Rotorua District Council

Western Basin Structure Plan

Options Analysis Report

16 April 2008

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Rotorua District Council

Western Basin Structure Plan

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1 Executive Summary

This is the fourth and final report for the Western Basin Structure Plan. It outlines the development of four structure plan scenarios and describes the preferred Structure Plan which evolved from the four scenarios in conjunction with consultation.

The development of four potential scenarios and the preferred Structure Plan for the Western Basin of Lake Rotorua has been firmly based on review and analysis of the existing structure of the Western Basin, relevant information and results from community consultation. The results of consultation have been woven through the development of a preferred structure plan. The consultation initially undertaken at the beginning of the project was used as a basis for the four potential scenarios.

The four basic scenarios were developed on the basis of distribution of future population, each with a similar population projection. The scenarios ranged from a compact distribution of population to dispersed distribution of the future population. The four scenarios were:

1. Status Quo
2. Compact Model (with an option for accommodating additional population in Hamurana as well as Ngongotaha)
3. Mixed Model
4. Dispersed Model

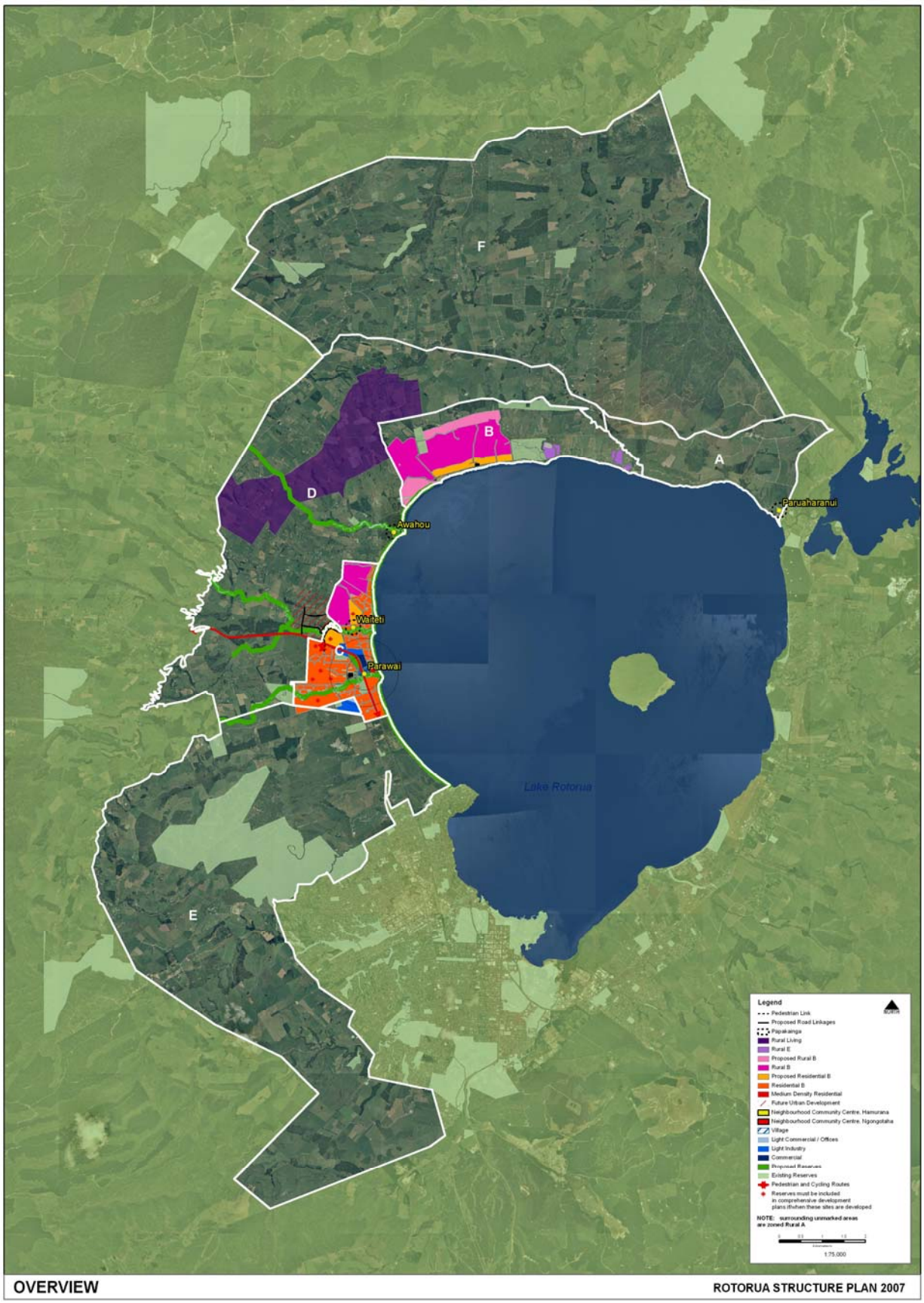
Each significant feature liked by the community was incorporated into at least one scenario, with disliked features being addressed or remedied. The community's responses to the four scenarios showed a preference split between the Compact Model (39%) and the Mixed Model (41%). The Compact, Mixed and Dispersed scenario were assessed against the Status Quo in an evaluation matrix with the Compact Model scoring very favourably. The Western Basin Structure Plan is based on the Compact with an element of the Mixed Scenario (given the community's preference for these two scenarios), with features being a combination of feedback from the community, evaluation matrix results and analysis of the infrastructure requirements. The final Structure Plan for the Western Basin is a combination of the best features from each scenario.

The Western Basin Structure Plan identifies areas to accommodate population growth around Ngongotaha, with a small amount of intensification on the flatter areas of Hamurana, around Ngongotaha Village, and a defined area of rural lifestyle. The Structure Plan also creates opportunities for papakainga housing around Marae. In response to Environment Bay of Plenty's Rule 11 which reduces the nutrient input from dairy farms, discrete areas of rural lifestyle around Oturoa, Fleming, Sharp, and Jackson Roads have been identified to encourage retirement from dairy. Further analysis of this area needs to be undertaken as improvements in lake water quality is only one outcome – other possible effects such as landscape, transport, and rural character also need to be considered. This area also contains some notable ecological areas including Awahou Stream. In addition to accommodating population growth, the Structure Plan addresses economic, environmental, cultural and social issues. The Structure Plan contains extensive riparian vegetation and off-road cycle and walkways. This is an excellent opportunity to create links and alternative transport means to Rotorua's Central Business District and Mamaku.

Relocation of Ngongotaha Village is a key feature of the Structure Plan. This involves moving the village centre to the eastern side of Ngongotaha Road, realigning Taui Street to create a view shaft to Lake Rotorua,

integrating Ngongotaha Stream into the design of the Village and creating additional opportunities for commercial / business uses on Wikaraka Street. The site on the north western corner of the State Highway 36/5 roundabout is identified for a high quality business park. The Structure Plan also contains details of traffic infrastructure implications for each growth scenario. One of the key areas that will need to be addressed is future traffic congestion expected on State Highway 36, in the vicinity of Ngongotaha. The transport assessment in this document has been undertaken at a "high" level to assist is determining a preferred growth model. Once the preferred growth model is agreed it is recommended a more detailed Integrated Transport Assessment be undertaken to investigate capacity upgrades and transport improvements including concept designs, costings, staging implications, and advising on travel demand management measures.

The result is a Structure Plan for the Western Basin of Lake Rotorua, outlining future sustainable land-use and infrastructure solutions which are aligned with national, local, regional policy and community goals and aspirations.


F
B
A
D
Awahou
Paruaharanui
Waiteti
C
Parawai
Lake Rotorua
E
Legend
Pedestrian Link
Proposed Road Linkages
Papakainga
Rural Living
Rural E
Proposed Rural B
Rural B
Proposed Residential B
Residential B
Medium Density Residential
Future Urban Development
Neighbourhood Community Centre, Hamurana
Neighbourhood Community Centre, Ngongotaha
Village
Light Commercial / Offices
Light Industry
Commercial
Proposed Reserves
Existing Reserves
Pedestrian and Cycling Routes
Reserves must be included in comprehensive development plans if/when these sites are developed
NOTE: surrounding unmarked areas are zoned Rural A
1:75,000
OVERVIEW
ROTORUA STRUCTURE PLAN 2007

2 Introduction

This report is the final of four reports associated with the Western Basin Structure Plan:

1. Background Report (August 2007)
2. Gaps, Constraints and Opportunities Report (August 2007)
3. Consultation Outcomes Report (August 2007)
4. Options Analysis report

There have been a number of stages undertaken with this project, each of which is outlined in one of the abovementioned supporting reports. The first stage included research and information gathering, sourcing and collating all existing relevant information Council and other sources had available. This involved reviewing information and determining current land-use in the northern and western basin areas and the spatial distribution of each use. Current land-uses in the Western Basin were mapped, including potential subdivision opportunities under the Rotorua District Plan. Infrastructure information was also reviewed including the existing capacity of water supply, stormwater, and wastewater reticulation systems in addition to the water and wastewater treatment plants. The findings from this stage are contained in the *Background Report*.

The second stage was to identify and describe constraints and opportunities for the Western Basin area in order to form a robust picture of potential land-use opportunities. This involved consideration of issues such as:

- natural hazards including flooding
- protected trees and native bush
- protected and historic buildings
- natural character of the area
- infrastructure capacity or location
- sensitive geothermal areas
- groundwater constraints
- sites of cultural significance such as waahi tapu
- areas vulnerable to erosion
- sites of ecological significance
- sensitive receiving catchments
- archaeological sites
- significant landscapes
- geology

This information was presented as a number of mapped overlays indicating the “no-go” areas that were not appropriate for development, and were presented in the *Gaps, Constraints and Opportunities Report*.

Consultation with the community was undertaken through a range of forums at different stages of the project. The *Consultation Outcomes Report* outlined the methods, timing and outcomes of the consultation. The report demonstrated the link between community participation and feedback, and the final structure plan. It is apparent in the design of the final structure plan that the issues raised by the community through consultation have been addressed by features in the structure plan. The structure plan takes into account what the community told the project team they wanted to see.

The *Options Analysis Report* is the final report and outlines four scenarios, including the base scenario incorporating all committed land-use and transport improvements. The Status Quo model provided a `Reference Case` from which other options were compared against. Although three alternative conceptual designs were developed, the final Structure Plan is a combination of the best aspects of the community-preferred scenarios. This report documents the evaluation of each scenario. Collecting all the background information, constraints and opportunities identified, and outcomes from consultation with the community, this report presents the

preferred Western Basin Structure Plan. The Structure Plan indicates the future shape, land uses and growth of the study area for the next 30-50 years.

2.1 Future Growth Expectations

The need to plan for future growth in the region is a key policy consideration and is one of the reasons the Western Basin Structure Plan was initiated. The Rotorua Growth Model (Harrison Grierson, 2005) provides growth assumptions and models the Rotorua District through to 2051. The Model is based on medium growth projections and divides the District into a number of planning units, with the western and northern basin encompassed by Rural, Hamurana, Ngongotaha, and Northern planning units.

