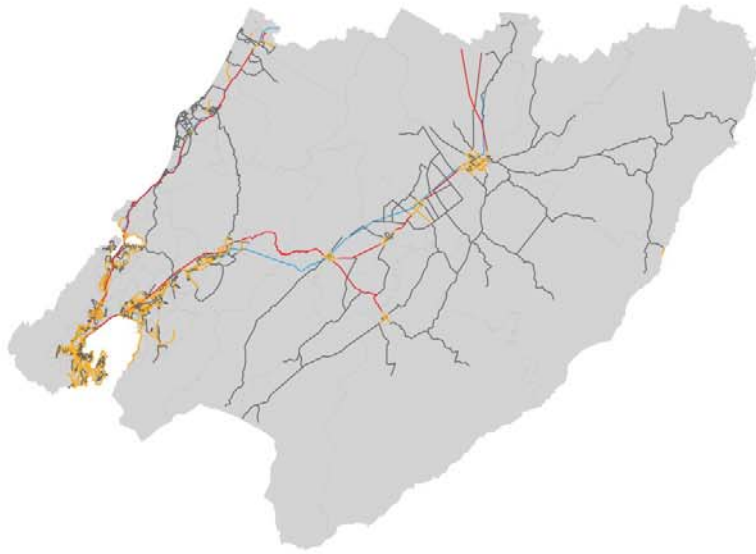


OPUS INTERNATIONAL CONSULTANTS AND ARUP

WELLINGTON TRANSPORT MODELS

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TN 29 : Demographic Inputs to WTSM

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ARUP



Wellington Transport Models

TN29 : Demographic Inputs to WTSM

prepared for

Greater Wellington Regional Council

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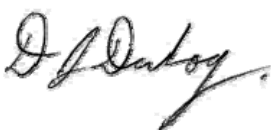


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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Introduction

A key input to the development of the WTSM model is land use data which is used in the development of trip matrices. Travel demand within the Wellington Strategic Transport Model (WTSM) is determined by several factors, with the most critical being the demographic makeup of the region. This includes the number, age distribution, labour force status and location of residents, along with employment location. These forecasts are critical as population has a causal relationship with travel demand. This information is required in the form of the number of employees, residents, households and students located in each WTSM zone.

As part of the development of the previous 2006 WTSM model, land use projections were developed for low, medium and high growth scenarios for both future horizon years. For the new 2011 model updated projections are needed for both the base year (2011) and horizon years (2021, 2031, and 2041). The 2011 update builds upon the work completed in 2006.

For the horizon years matrices representing a range of different potential land use scenarios are needed. The generic future forecast scenarios are low, medium and high growth. In addition to the basic growth scenarios, three expansion scenarios were developed to capture travel demands which could result if land use patterns in the future changed. This report documents the development of these land use inputs.

The development of the land use inputs can be divided into four broad steps.

- 2006 base development;
- 2011 base development;
- Rebasing the future year forecasts: low, medium and high growth; and
- Expansion scenario development.

Each of these steps are discussed in the following sections. The development of the land use inputs has been an iterative process and the forecasts have evolved throughout the model development.

2 2006 Base Development

The focus of this report is on the development of the land use scenarios for use in the updated 2011 WTSM model. However, the 2011 land use scenarios are based on the work undertaken previously to develop the land use scenarios for the 2006 model. Therefore this section on the 2006 base development is provided for completeness and to enable the reader to fully understand the inputs to the development of the land use scenarios for the 2011 model update.

James Newell of Monitoring and Evaluation Research Associates (MERA) completed the 2006 analysis. The full report¹ on the development of the 2006 base run is included in Appendix A and he states:

The population projections have been implemented by Monitoring and Evaluation Research Associates (MERA) in a region wide area unit level development model using the demographic assumptions from the December 2007 Statistics New Zealand local authority projection, 2006 census results and consultation with local authority officials. The demographic / development model is matched as closely as possible at area unit level with those assumptions. However, the fitting process means that summed over any individual local authority and inter-censal period the small area resulting projection can vary by around 100 from the target net migration rate.

