastructure provision under this future is rated at 15 out of a possible 60. It is important to note that this financial estimate does not include residential development that cannot be serviced by Council (i.e. the provision of on site tank water and waster water treatment facilities). Overall dispersed growth under future one would result in a lower proportion of the District's population being serviced by Council, population being serviced to a lower level and/or best practices for infrastructure provision not being adhered to. In addition future one presents significant difficulties in planning for the provision of infrastructure with these issues being reflected in the future's low sustainability rating.

The total cost of Council's growth related infrastructure provision under future two is estimated at \$1001.30 million over the 50 year planning horizon (\$20.03 million per annum) while sustainability for infrastructure provision is rated at 34 out of a possible 60. Additional costs primarily relate to expense associated with duplication of services for a second city of 25,000 people (the Marsden Point/Ruakaka node). This duplication raises concerns regarding competition for the allocation of resources. Coastal spread under this future also presents obstacles for sustainable infrastructure provision with these issues resulting in a moderate sustainability rating for future two.

The total cost of Council's growth related infrastructure provision under future three is estimated at \$919.47 million over the 50 year planning horizon (\$18.39 million per annum) while sustainability for infrastructure provision is rated at 43 out of a possible 60. The reduced cost of infrastructure provision is considered to be a function of consolidation of growth and avoidance of service duplication. The consolidated/planned nature of growth resulted in a relatively high sustainability rating for future three.

Also considered in this report are infrastructure and services at the District level. This consideration covers infrastructure and services that are important for growth but are unlikely to be affected by the pattern that growth takes. A key piece of District infrastructure identified within Council's property portfolio was the airport facility. While this has been subject to recent upgrades it will require a further \$1 million in security upgrades over the 50 year planning horizon. Solid waste facilities and services offered are landfills, transfer stations and rubbish and recycling collections. A total flat cost of \$3 million has been allocated to solid waste at a District level under

each of the three futures. Regardless of the future adopted a new water source and an upgrade of the existing Whau Valley facility will be required. The costs for these projects are expected to be \$21.50 million under futures one and three and \$20 million under future two (the discrepancy is due to a different upgrade option being preferred under future two). While specific costs were not able to be allocated at the time of writing both the central library and central business district are District resources that will be critical in meeting the requirements of growth over the 50 year planning horizon.

Appendix 4 provides a summary table of all costs across each of the three futures. Once District costs have been added to each future the total cost of growth related capital infrastructure projects under futures one, two and three is estimated at \$1001.10 million, \$1025.30 million and \$944.97 million respectively. These figures are in current day terms and exclude any increase in operational expenditure associated with capital projects.

While restricted to a high level analysis, this report will enable Council to consider the financial and non financial implications of infrastructure provision under each of the three futures based on uniform assumptions. These assumptions, their implications and ultimately the costs associated with infrastructure provision can then be refined once the outcomes of public consultation are known and a preferred future has been identified.