Of most relevance to the western basin study are the following predictions:

- Population growth is forecast to grow by 0.38% per annum between 2001 and 2021, and a further 0.15% per annum to 2051. This equates to an additional 255 people per annum for the period up until 2021, and from there until 2051, the projections indicate an additional 110 people per annum.
- The number of households will increase from 22,257 in 2001 to 26,917 in 2021, and continue to grow to 28,996 in 2051.
- An additional 44.26 hectares of industrial / employment land will be needed by 2021 and a further 28.64 by 2051.
- An additional 8.27ha of retail / commercial land will be needed by 2021 and a further 5.35ha by 2051.
- The Northern planning unit (north west of Ngongotaha) has been identified as a high growth area for the period 2001-2051. The rural planning units (encompassing the north-eastern corner of this study area, and around Mt Ngongotaha), and Hamurana planning units will experience moderate growth, and the Ngongotaha planning unit will experience stable growth.
- Household occupancy will trend downward from 3 people per occupied dwelling in 2001 to 2.67 in 2021, and further decrease to 2.6 in 2051. This results in a higher increase in household numbers compared to the population.

More specifically, the population figures in the Rotorua Growth Model (Harrison Grierson, 2005) applicable to the study area are shown in Table 2.

Table 2 - Summary of Population and Household Projections Contained in Rotorua Growth Model Report (Harrison Grierson, 2005)

	Population			Households	Additional Households	
Planning Unit	2001	2021	2051	2001	2021	2051
Rural	7,879	6,808	7,025	2,462	88	155
Hamurana	1,458	2,744	3,199	498	530	203
Ngongotaha	3,725	4,119	4,143	1,322	221	51
Northern	1,195	2,902	4,145	381	706	507

The total number of new households projected in the western and northern basin to 2021 is 1,545 and a further 916 are projected to 2051.

According to the Rotorua Growth Model (Harrison Grierson, 2005), additional employment land will need to be provided in the Rural planning units, additional retail land in Ngongotaha, and additional visitor accommodation in Hamurana.

The current zoning and likely take-up of residential land does not meet these growth requirements, however the Western Basin Structure Plan has been developed to accommodate these future projections.

The Structure Plan should be read in conjunction with the growth assumptions contained in the Rotorua Growth Model, which will be revised at a later date.

3 Scenario Options

Based on the feedback received from the community during consultation, four scenarios were developed.

Scenario 1: Status Quo is a comparative scenario, designed to assist the community identify what they liked / disliked about the present situation and to compare against Scenarios 2, 3 and 4.

Scenarios 2, 3 and 4 represent different distributions of a similar future population. Each feature of the scenarios can be directly traced back to issues raised by the community during consultation.

As there is uncertainty surrounding possible four-laning through Ngongotaha, all scenarios except Status Quo have assumed that four-laning will occur. The current status regarding roading proposals through Ngongotaha is that there is no four-laning proposed in Ngongotaha in Transit's Draft Rotorua State Highway Strategy, and no support from Transit or Rotorua District Council for a bypass.

3.1 Developing the Options

The preliminary consultation undertaken as part of this project required the community to identify what they liked and disliked about features of the study area as this feedback assisted development of the scenarios. These targeted questions addressed Ngongotaha, Hamurana, the rural areas, and Kaharoa. The questionnaire also asked what the community thought about various land uses and whether there needs to be more or less variety. Land uses included residential, recreational, rural, industrial, and business. A full list of the feedback from this consultation is contained in the Consultation Outcomes Report, but the main messages are listed below. They are listed in order of predominance:

Ngongotaha

Valued:	Issues:
Natural environment	Traffic volume and size of vehicles
Open spaces, lakes, streams	Mill site and Wikaraka Street
Closeness of community, friendliness	Contaminated industrial land
Intimate, quiet village atmosphere	Noisy cars and youth behaviour
Variety of shops and its small size	Inadequate public recreation and facilities for range of ages
Walkways, gardens, streams, hanging baskets	Neglected, disused sites

Hamurana

Valued:	Issues:
Its quiet, peaceful	Wastewater connection
Own community	A few more commercial opportunities
Lifestyle	Volume of traffic
Rural feel	
Walks and lakeside public access	
Recreational facilities such as the golf course,	

esplanade reserve

Kaharoa

Valued:

Views
Its distance from Rotorua 23km
The beautiful diverse landscape and the smallish community
Well integrated community
It still functions as a community – neighbours know and look out for each other
Feeling of out of town but not too far so that city facilities / benefits are available
For what it is – a rural community

Issues:

Wind, cold in winter
Unplanned or badly planned change and growth
More subdivision with people (townies) who have no business living in the country and then complain about noise of top dressing planes
Unhappy with general / some lack of knowledge, value and awareness of aspects of the natural environment which is causing loss of / degradation of forest remnants, ryolitic domes etc

Rural

Valued:

Lifestyle
Caring, safe atmosphere
Quiet / peace
Rural character and feel
Feeling of out of town but not too far so that city facilities / benefits are available

Issues:

"Townies" don't understand that it is a tractors, cows, dirt on road are some things that happen
State of stream banks
"Rural Area"– Openness
Poor quality roads

Wanted More:

Well planned business land
More recreational facilities / opportunities
Natural environment

Wanted Less:

Industrial land

Mixed Response:

Residential

This feedback from the community provided clear direction for the development of the four scenarios. All scenarios were layered on top of the constraints maps developed in the Gaps, Constraints and Opportunities Report. Constraints included archaeological sites, significant landscapes, ecology, ground water, geology, geotechnical, service water and servicing amongst others.

The scenarios were developed on the basis of distribution of future population, each with a similar population projection. The scenarios ranged from a compact distribution of population (utilising existing settlements of Ngongotaha and Hamurana) to dispersed distribution of the future population (the most dispersed model accommodating the future population spread evenly through the rural areas). Consequently, each of the scenarios had varying effects on rural land. These ranged from minimal effect in the Compact Model to significantly changing the rural nature in the Dispersed Model. This resulted in four scenarios being:

1. Status Quo
2. Compact Model (with an option for accommodating additional population in Hamurana as well as Ngongotaha)
3. Mixed Model
4. Dispersed Model

Each significant feature liked or disliked by the community was addressed / incorporated into at least one scenario. For example, the state of the streams and stream banks was raised through consultation as a significant issue. Consequently, the Compact Model included re-vegetation of all stream banks. Additionally, all new housing around the streams was oriented to face the streams, rather than turning its back on the stream as has been done in Ngongotaha historically to make a feature of the streams. The significant features of each scenario are outlined below.

3.2 Scenario 1: Status Quo

Scenario 1: Status Quo is the current situation within the study area. It assumes that the existing zones from the Rotorua Operative District Plan, land uses and dwelling densities will remain. The Status Quo scenario provided a useful yardstick for the community to evaluate whether they wanted their environment to change or remain as it currently is. The main features were:

- No change to current densities or extent of settlements
- No change to the location of the village
- It is understood that the four-laning through Ngongotaha may occur
- No change to industrial areas
- No additional commercial areas
- No additional public open space
- Two distinct settlements being Ngongotaha and Hamurana
- Existing opportunities for subdivision as contained in the District Plan
- No changes to the rural area
- No changes to the current extent of servicing
- Business as usual

The current number of residential lots is 1,372 with an approximate population of 3,704 (assuming an average household size of 2.7 people). The settlement and rural zones account for 1,487 sites and approximately 4,015 population. A 40% uptake of the theoretical subdivision potential in Residential B zone has been assumed, as a significant number of these are 2 lot infill and unlikely to be developed, and the larger sites will need to provide roads and reserves so unlikely to ever meet their theoretical full development yield. The potential number of additional lots across the study area under the current District Plan rules is calculated as 1,280 lots (approximately 3,456 additional population).

Zone	Current Number of Lots	Theoretical Additional Yield
Residential B	1,372	(40% of possible) 617
Rural A	973	489
Rural B	316	67
Rural B1	3	34
Rural E	195	73
TOTAL	2,859	1,280

3.3 Scenario 2: Compact

Scenario 2: The Compact Model accommodates future change and population around the existing communities. The Compact Model has two sub-scenarios which can be used together or separately – one focusing on Ngongotaha and the other focusing on Hamurana.

3.3.1 Ngongotaha

The Ngongotaha sub-scenario of the Compact Model contains all future population growth and changes to the Ngongotaha urban area. Significant features that were identified in consultation and included in the Ngongotaha Compact Model are as follows:

Residential

- Future population growth contained within Ngongotaha
- No additional development in the rural environment
- Expansion of the Ngongotaha urban footprint to include land to the north
- Land around Rahui Road identified for future residential development but only when / if required (likely to be long term)
- Higher housing densities around village
- Larger sites alongside State Highway 5 so houses can be located further away from the traffic noise

Reserves and Public Open Space

- Extensive revegetation of stream banks
- Network of walkways / reserves along all main stream banks
- Converting the railway line into a railway reserve to facilitate walking and cycling as direct link to CBD and Mamaku. This was in response to suggestions for more recreation facilities.
- Encourage housing developments to face the streams rather than turning their backs on them
- Use of streams as a feature of the township
- Better design around public open space to get houses facing onto the public open space, makes it a safer space to use
- Acquisition of lake frontage for reserve upon subdivision of those sites
- Revegetation of the wetlands between the railway line and the main road. Create an attractive public open space
- Changing rooms and club facilities for rugby grounds

Ngongotaha Village

- The village character of Ngongotaha Village was valued by the community. The Compact Model included a re-modelling and repositioning of the Village to strengthen the characteristics that the community said they valued. The Village centre was moved to the eastern side of Ngongotaha Road, closer to the lake. Traffic volumes and parking in the Village came through as a significant issue during consultation. In the Compact Model, parking was consolidated to the eastern side of the railway line rather than being spread the length of Ngongotaha Road. The repositioning of the Village to one side of the main road will allow a more consolidated, compact village while making more of its assets being the lakefront and the Ngongotaha Stream.
- Repositioning of Ngongotaha Village more towards the lake
- Create a focal point for the town
- Proximity to railway reserve so the village becomes a “destination” for cyclists from the CBD
- Extensive parking areas alongside railway line

- Retain a "neighbourhood" sized commercial area on the Mamaku side of the main road. Consisting of convenience shops so has a different focus to the village on the other side of the road.
- Realign Taui Street to create a view shaft from the main road to the lake
- Reposition village to capitalise on stream

Roading Changes

- Introduce roading layout changes to ease traffic congestion through Ngongotaha in the morning peak.
- Improve access from side streets to Ngongotaha village.
- Move away from cul-de-sacs to more connected roading patterns
- Roads alongside streams to maximise access and use of walkways

Industrial / Business Opportunities

- Identification of a potential business park complex (similar to that opposite the airport on the eastern side of the lake) at the intersection of State Highway 5 and Ngongotaha Road. This was in response to the request for more high quality business land
- Offices on the residential side of the proposed business park, compatible with the surrounding residential area.
- Only a moderate amount of industrial land. Consultation suggested that industrial land wasn't wanted by the community. However, if industrial land was developed well, there is a place for it. The community dislike the look of the industrial land on Wikaraka and Taui Streets and have the perception that this is what all industrial land will look like.
- Incorporate a change in use of Wikaraka St heavy industry to light industry and/or commercial to facilitate clean up of contaminated land and enable a land use more compatible with the surrounding residential areas. This was in response to the community stating they disliked this area.

The current number of residential lots in Ngongotaha 1,372 with an approximate population of 3,704 (assuming an average household size of 2.7 people). A 40% uptake of the residential zone has been assumed as outlined in the Status Quo Model. The suggested extension to Ngongotaha to the north would yield 286 additional dwellings (assuming 30% requirement for reserves and infrastructure). An area of 4.73 hectares has been identified for medium density housing around Ngongotaha Village. This is likely to produce approximately 157 extra dwellings based on an average lot size of 300m^2. This area has high amenity due to the lake and the stream and the smaller sites will be balanced by the significant amount of open space.