Population change has three components:

- *Residents of the area move away (migration out) and people move in from other areas (migration in), giving the change due to migration (net migration). Net migration itself has two components: internal migration, being movement of people between locations within New Zealand, and external migration, people travelling to or from overseas.*
- *Residents of the area die (characterised by the mortality rate).*
- *Residents of the area give birth, thereby creating new residents (characterised by the fertility rate).*

Net migration is the most critical of these three components, and it is the one with the greatest degree of uncertainty attached. It is also the one area over which the actions of the Territorial Authorities in the Greater Wellington region can have a positive or negative influence.

When discussing the population projection starting point, James Newell goes on to make the following statements.

There are three different means of determining the initial population of the region from which the population projections are made. WTSM uses the Census enumerated usually resident population, which counts the people who usually live in

¹ WTSM Demographic Projections Report 2006 Base Run for GWRC and SKM, prepared by James Newell of MERA, 2008.

the Wellington region, were present in New Zealand on Census night and were enumerated in the census. It also includes Wellington region residents who were temporarily away from their homes but still in New Zealand on Census night. The selection of the census enumerated usually resident population² rather than an adjusted estimated actual population is influenced by the fact that the modelling process involves the synthesis of a wide range of statistical inputs arising from the population census drawn from a range of census periods. Adjustment to determine the estimated actual population relating to all of the inputs is much harder than that involved in adjusting aggregate population estimates based on one census. The forecasting process is oriented to looking at the increments of change in population, employment, households etc. rather than absolute figures. The difference between estimated actual and census enumerated populations is known as the net census undercount. Estimation of the net undercount for any one census has a high level of uncertainty and is an evolving science. Differences between the undercount estimates for successive census are much smaller than the actual undercount rate for any one census. This is the error factor that is associated with comparing census counts for different census. Of more impact on the modelling estimates are the variation (in many cases increasing) rates of unspecified or uncoded values for some census questions. The large and increasing proportion of workplace trips not coded to an area unit is a good example.

The census enumerated count does not include residents temporarily away overseas on Census night or residents "missed" by the Census (estimated at 1.3 percent for the Lower North Island³). With regard to residents not included in the Census, it is considered appropriate not to include them in the projections due to the need for information collected by the Census to allow them to be categorised into household types, employment status, etc.

The base estimates presented here can be adjusted upward at a later date to correspond with Statistics NZ assumptions about the difference between the census enumerated count and the estimated actual count using the results released as part of the Statistics NZ 2007 projection round. Statistics NZ does more than just adjust for the differences between enumerated and estimated actual populations. It also rebases the estimates from the beginning of March to the 30th June of the census year.

Given the basis from which all demographic projections for WTSM are made, it is important to remember that the usually resident population in the region may be underestimated by 1.3 percent as at 2006, which equates to an additional 5,800 residents.

² Note that the effects of suppression and rounding of 2006 base population estimates during conversion from 2006 area unit to a 1996 area unit base results in slightly different estimates for the resident population as determined for the usual resident population (448,930) and the employment by residence population (451,200), a difference of about 0.5%. For convenience, the employment by residence population estimates were used in the WTSM model.

³ A Report on the 2006b Post-enumeration Survey, Statistics New Zealand.

There is a small variation between the totals for population and employees in the Stats NZ data compared to what is used in WTSM. There are a number of factors which contribute to these differences. The usual resident population estimates are used as the basis of the population in WTSM, while employment based on residence location is used as part of the employee numbers in WTSM. There are some differences in how these data sets are defined which means when doing cross checks between the different data sets it doesn't always add up perfectly. This is discussed further in a memo produced by James Newell and included in Appendix A. The differences between the Stats NZ figures⁴ and those used in WTSM are small and will not have an impact on the final outputs from the WTSM model.

⁴ Local Authority Population Projects released by Stats NZ Decmeber 2007.