Appendix 1: Future One Infrastructure Cost Summary

Nodes	2061 Business Floor Area	2061 Population Projections		Water	Library	Waste Water	Roading	Parks	Total I & S Estimate (\$M)
		Resident Population	Peak Population	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	
Hikurangi	63,101	1,742	N/A	0.00	0.00	0.70	0.00	0.00	0.70
Kamo	169,410	21,732	N/A	5.00	4.00	20.64	5.20	42.37	77.21
Marsden Point/Ruakaka	800,410	7,634	10,315	3.00	3.00	33.90	66.10	19.08	125.08
Matapouri	N/A	1,571	10,862	5.00	0.00	104.00	0.00	39.21	148.21
Maungakaramea	N/A	3,957	N/A	3.00	0.00	38.00	0.00	4.43	45.43
Maungatapere	42,466	5,861	N/A	1.80	0.00	57.00	0.00	12.17	70.97
Maunu	1,441	7,934	N/A	1.50	4.00	7.48	0.00	11.59	24.57
McLeod Bay	N/A	1,004	3,658	0.70	0.00	5.92	0.00	13.90	20.51
Ngunguru	361	2,498	7,023	18.00	0.00	11.88	1.40	22.73	54.01
Oakura	N/A	288	1,896	0.00	0.00	2.97	0.00	3.04	6.01
Onerahi	59,355	8,698	N/A	0.10	4.00	3.08	0.00	6.23	13.41
Otaika	1,072,202	5,752	N/A	0.30	4.00	4.61	116.40	4.20	129.51
Parua Bay	6,958	3,986	5,190	1.50	0.00	7.95	0.50	3.78	13.74
Pataua	N/A	2,330	6,004	0.00	0.00	17.73	0.00	20.98	38.71
Tikipunga	73,391	12,647	N/A	3.00	4.00	9.78	2.50	12.46	31.74
Tutukaka	N/A	1,639	5,989	3.00	3.00	10.07	0.00	26.37	42.44
Urquharts Bay	N/A	925	2,568	0.70	0.00	4.00	0.00	11.57	16.27
Waipu	43,061	2,506	4,781	2.00	2.00	7.18	1.20	8.50	20.88
Waipu - Langs Beach	N/A	1,226	7,095	2.00	0.00	12.78	2.10	23.05	39.93
Whangarei City	2,001,546	17,882	N/A	8.00	0.00	11.89	39.40	0.00	59.29
Other	N/A	21,151	N/A	0.00	0.00	0.00	0.00	0.00	0.00
Total	N/A	132,963	N/A	58.60	28.00	371.56	234.80	285.65	978.60

Note: Figures include only WDC administered expenditure (including growth related expenditure to be recovered through Development Contributions) and the Futures Team will liaise directly with external agencies (i.e. Transit, network electricity providers etc) regarding their estimated expenditure. As backlog will need to be met in order to provide for future growth backlog expenditure has also been included (where applicable).

Appendix 2: Future Two Infrastructure Cost Summary

Nodes	2061 Business Floor Area	2061 Population Projections		Water	Library	Waste Water	Roading	Parks	Total I \$ S Estimate (\$M)
		Resident Population	Peak Population	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	
Hikurangi	32,914	2,508	N/A	0.50	2.00	1.90	0.00	0.00	4.40
Kamo	73,644	19,683	N/A	4.50	4.00	16.37	5.20	36.83	66.90
Marsden Point / Ruakaka	2,621,203	25,000	30,000	17.00	10.00	108.58	117.40	86.40	339.38
Matapouri	N/A	814	5,627	4.00	0.00	54.00	0.00	18.33	76.33
Maungakaramea	N/A	1,790	N/A	1.00	0.00	17.00	0.00	0.00	18.00
Maungatapere	18,793	2,868	N/A	0.00	0.00	28.00	0.00	2.02	30.02
Maunu	893	6,774	N/A	1.00	4.00	5.25	0.00	7.88	18.12
McLeod Bay	N/A	1,059	3,859	0.80	0.00	6.30	0.00	14.74	21.84
Ngunguru	465	1,405	3,950	16.00	0.00	5.97	0.00	9.24	31.21
Oakura	N/A	845	5,556	10.00	2.00	10.01	0.00	18.38	40.39
Onerahi	38,900	11,480	N/A	3.00	4.00	8.36	0.00	13.43	28.79
Otaika	196,203	8,104	N/A	0.20	4.00	6.10	55.30	10.29	75.89
Parua Bay	279	2,220	2,891	0.70	0.00	3.51	0.00	0.00	4.21
Pataua	N/A	1,001	2,579	0.00	0.00	11.14	0.00	7.07	18.21
Tikipunga	16,229	12,179	N/A	2.80	4.00	8.68	2.50	11.30	29.28
Tutukaka	N/A	1,700	6,211	3.00	3.00	10.50	0.00	27.40	43.90
Urquharts Bay	N/A	895	2,485	0.60	0.00	3.85	0.00	11.18	15.63
Waipu	24,977	2,469	4,711	2.00	2.00	6.89	1.20	8.28	20.37
Waipu - Langs Beach	N/A	1,645	9,516	3.00	0.00	17.43	2.10	32.34	54.87
Whangarei City	829,943	22,212	N/A	8.00	0.00	16.16	39.40	0.00	63.56
Other	N/A	3,036	N/A	0.00	0.00	0.00	0.00	0.00	0.00
Total	N/A	129,687	N/A	78.10	39.00	345.98	223.10	315.12	1001.30