Zone	Current Number of Lots	Theoretical Additional Yield
Residential B	1,372	(40% of possible) 617
Future Residential B	2	286
Medium Density Residential	10	157
Future Urban Development	10	Depends on dwelling density: 1,644 @ 450m^2 92 @8000m^2

3.3.2 Hamurana

This sub-scenario of the Compact Model addresses changes in and around Hamurana's settlement. Changes and intensification of Hamurana's residential area are conditional upon wastewater being reticulated. Environment Bay of Plenty's On-site Effluent Treatment Regional Plan 2006 identifies wastewater treatment solutions for Hamurana as a priority. Unless connected to a sewer by December 2010, most conventional septic tanks systems in the Rotorua Lakes' Catchments will be required to upgrade to an approved advanced waste water treatment system. Those in Hamurana have until December 2014. However from 1 December 2014 all

existing conventional on-site effluent treatment systems in Hamurana will either need to apply for a discharge permit from Environment Bay of Plenty (EBoP); be upgraded to Advanced Systems; or connected to a reticulated system.

Significant features that were identified in consultation and included in the Hamurana Compact Model are as follows:

Residential

- Any changes are dependent on wastewater servicing and connection to either existing or new wastewater treatment plant
- Doubling of density on slopes – currently minimum 8000m^2, reduce to minimum lot size 4000m^2. This would result in a doubling in the number of houses on the caldera slope
- Preservation of Hamurana character important so only allow moderate increase in number of dwellings
- Increased density on flatter areas of Hamurana as that area is not so visually obvious. Currently minimum 8,000m^2, reduce to minimum lot size 800m^2
- Incorporate a small extension to footprint of Hamurana above Fryer Road
- Development opportunities opposite Tauranga Direct Road. Development controls introduced regarding placement of houses so not obvious from the road.

Public Open Space

- Increasing the lakeside reserve at Hamurana by removing some of the baches on reserve land. This was the community response to being asked if there was sufficient recreation land.
- Extend lake edge reserve
- Possibility of mountain bike trails or walking trails above Hamurana
- Retain Hamurana Golf Course
- Retain and revitalise Hamurana Springs as a tourist destination

Infrastructure

- Better roading layout and connection rather than a network of dead-ends
- Wastewater reticulation of Hamurana

Commercial Opportunities

- A small amount of land for economic development at Hamurana such as a café, restaurant, hairdresser or similar businesses appropriate for a small community. The inclusion of this was based on responses from the Hamurana community when asked if they felt there should be more business land. With increased Hamurana population, small commercial centre may be viable e.g. café, convenience shops.

The current number of residential lots in Hamurana is 255 with an approximate population of 688 (assuming an average household size of 2.7 people). Under the current District Plan provisions an additional 32 lots can be created.

The area of increased density on the flatter areas of Hamurana accounts for 30.2 hectares. Allowing 30% of infrastructure, roads and reserves, this has a potential yield of 470 dwellings. The areas identified as future Rural B encompass approximately 38 hectares above Fryer Road and 26 hectares below the intersection between Tauranga Direct Road and Hamurana Road. Using the lot size provisions of Rural B, This is likely to result in 48 and 33 lots respectively.

Using the existing potential capacity and the theoretical yield, the proposed change could result in an approximate tripling of the population at Hamurana.

Zone	Current Number of Lots	Theoretical Additional Yield
Future Rural B	22	59
Increased density to Residential B standards on flatter areas	83	387
Existing Rural B lots	240	272
TOTAL	345	718

3.4 Scenario 3: Mixed

The Mixed Model is a scenario fitting between the Compact and Dispersed Scenarios. It includes elements of both with some growth / change in Ngongotaha and some rural lifestyle but only in specifically identified areas. Rule 11 introduced by EBoP was a concern for the community and both the Mixed Model and Dispersed Model reduce the size and number of dairy farms (Appendix A).

Urban living

- Moderate amount of growth in Ngongotaha and Hamurana
- Limited extension to Ngongotaha urban footprint at the Hamurana end of Ngongotaha
- Includes features of the Compact Model including revegetation of stream banks, network of walking trails, changes to industrial area and village.
- Opportunities for papakainga housing (individual dwellings on Maori owned land located around the Marae)
- Does not include extension of the urban limits around Pukehangi Road

Rural Lifestyle

- Allow rural lifestyle only in identified areas
  Oturoa / Dalbeth Road - Already smaller land parcels and fragmented, large number of streams and tributaries, good connection to Ngongotaha Village
  Small amount of rural residential in Kaharoa - Strengthen the Kaharoa community without significantly changing the character. Water supply is an issue and needs to be addressed for this to be feasible.
- Opportunities for riparian planting along stream banks in rural areas

3.5 Scenario 4: Dispersed

The Dispersed Model provides a contrast to the Compact Model and spreads population growth evenly through the rural area. Two different densities of 1 dwelling per 10 hectare average and 1 dwelling per 4 hectare average were used to calculate the possible population projects.

Because of the average size of the sites, it was assumed that wastewater would be treated and disposed of on site or through localised package treatment plants that treated wastewater from a group of houses. Features of the Dispersed Model were:

- Population growth is dispersed throughout the rural environment
- Does not provide for growth in Ngongotaha or Hamurana settlements
- Significant effect on rural character

- Options to cluster houses or disperse them
- Has potential to address EBoP Rule 11
- Each lot would have to service on site
- Would disperse traffic but may result in wide spread congestion

If all existing Rural A properties were to develop to an average lot size of 10 ha, this would result in an additional 862 additional lots (2,319 additional population). An average lot size of 4 ha (10 acres) would result in 2,862 additional lots (7,727 additional population).

4 Towards the Preferred Scenario

The purpose of this section is to provide an assessment of the implications of each of the structure plan scenarios (status quo, compact, mixed and dispersed).

Once the initial scenarios were developed, evaluation of each was undertaken. This involved multi-criteria analysis to allow comparisons to be made. When combined with infrastructure considerations, this allowed the implications of each land use (including area and type) to be evaluated. Additionally, this evaluation was intended to form the background to any future Section 32 reports required as part of a Plan Change to include the Preferred Scenario into the Rotorua District Plan.

The potential impact on infrastructure was also assessed. The land use changes, density and subdivision provision and the projected population growth will have a direct impact on determining the capacity of the existing infrastructure (both the reticulation systems and the treatment plant) and whether these existing assets have the spare capacity to cater for the projected demands. Other mechanisms for treatment such as low impact stormwater design were also considered.

An initial traffic assessment (refer to Section 5) reflects the importance of existing transport corridors, focussing particularly on routes between Hamurama, Ngongotaha, Rotorua and Tauranga. In assessing the potential impacts of future development on key intersections between these routes, the effects of planned infrastructure improvements and travel demand management measures were considered. The traffic assessment has provided a good insight to transport issues and opportunities for each scenario. It is proposed that a detailed Integrated Transport Assessment (ITA) be undertaken once the preferred scenario is chosen. The ITA would include details of transport proposals by stage of development, address detailed travel demand management measures, and provide details of concept designs and costings.

4.1 Three Waters Infrastructure Implications

Background information pertaining to existing infrastructure and LTCCP provisions is contained in Appendix B.

4.1.1 Wastewater Infrastructure

The provision of trunk mains and treatment (whether centralised or de-centralised treatment option) in accordance with the Rotorua Basin Wastewater Strategic Plan (WWSP) would be similar irrespective of the development scenario adopted.

The more compact development scenarios are likely to have lower reticulation costs, and potentially the dispersed model might have a lower rate of connection if the cost of reticulation was prohibitive. This would reduce the benefits of wastewater servicing in terms of reduction in nutrient loads on the lake.

It is expected that the costs of reticulation are at least partially borne by developers. Further calculations need to be undertaken to determine likely costs and estimate financial contributions.

If the de-centralised wastewater treatment option is adopted then land needs to be identified and set aside for the treatment plant and land disposal system.

4.1.2 Water Supply Infrastructure

Ngongataha and Hamurana Supply Areas
Population growth within the Ngongataha and Hamurana water supply areas can be accommodated up to the levels assumed in the Rotorua Growth Model (RGM). Such growth may require upgrading of the existing reticulation networks, depending on the location of development.

The Water Supply Strategy (WSS) indicates that consents to increase takes from current sources (central supply springs in the case of Ngongataha or Rewarewa Spring in the case of Hamurana supply) or to use other spring sources are unlikely to be obtained under current EBoP policies. Therefore, growth scenarios which result in significantly larger populations than projected by the PGM in either area are likely to require the development of additional supplies at considerable cost. This has not been anticipated in the Long Term Council Community Plan (LTCCP).

Kaharoa Supply Areas
Unlike the Ngongataha and Hamurana networks, the Kaharoa supply is a restricted supply, with consumers providing their own storage to meet peak demands. The entire volume of the consent attributed to Kaharoa has been allocated to the rural consumers served by the network and is not available for allocation to other areas. Unless the LTCCP is changed, this means that any further subdivision must not be so intense as to create demand in excess of the available supply per hectare. Again, the WSS indicates that consents to increase takes from the current source (Rewarewa Spring) are unlikely to be obtained under current EBoP policies. Therefore higher density development or introduction of urban service levels will require the development of additional supplies at considerable cost. This has not been anticipated in the LTCCP.

Currently, when subdividing in this area the allocation of the parent lot must be split between the new lots created. The Rotorua Basin Wastewater Strategic Plan (WSS) states that the average demand in the Rotorua Basin is 275 litres per person per day. The average weekly peak summer demand is around 440 litres per person per day ($\times$1.6). This limits the population density for residential development of dry stock farming areas (allocation 450L/Ha/day) to around 1.8 Ha per person and dairy farming areas to around 1.0 Ha per person. While a minimum lot size could be set based on typical household occupancy rates (e.g. 5.4 Ha for 3 persons per household in dry stock areas), this would bring a risk of water shortage in certain areas if a number of households with above typical occupancy rates were established. A minimum lot size based on higher than typical household occupancy rates, say 4.5 persons/lot, seems appropriate, i.e. 8Ha in dry stock areas and 4.4Ha in dairy areas.

Areas above the 340m Contour
The 340m contour is adopted in all infrastructure strategies and assessments as the limits to servicing however there are areas above the 340m contour currently serviced in the Western Basin (particularly in the Kaharoa supply area) and it may be feasible to reticulate further development above the 340m contour in some areas. However, this becomes increasingly expensive due to implications for the existing infrastructure and depending on the total population, may not be feasible if the supply is over-allocated. Use of on site rainwater collection remains an option for sites above the 340m contour but is not recommended except as a supplement to the potable supply.

4.1.3 Summary of Three Water Servicing Issues

340m Contour Limits of Servicing

The wastewater and water supply strategies have adopted the 340m contour as the upper limit for servicing. However, some consumers in the Western basin above the 340m contour are already supplied and when considering the long term planning horizon, if there are good reasons to extend the reticulation to higher levels within the basin in some areas albeit at considerable cost, then this should not necessarily be ruled out. As with other areas, development above the 340m contour would be subject to the constraints on population imposed by water source and wastewater treatment limitations

Wastewater

- RDC has committed to extending the wastewater reticulation catchment into the Western Basin.
- In some areas (notably Hamurana), reticulation is a pre-requisite for intensification.
- Compact models allow higher connection rates, which will benefit lake water quality.
- An early decision needs to be made on whether to adopt the Centralised or De-centralised treatment option.
- The benefits of a De-centralised treatment option (i.e. a satellite plant at Awahou) increase with increasing population in the northwest. There is likely to be a number of issues associated with potential satellite plants at Awahou.
- The proposed serviced catchment excludes significant areas of potential development, being those areas above the 340m contour.
- Development above the 340m contour could be serviced however on site wastewater disposal is also feasible.