3 2011 Base

3.1 2011 Base Development

The initial plan was to update the 2006 base to a 2011 base using 2011 census data for the eight districts of the Wellington region as shown in Figure 3-1.

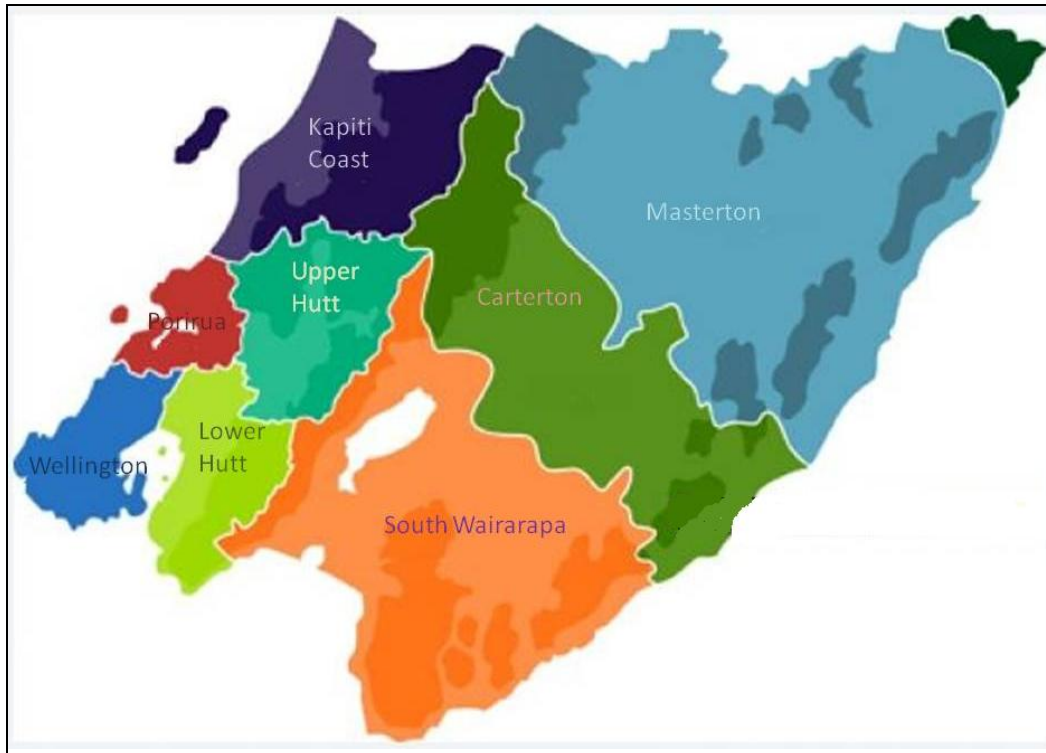


Figure 3-1: Map showing the Greater Wellington Region

However, due to the Canterbury earthquakes of 2010 and 2011 the census planned for March 2011 was cancelled and has been re-scheduled to 2013. Despite the lack of census data to update the model to 2011 the 2006 WTSM was considered somewhat out of date and needing updating. Therefore, Russell Jones of Prism Consulting was engaged to develop a new 2011 base. Russell Jones' work is documented in Appendix B.

A number of checks were completed on the new 2011 base including comparisons to the 2006 base and comparisons between the 2011 base for WTSM and the Stats NZ 2011 estimates. These are discussed below in Section 3.2.