Note: Figures include only WDC administered expenditure (including growth related expenditure to be recovered through Development Contributions) and the Futures Team will liaise directly with external agencies (i.e. Transit, network electricity providers etc) regarding their estimated expenditure. As backlog will need to be met in order to provide for future growth backlog expenditure has also been included (where applicable).

Appendix 3: Future Three Infrastructure Cost Summary

Nodes	2061 Business Floor Area	2061 Population Projections		Water	Library	Waste Water	Roothing	Parks	Total I & S Estimate (\$M)
		Resident Population	Peak Population	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	Cost Estimate (\$M)	
Hikurangi	65,611	5,000	N/A	1.50	2.00	6.98	1.00	0.87	12.35
Kamo	73,644	19,683	N/A	4.50	4.00	16.37	5.20	36.83	66.90
Marsden Point / Ruakaka	1,572,722	15,000	35,503	9.00	3.00	73.63	66.10	45.36	197.09
Matapouri	N/A	814	5,627	4.00	0.00	54.00	0.00	18.33	76.33
Maungakaramea	N/A	1,790	N/A	1.00	0.00	17.00	0.00	0.00	18.00
Maungatapere	18,793	2,868	N/A	0.00	0.00	28.00	0.00	2.02	30.02
Maunu	893	6,774	N/A	1.00	4.00	5.25	0.00	7.88	18.12
McLeod Bay	N/A	1,059	3,859	0.80	0.00	6.30	0.00	14.74	21.84
Ngunguru	465	1,405	3,950	16.00	0.00	5.97	0.00	9.24	31.21
Oakura	N/A	845	5,556	10.00	2.00	10.01	0.00	18.38	40.39
Onerahi	38,900	11,480	N/A	3.50	4.00	8.36	0.00	13.43	29.29
Otaika	196,203	8,104	N/A	0.20	4.00	6.10	55.30	10.29	75.89
Parua Bay	627	5,000	6,511	1.50	0.00	10.47	0.50	7.50	19.96
Pataua	N/A	1,001	2,579	0.00	0.00	11.14	0.00	7.07	18.21
Tikipunga	16,229	12,179	N/A	2.80	4.00	8.68	2.50	11.30	29.28
Tutukaka	N/A	1,700	6,211	3.00	3.00	10.50	0.00	27.40	43.90
Urquharts Bay	N/A	895	2,485	0.60	0.00	3.85	0.00	11.18	15.63
Waipu	50,572	5,000	9,539	3.00	4.00	16.39	1.20	23.72	48.31
Waipu - Langs Beach	N/A	1,645	9,516	3.00	0.00	20.20	2.10	37.87	63.17
Whangarei City	829,943	22,212	N/A	8.00	0.00	16.16	39.40	0.00	63.56
Other	N/A	5,234	N/A	0.00	0.00	0.00	0.00	0.00	0.00
Total	N/A	129,688	N/A	73.40	34.00	335.34	173.30	303.43	919.47

Note: Figures include only WDC administered expenditure (including growth related expenditure to be recovered through Development Contributions) and the Futures Team will liaise directly with external agencies (i.e. Transit, network electricity providers etc) regarding their estimated expenditure. As backlog will need to be met in order to provide for future growth backlog expenditure has also been included (where applicable).