Water

- Current sources are capable of meeting supply needs in accordance with the PGM predictions however there is little or no spare capacity at source.
- The LTCCP makes no commitment towards improving service levels or extending the network coverage.
- Development scenarios which result in populations in excess of PGM predictions cannot be serviced without new supplies being developed.
- There are no low cost options for increasing raw water source volumes.
- The Kaharoa Network is a restricted supply. This means that urban levels of service cannot be provided and lot sizes need to be controlled in a way that matches population per hectare to available water allocation.
- The supply areas currently exclude significant areas of potential development above the 340m contour however extension of the reticulation above the 340m contour is feasible in some areas. Development above the 340m contour could use rain water collection however reticulation from a public source is recommended for potable supply.

4.2 Transport

This section provides details of the performance of the existing road network and proposed road transport improvement projects contained in the Regional Land Transport Strategy and Transit's 10 year Land Transport Programme.

4.2.1 Future Traffic Demand

A summary of the three scenarios (Compact, Mixed and Dispersed) and estimated trips that will be generated are presented in Table 1 below. The Dispersed Model has been segregated into three cells for the analysis:

- Cell A, north of Hamurana Road, between SH36/Hamurana Road and SH33/Hamurana Road intersections;
- Cell B, west of SH36 between by SH36/Hamurana Road and SH36/SH5 intersections;
- Cell C, south of SH5.

Table 1 : Growth Models

Model	Additional Lots	Vehicles per peak hour	Vehicles per day
Mixed Model	1970	1647	17730
Compact Model	1661	1412	14949
Dispersed model (option 1)	3405	2894	30645
Dispersed model (option 2)	1363	1159	12267

Note: Dispersed Model Option 1 is to subdivide rural areas into 4 ha lots, Option 2 is to subdivide rural areas into 10 ha lots.

4.2.2 Capacity Assessment

A capacity assessment has been based on a 'high-level' analysis of the predicted changes in peak hour flows identified in Table 2. The distribution of trips from the development scenarios are based on traffic turning count surveys undertaken in September 2006. This indicated that approximately 90% of vehicles travel towards Rotorua in the AM peak. No future regional traffic growth has been applied as there are currently many unknowns such as when development growth will occur locally and over the wider area such as at Pies Pa.

4.2.3 Mid-Block Analysis

The results of this assessment are presented in Table 2 and discussed below.

Table 2 indicates that additional capacity is required on SH36 from just north of Ngongotaha to the SH5/SH36 intersection for the mixed, compact and dispersed (4 ha lot) growth models. The draft Rotorua State Highway Strategy notes that four laning through Ngongotaha is unlikely. An alternative could be the formation of an alternative route bypassing Ngongotaha. However currently there is no support from Council or Transit for a Ngongotaha bypass.

Table 2 : Traffic Analysis at mid-blocks

Mid-block Sections	Peak hour flow one way flow	Volume capacity ratio
Existing Situation 2005		
Hamurana Road (between Unsworth Road and SH33)	99	0.06
Hamurana Road (between SH36 and Unsworth Road)	225	0.14
SH36 (directly south of Hamurana intersection)	450-630	0.28 - 0.39
SH36 (directly north of Hamurana intersection)	270-315	0.17 – 0.2
SH36 (directly north of SH36/SH5 roundabout)	630-990	0.39 - 0.62

Future Situation		
Mixed Model		
Hamurana Road (between Unsworth Road and SH33)	175	0.11
Hamurana Road (between SH36 and Unsworth Road)	301	0.19
SH36 (directly south of Hamurana intersection)	730	0.46
SH36 (directly north of Hamurana intersection)	486	0.30
SH36 (directly north of SH36 / SH5 roundabout)	1811	1.13
Compact Model		
Hamurana Road (between Unsworth Road and SH33)	166	0.10
Hamurana Road (between SH36 and Unsworth Road)	428	0.27
SH36 (directly south of Hamurana intersection)	872	0.55
SH36 (directly north of Hamurana intersection)	566	0.35
SH36 (directly north of SH36 / SH5 roundabout)	1767	1.10
Dispersed Model 1: 4 ha lots		
Hamurana Road (between Unsworth Road and SH33)	374	0.23
Hamurana Road (between SH36 and Unsworth Road)	500	0.31
SH36 (directly south of Hamurana intersection)	1435	0.90
SH36 (directly north of Hamurana intersection)	799	0.50
SH36 (directly north of SH36 / SH5 roundabout)	1861	1.16
Dispersed Model 2: 10 ha lots		
Hamurana Road (between Unsworth Road and SH33)	397	0.25
Hamurana Road (between SH36 and Unsworth Road)	523	0.33
SH36 (directly south of Hamurana intersection)	910	0.57
SH36 (directly north of Hamurana intersection)	505	0.32
SH36 (directly north of SH36 / SH5 roundabout)	1297	0.81

Source: Existing Traffic Volumes (AADT) Transit New Zealand (2005)

4.2.4 Intersection Analysis

Observations on site and discussions with Council officers have revealed that there are current capacity issues at the SH5 / SH36 intersection, particularly queuing back through Ngongotaha in the AM peak. There are no other current intersection capacity issues to note between SH36 / Hamarana Road, and SH5 / SH36 intersection.

Proposed intersection upgrades noted in Transit's Draft LTP are:

- Ngongotaha roundabout tidal improvements through the provision of traffic lights (which will assist in mitigating the queuing problems noted above);
- Waiteti intersection improvements;
- Hamurana / Tauranga Road intersection improvements (changing the priority of traffic to the dominant movement to / from Tauranga).

No detailed analysis has been undertaken at an intersection level. It is acknowledged that recent turning count information (September 2006) is available at SH36 / SH5, SH33 / Hamurana Road and SH36 / Hamurana Road but no details of queuing and delays. Once a better understanding is obtained of regional traffic growth and when local growth / development is likely to occur, intersection improvements and timescales can be assessed in further detail. This detailed information would be included in the proposed Integrated Transport Assessment which is recommended to be undertaken for the preferred growth scenario.

4.2.5 Rail

With respect to the rail corridor, On-track have given permission for the operation of a passenger transport service from Lake Road to Mamaku, and the LTSA are processing an application for a license. It is therefore a possibility that the rail line will be used again.

4.2.6 Bus and Park and Ride

Bus is likely to form an integrated part of transport solutions. The Rotorua Draft State Highway Strategy Review 2007, comments that possible solutions should include TDM and traffic management measures through Ngongotaha township, including bus services and park and ride. The implications of bus services, park and ride and associated potential modal shift should be explored in greater detail for the preferred growth model in the recommended Integrated Transport Assessment.

4.2.7 Walking and Cycling

Walking and cycling will be an important element for managing travel demand, including in the Ngongotaha / Hamurana areas. A Ngongotaha cycleway between Ngongotaha and the CBD should be supported. Pedestrian flows should be targeted to suitable crossing facilities which will need to be integrated as part of the overall transport strategy for the preferred growth scenario.

4.2.8 Conclusions

The above provides a 'high level' analysis of the traffic demand of the three growth models tested. A more detailed traffic impact assessment is required to assess the impacts at a micro-level (internally and externally to the growth nodes) and to take into consideration measures to reduce the number of vehicular trips through TDM and public transport. The work undertaken to date has revealed:

4.2.8.1 Existing situation

There are capacity issues from north of Ngongotaha to the SH5 / SH36 roundabout. Traffic currently queues back from the SH5 / SH36 roundabout in the AM peak through Ngongotaha and on occasions for 2–3km through the town. This causes traffic and environmental issues within Ngongotaha itself including obtaining access to SH36 from adjacent side roads.

There are a number of proposals including 4-laning of Ngongotaha Road, signalising on a tidal basis SH5 / SH36 intersection and changing the priority of SH36 / Hamurana Road. Such improvements are likely to assist in mitigating current congestion issues.

There are no other significant capacity issues to note in the study area for the existing situation.

4.2.8.2 Structure Plan Scenarios

Mixed model

- Generates approximately 17 800 vpd[1]. 10 600 vpd are concentrated in Ngongotaha, 6 500 vpd to the west of Ngongotaha (rural lifestyle blocks), and 450 vpd Kaharoa development.
- Has less impact on the SH36 / Hamurana intersection compared to the other growth models as there is limited growth north of Hamuruna Road except at Kaharoa.
- The section of road north of Ngongotaha to the SH5 / SH36 roundabout will be over capacity.
- Access to the State Highway network will need to be carefully considered.
- Concentrated growth at Ngongotaha provides good opportunities to be served by public transport.

Compact model

- Generates approximately 15 000 vpd - Hamurana (4 400 vpd) and Ngongotaha areas (10 600).
- The section of road north of Ngongotaha to the SH5 / SH36 roundabout will be over capacity.
- Access within Ngongotaha will need to be carefully considered to avoid conflicts between vehicles and pedestrians.
- There are opportunities to provide for public transport (ferry and bus) through the concentration of properties at nodes in Hamurana and Ngongotaha.

Dispersed model (option 1)

- Generates the most number of trips from the growth models tested (31 000 vpd). Approximately 20 000 vpd are located north of SH5, 11 000 vpd south of SH5.
- It is estimated that 60% of the trips (12 000 vpd) north of SH5 (cell A and B) will head to Rotorua in the AM peak. This will cause higher traffic levels on the already congested SH36 route north of Ngongotaha to SH5 / SH36 roundabout. The remaining 40% of these trips will consist of local trips (e.g. to Ngongotaha, east via Hamurana Road) and north in the direction of Tauranga.
- Access to the SH network will need to be carefully considered. In particularly from growth node C (south of SH5) which will require access via SH5 or Fairy Springs Road. As previously noted Fairy Springs Road will be 4-laned at Fairy Springs, which will provide a four lane urban arterial with traffic signal controlled intersections between Fairy Springs and Malfroy Road.
- Limited opportunities for public transport as growth spread throughout rural areas.

Dispersed model (option 2)

- The proposed growth will have similar impacts to the Dispersed Model (Option 1). The key difference is that instead of 4 ha lots, 10 ha lots are proposed which would reduce the overall traffic impact by approximately half.
- Access to the State Highway network will need to be carefully considered.
- There are fewer opportunities for public transport as growth spread throughout rural areas.

All three models will further deteriorate the level of service between Ngongotaha and the SH36 / SH5 roundabout. It is likely that additional capacity and / or public transport improvements will be required to accommodate predicted demand. Any capacity improvements through Ngongotaha will require careful integration with urban design and access control. Through consultation, the community has clearly indicated a preference for a bypass rather than four laning through Ngongotaha.

[1] Vehicle movements per day

The Dispersed Model will require access onto SH5 or Fairy Springs Road. The most appropriate access locations will need to be looked at carefully particularly in light of Fairy Springs Road being four lanes in the future from Fairy Springs to Malfroy Road

A more detailed transport assessment through an Integrated Transport Assessment is recommended for the preferred scenario. This would cover a more detailed investigation of capacity upgrades and transport improvements including staging implications, concept design, and costings.