3.2 Checks on the 2011 Base

Table 3-1, produced by Russell Jones compares the percent change between the 2006 and 2011 population values based on both the Stats NZ medium growth projections and the figures used in WTSM. This shows that while there is some variation in the absolute values used in WTSM compared to Stats NZ, the percent change between 2006 and 2011 for both data sets is relatively consistent. The 2006 WTSM inputs is from the 2006 model, while the

2011 WTSM input values are the new values produced by Russell Jones for use in the new version of WTSM.

Table 3-1: Comparison of 2006 and 2011 WSTM and Stats NZ Medium Population

Territorial Authority	Source	2006	2011	% Change 2006 to 2011
Wellington City	WTSM Inputs	179,094	191,236	6.78%
	Stats NZ	187,700	200,500	6.82%
Porirua City	WTSM Inputs	49,513	51,443	3.90%
	Stats NZ	50,600	52,700	4.15%
Kapiti Coast District	WTSM Inputs	46,260	49,085	6.11%
	Stats NZ	47,500	50,600	6.53%
Upper Hutt City	WTSM Inputs	38,573	40,379	4.68%
	Stats NZ	39,700	41,500	4.53%
Hutt City	WTSM Inputs	97,911	99,678	1.80%
	Stats NZ	101,300	103,500	2.17%
South Wairarapa District	WTSM Inputs	8,603	8,873	3.13%
	Stats NZ	9,100	9,400	3.30%
Carterton District	WTSM Inputs	6,898	6,969	1.03%
	Stats NZ	7,300	7,500	2.74%
Masterton District	WTSM Inputs	23,168	23,588	1.81%
	Stats NZ	23,200	23,400	0.86%
Total	WTSM Inputs	450,020	471,251	4.72%
	Stats NZ	466,400	489,100	4.87%

Opus completed a number of checks on the land use forecasts provided by Russell Jones. X-Y Scatter Plots of the population, household and employment data were created in order to compare the previous 2006 WTSM base data with the 2011 data. Two datasets were plotted on each graph:

- 2006 WTSM base data versus the 2011 medium forecast used in the previous (2006) WTSM model, and
- 2006 WTSM base data versus the new 2011 base estimate provided by Prism Consulting.

By plotting these two data sets on the same chart it is possible to identify any outliers and ensure the new estimates are reasonable. Figure 3- shows the scatter plot for the total population. The blue data set represents the new 2011 estimate from Prism Consulting while the red data set is based on the 2011 medium forecast from the previous (2006) WTSM model. There are a number of outliers, highlighted in blue boxes in Figure 3-, where the updated 2011 population figure is noticeably higher than the comparative data. These outliers and the location of them are summarised in Table 3-2, below.

This result has been accepted as reasonable as each of these zones are located in areas which correlate to the intended growth and intensification aspirations of the regional planning documents. The Wellington City suburbs are situated along the Johnsonville to Airport Growth Spine and the Northern Growth Management Area.

Porirua City Council has a number of development strategies such as the Porirua City Centre Revitalisation Plan, and several Porirua Development Frameworks for North of Cambourne, Pauatahanui/Judgeford, Takapuwhia and Elsdon and Kenepuru Surplus Hospital Lands. There are also a number of Village Plans being facilitated by Porirua City Council for areas such as Cannons Creek, Pauatahanui, Whitby and Waitangirua.

Since 2006, Waikanae has had a number of private plan changes adopted into the Kapiti Coast District Plan for the future development of land to the north of the urban edge of Waikanae. These are plan changes such as Waikanae North, Waikanae Northern Urban Edge, and Ngarara Farms.

Table 3-2: Outliers in the Total Population Data

Higher than Expected	
WTSM Zone Number	Location
10	Hataitai
80	Newlands
82	Churton Park
91	Tawa
104	Aotea and Papakowhai, Porirua
105	Paremata, Porirua
107	Whitby, Porirua
125	Waikanae
149	Upper Hutt