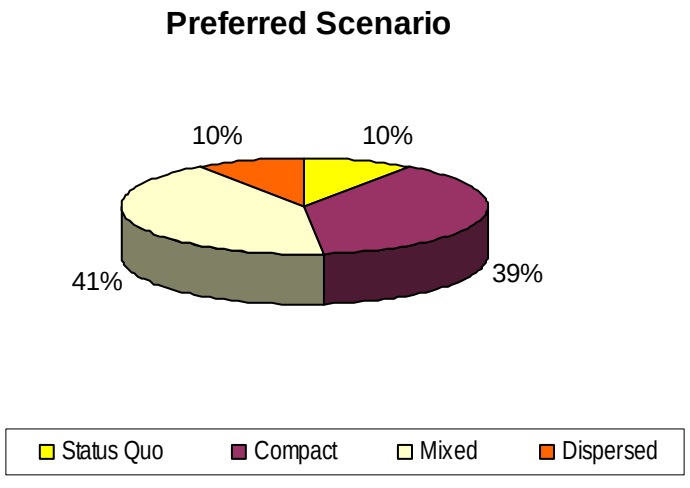
4.3 Other Infrastructure

Each scenario has varying levels of ease of servicing including the provision of electricity, telecommunications, and natural gas. The Compact Model is the easiest to service and the most efficient as it builds on existing infrastructure. The Dispersed Model requires significant investment in hardware and the laying of extended networks due to wide-spread development.

4.4 Consultation Outcomes

At the inception of the Western Basin Structure Plan Project, it was considered that the final preferred scenario would be determined through consultation with the community. Each significant feature liked or disliked by the community at the start of the project was incorporated into at least one scenario. The scenarios were presented to the community in March 2007 and the feedback has provided direction for the final Western Basin Structure Plan, including not only the community's preferred distribution of growth, but also whether they supported the changes to the features they liked or disliked from the initial consultation.

The community's responses to the four scenarios showed a preference split between the Compact Model (39%) and the Mixed Model (42%). Additionally, the community was asked which features of each scenario they liked and disliked so even though they supported the population distribution of a certain model, they may have liked features of other models. Based on this feedback, the preferred scenario is a combination of the compact and mixed model.



The main messages from the questionnaire used at the Open Days as part of consultation were:

Status Quo Model

Features Liked:	Features Disliked:
None	No forward progress to accommodate the future
The distinct nature of each settlement	No growth for Ngongotaha
Comfortable with what's there	Industrial uses are still in an inappropriate location
No change required	Is stagnated

Compact Model

Features Liked:	Features Disliked:
Repositioning of Ngongotaha Village	Four-laning through Ngongotaha
Re-vegetation along streams	Smaller section sizes
Additional reserves and public open spaces	Increased housing density and infill housing
Railway reserve	Increased industrial / business land
Houses oriented to face streams	
Changing industrial area to commercial	

Mixed Model

Features Liked:	Features Disliked:
Rural lifestyle in Dalbeth Road	Only two areas identified for lifestyle
Rural lifestyle opportunities	Need to address Rule 11 of EBoP
Allows growth but keep rural character	Do not want more development at Kaharoa due to water supply issues
Assists with reducing dairy farms	
Replanting of streams	
Range of lifestyle choices	

Dispersed Model

Features Liked:	Features Disliked:
None	Spoil the rural atmosphere
Disperses effect of growth across study area	More traffic leading to congestion
Assists achieve outcomes of Rule 11 of EBoP	Increased fragmentation of rural area
More lifestyle opportunities	Only caters for one sector of the community
	Loss of productive farm land
	Poor use of productive land

The features that the community liked and are included in the final scenario are:
- Keeping the rural character
- Hamurana and Ngongotaha as distinct settlements – promotes community identity
- Retain village character of Ngongotaha
- making the stream a feature of Ngongotaha Village
- Re-vegetation and rehabilitation of the pond alongside the railway line
- Improvements to Ngongotaha roundabout
- Repositioning of village, centering the shopping and commercial activities – creates a focus
- Create walk / cycle track to Rotorua along old railway line
- Change Taui and Wikaraka Street from industrial to commercial
- Increasing access to public areas for recreation use

- Re-vegetation along all streams
- Increased walking tracks
- Orientation of houses around streams, making streams a feature of the village
- Keeping most growth around established communities
- Opportunity for small commercial area in Hamurana, prefer boutique or café style which would draw tourists and locals away from the city to under utilised parks, walking areas and Hamurana Springs
- Higher density living close to Ngongotaha Village with focus on lake / streams
- Minimal impact on farmland
- Rural look (theme) is kept through limited urban developments
- Rural lifestyle opportunities – addresses demand
- A scenario that allows growth but keeps the rural outlook
- Development on dairy farms as this will address Rule 11

This information combined with the results of the evaluation matrix and the infrastructure effects has determined the final preferred scenario.

4.5 Evaluation Matrix

An evaluation matrix was developed - based on the quadruple bottom line approach identifying environmental, economic, social, health and safety and cultural aspects. These were also aligned with the Community Outcomes contained in the Rotorua District Council LTCCP. Each scenario was assessed against the Status Quo Scenario and rated appropriately.

The Compact Scenario ranked significantly better than all other scenarios including Status Quo scenario. It ranked higher against all other scenarios in environmental wellbeing, social wellbeing, economic wellbeing and health and safety.

The Compact Model scores highly in the environmental wellbeing assessment criteria due to efficient use of existing infrastructure, retention of rural character, efficient use of energy resources with lower dependence on cars, and maintenance and enhancement of amenity values. Creating riparian reserves improves stream management especially in the lower reaches that may be more prone to erosion, silting and flooding. By comparison, the Dispersed Model scores poorly because of its greater and widespread effect on rural character, amenity values, and inefficient use of infrastructure. The Dispersed Model would require considerable investment and construction of new infrastructure.

The Compact Model also compares well for social connectedness, increases employment opportunities and retains and strengthens community character. Because of its compact shape, there are better opportunities for live, work and play locally. All scenarios scored equally for diversity of housing options and lot sizes.

The Mixed and Compact Models scored equally for cultural wellbeing assessment criteria. This is due to papakainga housing, allowing for significant improvement in the relationship of Maori with ancestral lands, water, sites, waahi tapu and other taonga. The Mixed Model also allowed for preservation of culturally important, especially those located around Marae. The Dispersed Model allows for the greatest development options for Maori land. This is because there are a number of large sites zoned as Rural A that are in multiple Maori ownership.

The Compact Scenario also compares well against economic wellbeing assessment criteria. Increased population of Ngongotaha increases the economic viability and vitality. The additional business land identified also has the potential to increase the economic activity with business park type activities.

The Compact Scenario compared well against Health and Safety assessment criteria, due to features such as changing the orientation of houses to overlook reserves and streams as this increases the safety of public spaces through passive surveillance. Changes in use of potentially contaminated sites will facilitate remediation of the contamination, resulting in a healthier and safer environment.

The results of the evaluation matrix clearly indicate that the features of the Compact Scenario will produce a significant improvement in terms of environmental wellbeing, social wellbeing, economic wellbeing and health and safety. The papakainga opportunities provided by the Mixed Model provide a significant improvement in cultural wellbeing. Protection of indigenous vegetation scored better in the Mixed and Dispersed Models as it was considered that subdivision will create opportunities for re-vegetation and fencing of native bush.

The Compact Scenario had the most features but this is because greater population in a small area consequentially produces greater demand for services, reserves, employment opportunities etc. This was the best scenario to show these features on as the maps were at the largest, most appropriate scale.

5 Western Basin Structure Plan

Based on the outcomes of the consultation, the evaluation matrix, and infrastructure implications, a Preferred Structure Plan for the Western Basin of Lake Rotorua has been developed. This is a combination of:

- the features identified by the community as preferred during consultation
- features that scored highly on the evaluation matrix, and will result in a significant increase / improvement on the status quo
- infrastructure improvements

The preferred growth pattern involves expansion of the Ngongotaha village towards the north / north-west. The growth of the village is constrained by Lake Rotorua to the east, and incised steep topography to the west. During consultation, the community said that they valued the separate and distinct character of the settlements. With Hamurana located to the north-east and Rotorua Central Business District (CBD) to the south, the expansion of Ngongotaha is somewhat constrained. In addition, consultation indicated that the community really values the small, close knit village atmosphere of Ngongotaha. It is considered that significantly expanding Ngongotaha would destroy this character.

Based on feedback from the community, a small amount of additional residential development is identified for Hamurana and papakainga opportunities for marae. Additional residential development at Hamurana has been restricted to the flatter areas on the northern side of Hamurana Road. It was considered that the larger 8000m^2 lot size on the caldera slopes contributed to the character and should be retained. Community feedback clearly indicated that the community preferred the mixed and compact scenarios. In accordance with this, an area for rural lifestyle has been identified along the Oturoa, Fleming, Sharp and Jackson Roads. To meet the requirements of EBoP's Rule 11, existing dairy farms form the basis for locating rural lifestyle (Appendix A). Rule 11 targets dairy farms as being the most significant contributor to nutrients in Lake Rotorua. In addition, areas of ecological significance were included in the rural lifestyle areas to facilitate protection and restoration.

Although this area has been identified for rural living, densities or lot sizes have not been identified. It is recommended that a landscape assessment of this area be undertaken to determine subdivision provisions that will not undermine the rural character of this area but will facilitate the retirement of the properties from dairy. In addition, it is recommended that design criteria be developed for this area to ensure quality outcomes. Retiring farms from dairy will undoubtedly assist in improving lake water quality, however this should not be to the detriment of other aspects such as landscape, rural character, and infrastructure provision.

The Structure Plan does increase the number of potential sites and therefore population that can be accommodated in the study area. As stated above, the potential yield of the appropriate lot size of the rural living area has not been calculated and is a subsequent piece of work to be undertaken by Council.

A land area allowance to provide for infrastructure including roads and reserves has been made – 30% for the higher densities and 15% for the larger Rural B sized sites[2].

[2] The potential yield was calculated based on the available land area minus 30% or 15% to provide for infrastructure, then divided by the lot size.

Ngongotaha

	Lots	Population
Current residential sites	1,575	4,250
Current infill capacity (assume 40% takeup)	600	1,620
Northern extension	*286*	*770*
Dalbeth Road		
@ 4,000m² lots OR	*224*	*604*
@ 450m² lots	*1,642*	*4,435*
Medium intensity around village	*50*	*135*

Hamurana

	Lots	Population
Current Rural B sites	316	853
Current infill capacity	39	105
Lower slopes	*277*	*747*
Rural B by the lakefront	*22*	*59*
Upper extension to Rural B	*10*	*27*

In addition, the subdivision rules for the Rural A and Rural E sites remain the same and therefore the potential yield also remains as the Status Quo.

However the Structure Plan does not only address residential growth, it provides for economic / commercial development and additional public open space. A recommendation of the Structure Plan is to relocate and redesign Ngongotaha village, giving the town a more focused heart. This will also allow the village to capitalise on two valuable assets – Ngongotaha Stream and proximity to Lake Rotorua. The work already undertaken by RDC Parks regarding Ngongotaha Village Upgrade has been incorporated and aligned into the Structure Plan.

Analysis of demographics indicates "bulges" in the population in the 10-14 year old bracket and the 40-49 year old bracket. The downward trend begins from 14 years to 40 years old. One possible explanation is these age groups are moving away from the area initially for education reasons, and then perhaps staying away due to employment opportunities elsewhere. This may be partly due to the lack of employment opportunities locally. The Western Basin Structure Plan identifies areas for new business which may create additional employment opportunities.

Based on feedback from the community, increased opportunity for outdoor activity is required so a number of additional reserves form part of the Structure Plan. The most notable is esplanade reserves on both sides of all significant streams. This not only provides walking opportunities, but improves the quality of the stormwater entering the streams and the quality of the stream habitat.

5.1 The Living Aspect

Community consultation indicated that there a number of different communities within the study area and that each has its own identity, separate from others. Consequently any changes to the communities need to retain the unique character and identity. The distribution of population growth is mostly accommodated in Ngongotaha, with some intensification on the flatter areas of Hamurana. There is allowance for papakainga housing around marae and rural lifestyle in selected areas to address EBoP's Rule 11. All features outlined below are identified on the 'Live" map. 400 metre and 800 metre walking radii have been drawn around Ngongotaha Village to indicate 5minute and 10minute walking distances from the Village.

Expansion of Ngongotaha

Ngongotaha is reasonably compact and the extension to Ngongotaha has attempted to retain this compact shape. Ngongotaha is somewhat constrained by topography with incised hillock country on its western boundary. An 18 hectare extension to the north, adjacent to Waiteti Stream has been identified for residential uses. Development of this site for residential purposes will require a contaminated site assessment to ensure that any contamination (if any is present) can be mitigated to an appropriate level. In addition, thorough geotechnical investigation is required to determine the suitability for housing platforms. Despite the constraints of this site, there is the potential to create an innovative housing development incorporating the Waititi Stream as a feature and with low impact stormwater management. However a number of assessments need to be carried out first to determine suitability before development of this site can proceed.

A portion of Rural B between Waiteti Street and Leonard Road is suitable for Residential B densities, although the land closest to Ngongotaha Road in this area should be retained as Rural B as this provides an excellent entrance to the Village.

Future Urban Development

An additional 105 hectare has been identified as suitable for residential development on the northern edges of Waiteti Stream however this should be rezoned for urban development only if there is pressure for further residential sites. Further investigation of these sites is required to determine a suitable site size as this area forms the entrance into Ngongotaha, contributing to the character of the village. Should additional residential land be required, this area should be staged with the portion closest to Ngongotaha being released first. This may necessitate significant infrastructure costs up front but will contain urban development around Ngongotaha. Subsequent stages should only be released on a demand basis and should be balanced with the need for residential land on a District-wide basis.

Ngongotaha medium density

In a fully mixed community with a complete demographic profile, not everyone has the same housing needs. In order to provide housing diversity and to encourage activity around the Ngongotaha Village, an area of medium density housing is situated at the eastern end of Taui Street and the south-eastern portion of Wikaraka Street. This area has the potential for high amenity given the proximity to Ngongotaha Stream and the lake. Development such as this should be linked to the relocation of the village as the other two will support each other, and medium density housing is more sustainable closer to a commercial centre. This may be a longer term initiative given the current proximity to existing industrial activity. The likely lot size for this area is 300m^2, balanced by large areas of reserves. Because of the discrete pattern of land holdings, high design standards will be important to ensure a quality outcome. Good design guidelines will be essential.

This form of housing will provide for the older sector of the community, allowing them to still reside within Ngongotaha and fully participate in the community. It is considered better to have smaller lot housing concentrated in one area rather than dispersed through the urban areas.

Hamurana

Through consultation, it became apparent that the community at Hamurana value the unique character of the settlement. The current minimum lot size of 8,000m^2 was developed for several reasons – one of which was wastewater servicing as sites this size are large enough to treat and dispose of their own wastewater. However one additional reason for retaining the larger site size is to retain the character. In order to retain character, the 8,000m^2 lot size minimum was retained on the caldera slopes. There is potential for increased density on the flatter parts of Hamurana close to the lake front without impacting significantly on the character. Development contributions from these sites will assist with funding of wastewater reticulation. The flatter areas are not easily observed from other areas around the lake (such as the CBD) so will not affect landscape and amenity values.

Additional population in Hamurana will make any small neighbourhood commercial area more economically viable.

The Fryer Road extent of Rural B zoning has been revisited and extended slightly up towards the caldera rim. It is important that residential development extend no higher than this as it will start to have a significant visual impact on the caldera when viewed from other vantage points around and across the lake.

Zoning on the area between the Tauranga Direct Road and the lake has also been revised to Rural B, consistent with the dwelling density of Hamurana. It is recommended that any additional dwellings on this site comply with location criteria, using topography to shield development being visible from the road. There are two known archaeological sites on this area – a pit and a pa – which will require protection from development as part of any Plan Change Rules, Objectives and Policies.

Retaining a small number of Hamurana lakefront sites

There are a number of baches located on the lakefront, on RDC owned land. A number of these should be removed to increase the amount of lakeside reserve and increase views of the lake. However, there are approximately 5 sites at the western end which are hidden by topography. It is recommended that these be redeveloped and remain. They will have no impact on lakeside reserve as there is still public access along the length of the lake edge in front of the sites. There will need to be a change in zoning of the Hamurana baches that are to remain, from reserve to Residential.

Papakainga opportunities around Marae

Papakainga opportunities have been identified around Marae based on issues raised during hui. There is a real need for housing associated with the Marae – especially for the elderly, although the current zoning in the Rotorua District Plan does not allow for it. Papakainga should be located around Marae to strengthen Maori communities and Marae activities. This will allow ahi kaa to ensure the marae is a central focus for the particular hapu.

Rural living

An area for rural living has been identified between Oturoa Road and Tauranga Direct Road. It is bordered by Fleming, Sharp and Jackson Roads. This area includes some significant dairy farms as identified by EBoP (Appendix A). In addition, there are a number of significant ecological areas also included and development will facilitate their restoration and protection. Further assessment needs to be undertaken to determine development provisions such as lot size, location of dwellings, design, colour schemes etc to retain rural character.

It is important that development does not just address lakewater quality issues to the detriment of other effects such as landscape, water supply, traffic and rural character. Subdivision of dairy farms is not the only mechanism for improving lake water quality.

Kaharoa

Workshops with the Kaharoa community indicated that the most significant issue to any future development opportunities was water supply. No further development of Kaharoa is proposed as the rural character of this community is highly valued. Due to the current limitation on water supply, development will further limit the water supply to existing sites. Kaharoa has a number of significant ecological sites including Kokako habitats which need to be protected.

Rest of rural area

The community reaction to the Dispersed Scenario which proposed significant development throughout the rural area was very negative. This is a strong indication of the value placed on the rural area and that the community does not want to see any change. Apart from the identified rural lifestyle areas, there is no change to the current subdivision provisions in the rural area. However, it is recommended that all opportunities for re-vegetation of riparian edges is taken.

Urban edge

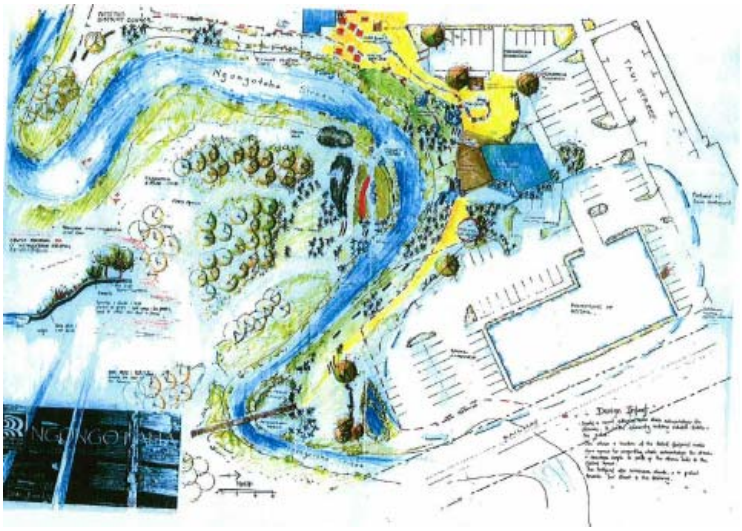
The existing urban extent along Pukehangi Road has been maintained. Above Pukehangi Road, the topography rises up towards the caldera rim. The caldera rim is a significant feature and backdrop to the CBD, especially on the western edges of the CBD where the caldera slopes are closest to the city centre. There is likely to be future development pressures in this area, given its proximity to the CBD. There has already been the introduction of Rural B1 zone that has been applied in this area as a result of a private plan change and it is likely that more applications of this nature will arise. Now that one development has been implemented using the Rural B1 rules, the effect of those rules should be re-considered as part of the District Plan review process. In the interests of creating a compact and efficient city form, Rotorua needs to identify and maintain an urban fence. It is considered that further urban development above this existing boundary will have an effect on the character and amenity and any future proposals will need to carefully consider the effect on this and mechanisms for mitigating. Further work is required to determine the extent of the urban edge and design controls to ensure a quality outcome.

Insert live map

4.6 The Working / Employment Aspect

The need for well designed commercial land within the study area was raised during consultation. However, the community was reluctant to accommodate industrial land due to the appearance of industrial land in Taui and Wikaraka Streets. The undesirability of this area came through very strongly in responses to the initial questionnaire. There is some difficulty with changing the use of the industrial areas due to the likely levels of contamination associated with historical uses. The remediation required to achieve a residential standard is unlikely to be economically viable so alternative uses for this land were considered to facilitate remediation.

There is a real possibility that four- laning through Ngongotaha will take place due to increasing traffic volumes. Based on discussions with Transit, the preferred structure plan assumes this will occur.



Village Centre Relocation

At present, Ngongotaha Village is split by the main road, with parallel parking on both sides. Widening the main road will further separate the two sides and detract from the "village heart" role that the commercial area has. It is recommended that the Ngongotaha village centre relocate to the eastern side of Ngongotaha Road to capitalise on the Ngongotaha Stream and proximity to the lakefront. Whether 4-laning occurs or not, the relocation of Ngongotaha Village Centre is recommended to provide a commercial heart for the Village that recognises links to the stream and lake. Through the community consultation, it became apparent that the community value the streams and therefore the linkages between Ngongotaha Village and the stream need to be a key feature. All new buildings adjacent to the stream should acknowledge frontage to the streams, making Ngongotaha Stream a safe, attractive and enjoyable feature of the Village. With Parawai Marae located near the middle of the proposed village, it will form an integral part of the village fabric.

Changes to alignment of Taui Street

Relocation of the village centre will require significant changes to Taui Street. At present Taui Street has a slight bend in the road, obscuring views to the lake. If Taui Street were to be straightened, realigned and widened, this would provide an effective view shaft to the lake – linking the Village to Lake Rotorua. At present, these connections do not exist. There needs to be a direct line of sight from anywhere on Taui Street to the lake.

The heart of the Village

The railway reserve will bring a reasonable number of people from Rotorua's CBD and centring the village around the Taui Street level crossing cements Ngongotaha as a destination for pedestrians and cyclists.

Providing a safer driving and parking environment

Parking and re-entering the flow of traffic on the main road was highlighted as an issue. By relocating the village centre to Taui Street, this problem will be resolved. Angle parking and designated parking areas in Taui Street will not only ease congestion on Ngongotaha Road but provide a safer driving environment.

There are a number of options for controlling traffic entry to and from Taui Street from Ngongotaha Road which should be explored as part of an Integrated Traffic Impact Assessment.

Retaining the Village character
The flower baskets and village feel of Ngongotaha was highly valued by the community and the future design of the paving, street design, and planting can re-create this character. Street trees help soften hard edges and can be used to make the new village a pedestrian friendly environment.