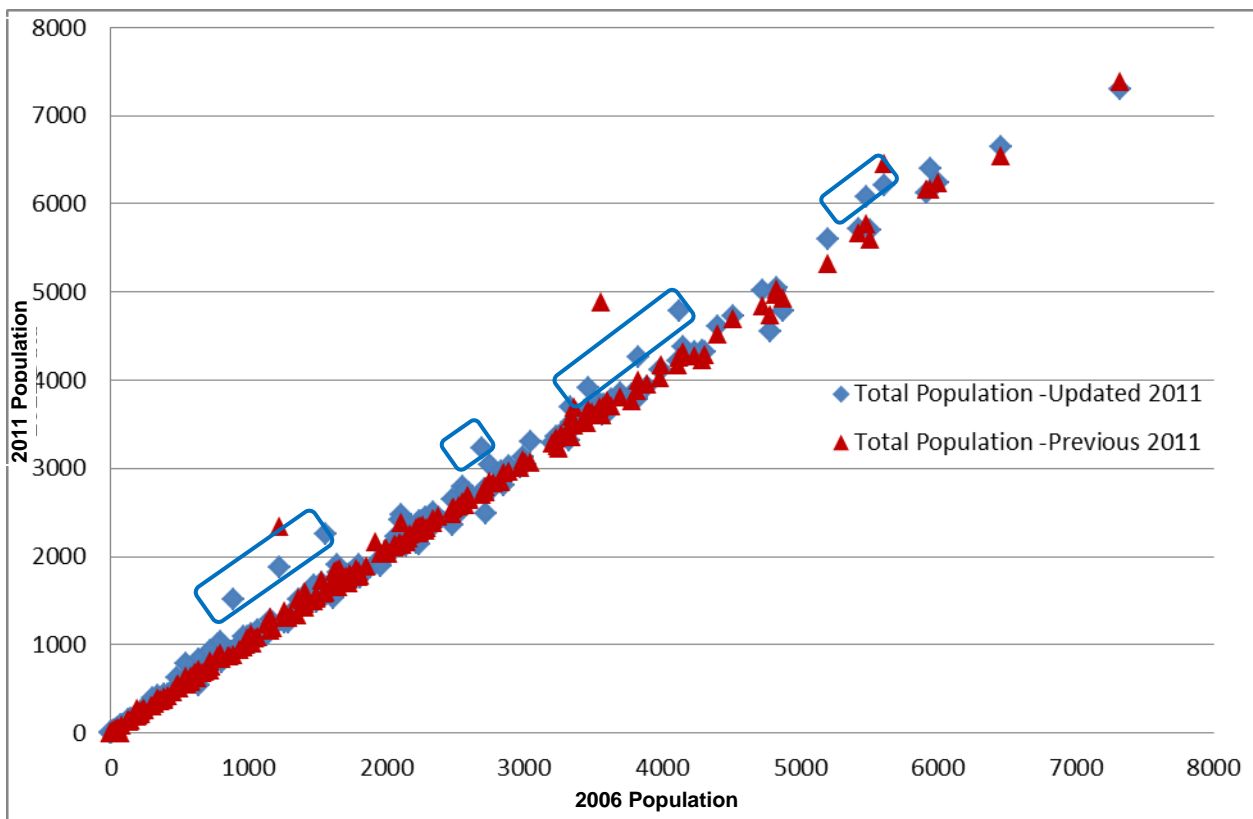


Figure 3-2: Total Population by WTSM Zone

Figure 3- shows a similar scatter plot for the total employment. The blue data set represents the new 2011 estimates while the red data set represents the forecasts from the previous (2006) WTSM model. There are a number of outliers where the updated 2011 employment figure is higher or lower than typical relative to the 2006 data and again these are highlighted in the blue boxes and summarised in Table 3-3 below. In general these results are considered reasonable as planning documents⁵ identify Wellington as a recognised area of employment growth.