Ngongotaha neighbourhood commercial centre

With the school and housing for the elderly located on the western side of Ngongotaha Road, there is capacity for a small neighbourhood-style commercial area on the western side to meet the convenience needs of the community. This will also allow people on their way home to convenience shop without needing to cross the flow of traffic. The type of commercial activities in the neighbourhood shopping area must be different to those in Ngongotaha Village to prevent competition. Appropriate commercial activities will include hairdressers, dairy, liquor store, bakery, takeaways, vet, video store and doctor.

Hamurana neighbourhood commercial centre

Based on feedback from the community during consultation, there is an opportunity for a small neighbourhood commercial centre to establish at Hamurana. With an increased population at Hamurana, a small commercial centre may be more viable than previously, however the success of this depends on increased population in Hamurana. Appropriate commercial activities will include hairdressers, dairy, takeaways, and a restaurant. The driving distance between Hamurana and Ngongotaha is approximately five minutes so the commercial centre needs to provide convenience items in order to be economically viable.

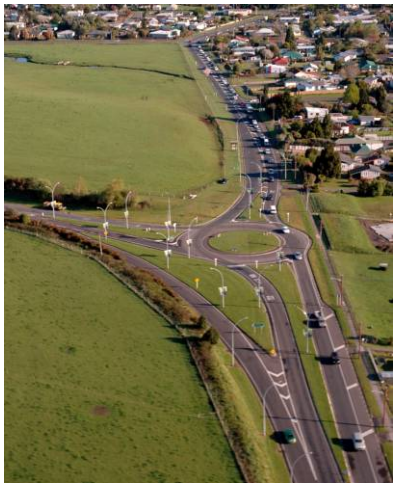
Addressing the industrial area on Wikaraka Street

Due to historic uses of these sites, it is assumed that there will be some level of contamination although the level of contamination will need to be confirmed through soil testing. As outlined above, feedback from the community regarding the industrial sites on Wikaraka Street was negative. Future uses of these sites are somewhat constrained by potential contamination. The short distance between residential and industrial uses creates the potential for conflict between uses. One mechanism for encouraging the clean up of these sites is to change the use from industrial to commercial / business. Commercial / business uses establishing on Wikaraka Street will need to be compatible with and not undermine the Village concept on Taui Street. This may include traveller accommodation, offices, large format retail, and community facilities such as a church.

Retaining light industrial areas

There is a continuing role for light industrial in Ngongotaha. This will be located at the northern end of Wikaraka Street and the sites next to the railway line at the northern end of Ngongotaha (including the historical stockyards site). It is important that future uses of these sites do not result in conflict of use with surrounding residential sites. The interface between this area and the new Somerly estate residential will have to be

carefully managed. Both are existing uses, but care must be taken where industrial uses adjoin residential. The same principle will apply to the new residential area north of the old saleyards.



Light industrial / business parks

The site on the corner of State Highway 5 and Ngongotaha Road presents an opportunity to establish a high quality business park. The north eastern corner is separated from the rest of the site by the stream running diagonally across the corner. Given the proximity to residential, it is recommended that the north eastern corner be used for offices or activities compatible with residential. Access for this site will need to be from Stembridge Road.

Insert "work" map

5.3 The Play Aspect

The features of a strengthened reserve network are illustrated in the map. More specifically, features around play and recreation include:

Increased network of esplanade reserves

In all the consultation to date, the streams are a feature highly valued by the community. In response to this, the Western Basin Structure Plan indicates an increased network of esplanade reserves both sides of the larger streams that dissect the study area. The creation of new esplanade reserves along stream edges is highly dependent on the subdivision of land adjacent. However, much of the remaining land along the Ngongotaha Stream, downstream of the railway corridor is in multiple Maori ownership. This means that other mechanisms will need to be investigated to achieve this outcome.

Increased walkways

By increasing the length and continuity of esplanade reserves along the length of the major streams, this will provide a network of walking / cycling trails and improve access to the streams.

Re-vegetation of all major stream banks

This will assist in managing stormwater through low impact design, and improve the quality of stormwater entering the Lake. In addition, re-vegetation of stream banks lowers the temperature of the streams, making the streams more habitable and increasing the biodiversity.

Increased pedestrian links

Safety and usability of reserves is increased if pedestrian links can be established between reserves. This also leads to increased permeability of the urban environment.

Creation of a railway reserve

This has worked successfully in several New Zealand cities including Nelson and involves removing the tracks and sleepers and laying gravel to make the surface suitable for cycling, walking and horse riding. The width of the railway reserve is more than sufficient to accommodate these uses. This provides a link between Mamaku through Ngongotaha to Rotorua CBD, providing not only recreational opportunities but a viable route for alternative transport.

Creation of wetland between Ngongotaha Road and railway line

This is currently a depression which floods during winter but has the potential to be a functional wetland during the winter months, providing an attractive entrance to the Village. It will have a dual role as a native habitat as well as filtering the stormwater runoff.

Continuous lakeside reserve

Taking all opportunities to achieve a continuous lakeside reserve providing access all the way around the lake. The creation of new esplanade reserves along the lake edge is highly dependent on the subdivision of land adjacent to the lake. Therefore any proposal that increases the likelihood of subdivision will enhance the provision of reserves.

Integrating reserve provisions into subdivision plans

There are a number of large residential zoned sites in Ngongotaha capable of being subdivided. Upon development, these sites will need to provide parks and reserves – the suitability, size and location of these should be assessed by Council at the time of lodgement of a subdivision application.

Removal of lakeside baches

There are a number of baches on RDC land at Hamurana. These baches are on leases and it is recommended that a number of them are removed to allow greater access to and view of the lake. There are 11 at the western end which are considered appropriate to stay as they are hidden from the road by topography.

Creation of mountain biking and / or walking tracks above Hamurana

At one of the community workshops, it was suggested that the bush along the top of the caldera rim above Hamurana might be suitable for mountain biking and / or walking trails. Further investigation needs to be undertaken as to the suitability, ownership and access. This may be an opportunity that is pursued privately.

Orientation of houses surrounding reserves

All new housing around the streams will be oriented to face the streams, rather than turning their back on the stream as has been done in Ngongotaha historically. Orientating the houses to overlook the streams has a number of benefits. Houses facing the streams increases access include the streams as part of the public realm, widen responsibility to include the community and improve safety with increased surveillance. Because streams came through as an important issue during consultation, the Structure Plan included this features to improve the quality and accessibility of the streams.

Integration of reserves into Ngongotaha Village

Ngongotaha Village is situated on the edges of Ngongotaha Stream and Lake Rotorua yet the Village does not make the best use of these assets and is located some distance away. By relocating and re-orienting the village centre, reserves can be integrated into the heart – opening up views to both the lake and the stream.

Ecological areas to be protected

There are a number of highly sensitive ecological areas located within the Western Basin Structure Plan area. In the Gaps, Constraints and Opportunities Report (August 2007), these were ranked as Tier 1-4 with Tier 1 having very high ecological significance, Tier 2 with high ecological significance, through to Tier 4 having medium ecological significance. Tier 1 and 2 areas have been identified on the Play map as it is recommended these areas are protected. In some cases, this may involve Council purchasing and / or managing the feature but more commonly will involve some other mechanism for protection such as QEII covenants. Hamurana Springs is one of these sites which require on-going protection from inappropriate development.

Community facilities

As can be seen from the map, community facilities are focussed around Ngongotaha Village. Educational facilities are located in the other settlements of Hamurana and Kaharoa also. The Structure Plan proposes to strengthen the village centre and build on the community facilities that are already located there. Due to the level of population increase expected, it is unlikely that further schools will be required.

Insert "play" map

Insert community facilities map

5.4 Infrastructure

5.4.1 Transport

There are a number of infrastructure improvements that can be made to assist the area function.

All scenarios resulted in a volume / capacity increase above 1.0 on State Highway 36 (directly north of the SH36 / SH5 roundabout), with the Compact Scenario reaching a volume / capacity level of 1.10 and the Mixed Scenario being 1.13. This indicates that additional capacity is required on SH36 from just north of Ngongotaha to the SH5 / SH36 intersection. This aligns with proposals in the Rotorua Transport Strategy 2006 of 4 laning of Ngongotaha Road. However the 4 laning noted in the Rotorua Transport Strategy suggests that this would not happen until after 2016 and depending on the timing of development, the timeframe may need to be brought forward. An alternative could be the formation of an alternative route to circumvent Ngongotaha.

Consolidating population growth in Ngongotaha with a small amount in Hamurana makes public transport more viable for both of these areas and needs to be further considered, especially in light of the predicted capacity deficit of SH36 through Ngongotaha.

As outlined in the "Play" section, the railway line provides an opportunity for alternative transport means (walking and cycling) from Ngongotaha to Rotorua's Central Business District.

Mechanisms for handling south-bound traffic entering the roundabout at the intersection of SH5 and SH36 need to be addressed in a subsequent Traffic Impact Assessment. There was public support for a slip lane for south bound traffic to reduce the number of cars having to enter the roundabout.

With the relocation of the Village centre, the intersection of Taui Street and Ngongotaha Road will need to be further considered. A roundabout is one mechanism that would allow traffic to enter and exit Taui Street safely. However being a State Highway, the roundabout would need to be designed appropriately for the volumes and type of traffic using Ngongotaha Road.

At a local level, all subdivisions should provide linkages between roads rather than cul de sac to improve permeability.

4.6.1 Three Waters Servicing

By accommodating the largest portion of growth around Ngongotaha, there are likely to be lower reticulation costs due to more efficient use of existing infrastructure. Reticulation of wastewater for Hamurana is required. If a de-centralised wastewater treatment option is adopted this would require land to be set aside for the treatment plant and land disposal system. The rural lifestyle area will require on site treatment and disposal of wastewater and depending on the distribution of dwellings, a package plant may be the most efficient means of achieving high quality treatment.
Growth may require upgrading of the existing water supply networks, particularly to the lifestyle areas. Costs associated with this have not been anticipated in the Long Term Council Community Plan (LTCCP) and it is recommended that costs are contributed by developers.

Unlike the Ngongataha and Hamurana networks, the Kaharoa supply is a restricted supply, with consumers providing their own storage to meet peak demands. Due to the restrictions, the maximum population density for residential development of dry stock farming areas (allocation 250L/Ha/day) is approximately 1.8 Ha per person and for dairy farming areas (allocation 450L/Ha/day) 1.0 Ha per person. A minimum lot size of 8Ha for dry stock areas and 4.4Ha for dairy areas (4.5 persons/lot) or larger is appropriate for this area to ensure adequate water supply.

Although the wastewater and water supply strategies have adopted the 340m contour as the upper limit for servicing, subject to source capacity limitations, some areas above the 340m contour could be serviced.

There are no low cost options for increasing raw water source volumes

5 Making it Happen

To give the Structure Plan effect, it will need to be incorporated into the District Plan review. This can be achieved in two ways - either the Western Basin Structure Plan is incorporated so that any development must comply with the structure plan, or rezoning to allow development to occur in accordance with the structure plan. It is possible (and indeed desirable) for minor deviations to occur following detailed site investigations. This may include deviations in road alignments or width of reserves.

There are a number of issues which need to be resolved before the Western Basin Structure Plan can be fully implemented on the ground:

1. Potential contamination on identified key sites
   Before development can take place on any of these sites, a detailed site contamination investigation must be undertaken to assess whether there is any contamination present and if so, what remediation steps are required. Identification of potentially contaminated sites is based on records and information held by RDC and historical knowledge of members of the community.

2. Constraints investigations
   There are a number of constraints other than contamination such as stormwater ponding and geotech which will need thorough investigation before development of sites can occur. These constraints may limit the development potential of sites.

3. Staging plans
   Staging plans will need to be developed to ensure that future residential areas are released in an appropriate manner.

4. Funding of wastewater reticulation system for Hamurana
   The Western Basin Structure Plan has been developed on the assumption that wastewater reticulation will be implemented for Hamurana. Without a reticulated system, no further development can occur as each site is currently required to treat and dispose of its own wastewater. A number of funding options are available to RDC ranging from Ministry of Health grants to specific developer contributions / levies.

5. Ability and timing to service future urban areas
   Before release of areas identified for Future Urban development or expansion, Council need to ensure these areas are able to be connected to the existing reticulated water supply, stormwater and wastewater infrastructure. The timing of release of this land will be based on the ability to service it.

6. Possible four-laning through Ngongotaha
   This has been identified by Transit as a possible solution to the increasing traffic levels through Ngongotaha. The road widening will have a significant impact on the village and Transit need to confirm the likelihood of these works taking place and the timing so that the village and community can be proactive in dealing with the possibility and for Council to determine how that might fit in with the implementation timeframes of this Structure Plan.

7. Comprehensive traffic impact assessment

It is recommended that a full multi-modal traffic impact assessment is undertaken for the preferred growth scenario. This should take into consideration transport impacts and mitigation measures within the internal growth nodes and also on the external network. Access to the existing road network should have preliminary designed intersections which should be justified in terms of efficiency and safety. Travel demand management, walking and cycling and public transport facilities should be incorporated and the impact assessed. Furthermore, the impacts of regional and inter-regional growth should be included in the analysis.

8. Future changes to SH36
   A better understanding is required on the future vision for the SH36 corridor from a sub-regional perspective e.g. what form will the SH36 corridor will take in the future - two lane, four lane, alternative route circumventing Ngongotaha, Ngongotaha pedestrian activity zone, where rationalisation of accesses is required, road hierarchy?

   In order to address the above recommendations it is suggested that there is close collaboration with Transit as SH36 is a critical roading component for growth in the Western Basin area. This will help ensure that transport objectives and solutions are closely aligned with Transit's thinking and hence will provide an opportunity to mitigate any conflicts or issues at an early stage in the process. The Ngongotaha community has indicated a strong preference for a by-pass to be constructed rather than four-laning.

   It is suggested that a meeting is held between RDC, Transit New Zealand and MWH as soon as is practically possible to discuss the above and how to take forward the transport component of the Rotorua Western Basin Structure Plan.

9. Subdivision provisions for rural living area
   Allowing development of dairy farms will facilitate the retirement of the farms and a transition to other uses with less nutrient inputs into Lake Rotorua. However, improving lake water quality is only one environmental gain and there are other aspects which need to be considered. It is recommended that a landscape assessment of this area is undertaken to determine development provisions such as lot size, location of dwellings, design, colour schemes etc to retain rural character.

10. Discussions with Ministry of Education
    Based on likely population projections, it is considered that existing schools should be able to accommodate the additional school aged pupils. However discussions with the Ministry of Education are needed to confirm this.

Appendix A Dairy Farms Identified by Environment Bay of Plenty

Appendix B Three Waters Infrastructure

Wastewater

The Rotorua District LTCCP states, "*The upgrade of the wastewater collection, treatment and disposal system will be undertaken under a programmed upgrade identified in the Wastewater Strategy to cater for growth and comply with resource consent conditions.*"

The current Rotorua Basin Wastewater Strategic Plan (WWSP) was prepared by Harrison Grierson Consultants Ltd in June 2006 and describes the infrastructure upgrading requirements to serve the projected 2051 population contained below the 340m contour of the basin. The population projections are those contained in the Rotorua Growth Model (RGM) prepared by Harrison Grierson Consultants Ltd in November 2005.

The WWSP describes how the Council intends to expand the network to capture areas in the Western Basin below the 340m contour not currently sewered, including Hamurana, Awahou and new catchments in Ngongataha. Treatment options include a Centralised Option using the existing Rotorua plant and a De-centralised Option with a new wastewater treatment plant located at Awahou.

The WWSP recommends the Centralised Option based on a detailed assessment of capital and operating costs, technical feasibility, flexibility and associated risks. However, the advantages of the Centralised Option are not overwhelming, and the WWSP recommends also that the Council continue to investigate the De-centralised Option including suitable locations for the treatment plant and land disposal components. While none of the Western Basin Strategy Study scenarios are likely to be constrained by either option, the De-centralised treatment option becomes more attractive under land use models that provide for a larger population in the Western Basin.

For a variety of reasons a decision on which treatment option to adopt cannot be left for much longer. Significant expenditure is about to be committed to upgrade existing infrastructure in response to growth in Ngongataha and to enable Hamurana to be connected in 2011. These upgrades are based on the Centralised Option. If flows were later "turned around" towards a new de-centralised treatment plant at Awahou, expenditure on these upgrades would prove to have been unnecessary. Indecision may result in the Centralised Option becoming the default option due to significant investments having been made to address short term needs.

The proposed catchment to be serviced under the WWSP includes most of the margin of the lake but in terms of land area is only a relatively small proportion of the total area of the growth cells considered by this Western Basin Strategy Study (refer to Figure 1) The proportion of the future population of the Western Basin serviced will depend on the land use model adopted. The basis for defining the catchment boundary at the 340m contour is not stated in the WWSP. It may be feasible to reticulate future development above the 340m contour in some areas of the Western Basin however this becomes increasingly expensive due to implications for the existing infrastructure. For the purposes of this study it is assumed that the 340m contour remains the practical limit for wastewater servicing. There appear to be no constraints on the use of on site wastewater disposal for land above the 340m contour provided that lot sizes are appropriate.

The financial forecasts in the LTCCP are consistent with the WWSP including capital expenditure on Hamurana Sewerage (2010 to 2011) and various projects to upgrade the treatment plant, land treatment system, pump stations and trunk mains for the Centralised treatment option.

Water Supply

There are three water reticulation networks in the Western Basin. The Western network includes Ngongataha which is supplied from the Central (city) network. The Hamurana and Kaharoa supplies share the same source (Rewarewa Spring) but have separate reticulation networks.

With the exception of Growth Cell A, the existing water reticulation networks cover all properties below the 340m contour. The properties covered by the water supply networks are the same as those within the proposed sewage catchment area described in the WWSP, although unlike the sewerage network, the water supply networks are already established.

The LTCCP states that the upgrade of sources and reticulation will be undertaken under a programme identified in the Water Strategic Plan. For the Rotorua Basin, the LTCCP states that capacity changes are likely to be solely due to growth rather than increasing levels of service.

Levels of service for domestic connections defined in the LTCCP include:

Central Urban (includes Ngongataha)	Minimum flow 30 L / minute Minimum pressure head 30m Fire fighting water supply provided
Hamurana	Minimum flow 20 L / minute Minimum pressure head 15m (no fire fighting water supply)

The Kaharoa network is a restricted rural supply with service levels of 450 L / Ha / day for dairy properties and 250 L / Ha / day for dry stock properties. Consumers need to provide their own storage and pumping systems if they wish to have minimum flows and pressures comparable with the urban supplies. The LTCCP does not provide for any upgrading of service levels for the duration of the plan.

There is no provision in the LTCCP to extend any of the networks.

The current Rotorua Basin Water Supply Strategy (WSS) was prepared by Harrison Grierson Consultants Ltd in August 2006. It concludes that the most appropriate network options for the Western Basin are the integration of the Western (Ngongataha) and Central (City) water supply networks, whilst retaining the independent operation of the Kaharoa and Hamurana networks. The WSS concludes that the existing supplies are sufficient for the 2051 population (below the 340m contour) in accordance with the RGM. However, the source takes will be at or near the maximum abstraction levels permitted by the consents. Further, the WSS indicates that consents to increase takes from current sources or to use other spring sources are unlikely to be obtained under current EBoP policies. Hence there are no low cost options for increasing source capacity should populations exceed RGM projections.

Options for additional raw water supply considered in the WSS include new bores which have a number of risks and uncertainties, or use of water from the lake, which would require an expensive three stage treatment process.

The financial forecasts in the LTCCP are consistent with the WSS. For the Western Basin supplies, capital expenditure over the next 10 years is limited to renewals only.

Appendix C Evaluation Matrix

+2	Significant increase / improvement
+1	Moderate increase / improvement
0	Same as status quo
-1	Moderate decrease / reduction
-2	Significant decrease / reduction

Scenarios	*1: Status Quo*	*2: Compact*		*3: Mixed*	*4: Dispersed*
		Ngongotaha	*Hamurana*		
Sustainable management of resources and / or Environmental Wellbeing					
efficient use and development of land	0	+2	+1	+1	-2
retention of rural character	0	0	-1	-1	-2
optimal use of productive rural land	0	0	0	-1	-2
groundwater quality maintained or improved	0	0	0	+1	+1
stream and lake water quality improved	0	+1	0	+1	+1
efficient use of energy resources e.g. low reliance on car travel	0	+2	-1	-1	-2
opportunities for development of renewable energy	0	0	0	0	-2
maintenance and enhancement of amenity values	0	+2	-1	-1	-2
protection of outstanding natural features / landscapes	0	0	0	0	-1
protection and enhancement of riparian areas, wetlands and trout habitat	0	+1	0	+1	+1
protection of intrinsic values of ecosystems	0	+1	0	+1	+1
protection of significant indigenous vegetation	0	0	0	+1	+1
biodiversity values	0	+1	0	+1	+1
reliance on individual on-site effluent treatment systems for wastewater	0	0	+1	-1	-2
efficient use of existing infrastructure i.e. roads, reticulated water supplies and wastewater, community facilities etc.	0	+1	0	-1	-2
		11	-1	1	-9
Social Wellbeing					
social connectedness	0	+2	+1	0	-1
opportunities for improved public access to lake and stream margins	0	+2	+1	0	0

employment opportunities	0	+2	0	-1	-1
Provision of and access to education opportunities	0	+1	0	0	-1
Diversity of housing options and lot sizes	0	+1	+1	+1	+1
Community character and identity	0	+2	0	0	-1
Access to communities / facilities / centres	0	+2	-1	0	-1
live / work / play opportunities	0	+2	0	0	-1
range of suitable transport options	0	+2	0	0	0
		16	2	0	-5
Cultural Wellbeing					
development options for Maori land	0	+1	0	+1	+2
relationship of Maori with ancestral lands, water, sites, waahi tapu and other taonga	0	+1	0	+2	+1
preservation of heritage values	0	0	0	0	-1
provision of public open spaces	0	+2	+1	0	-1
Preservation of culturally significant sites	0	0	0	+1	-1
		4	1	4	0
Economic Wellbeing					
New business opportunities	0	+2	0	0	-1
Accommodation of city population by 2021 / 2051	0	+1	0	+1	+1
Demand for Council services and infrastructure can be planned for and met	0	+1	-1	-1	-2
cost implications of consequential upgrades to roading infrastructure	0	-1	0	-1	-2
integrated provision of infrastructure	0	+1	0	0	-1
creating a dynamic business hub	0	+2	0	0	-1
		7	-1	0	-4
Health and Safety					
natural hazard mitigation including effects of climate change	0	0	0	0	0
opportunities for application of urban design and CPTED principles to enhance personal safety and security	0	+2	0	0	-1
safety of public spaces	0	+1	0	0	0
appropriate use and development of contaminated sites	0	+2	0	0	0
safe transport routes (vehicle, pedestrian, cycle etc)	0	+2	0	0 / -1	-1
			0	-1	-2
TOTAL	0	38	1	5	-18