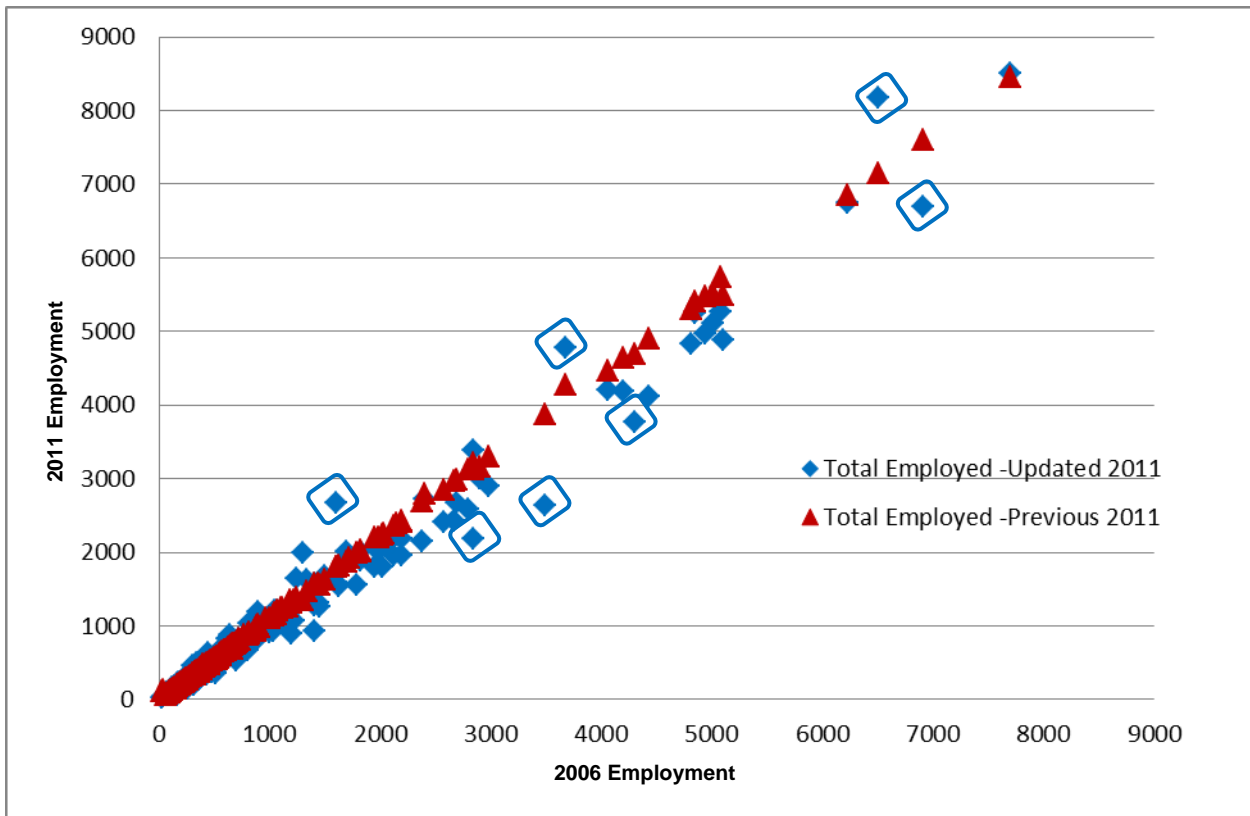


Figure 3-3: Total Employment by WTSM Zone

Table 3-3: Outliers in the Total Employment Data

Higher than Expected		Lower than Expected	
WTSM Zone Number	Location	WTSM Zone Number	Location
13	Adelaide Rd/ Wellington Hospital, Wellington	50	Taranaki to Cuba St, Wellington
55	Victoria Uni, Wellington	53	Cuba to Willis St, Wellington
59	Willeston to Brandon St, Wellington	57	Boulcott St, Wellington
		195	Petone

⁵ The planning documents considered include: Wellington City Council District Plan, Wellington Regional Strategy (June 2007), and the Draft Wellington Regional Policy Statement (2009).

Figure 3- below shows the scatter plot for the total households. The blue data set represents the new 2011 estimates while the red data set is from the 2011 forecasts used with the previous (2006) model. Analysis of Prism Consulting's work has shown that they have calculated the updated 2011 number of households based directly on the population forecasts i.e. if the population was forecast to increase by 2 percent in a zone the total number of households were also forecast to increase by 2 percent. This assumes the number of people per household has remained constant between 2006 and 2011. The assumption of no change to household size between 2006 and 2011 is discussed further in the report produced by Prism Consulting⁶.

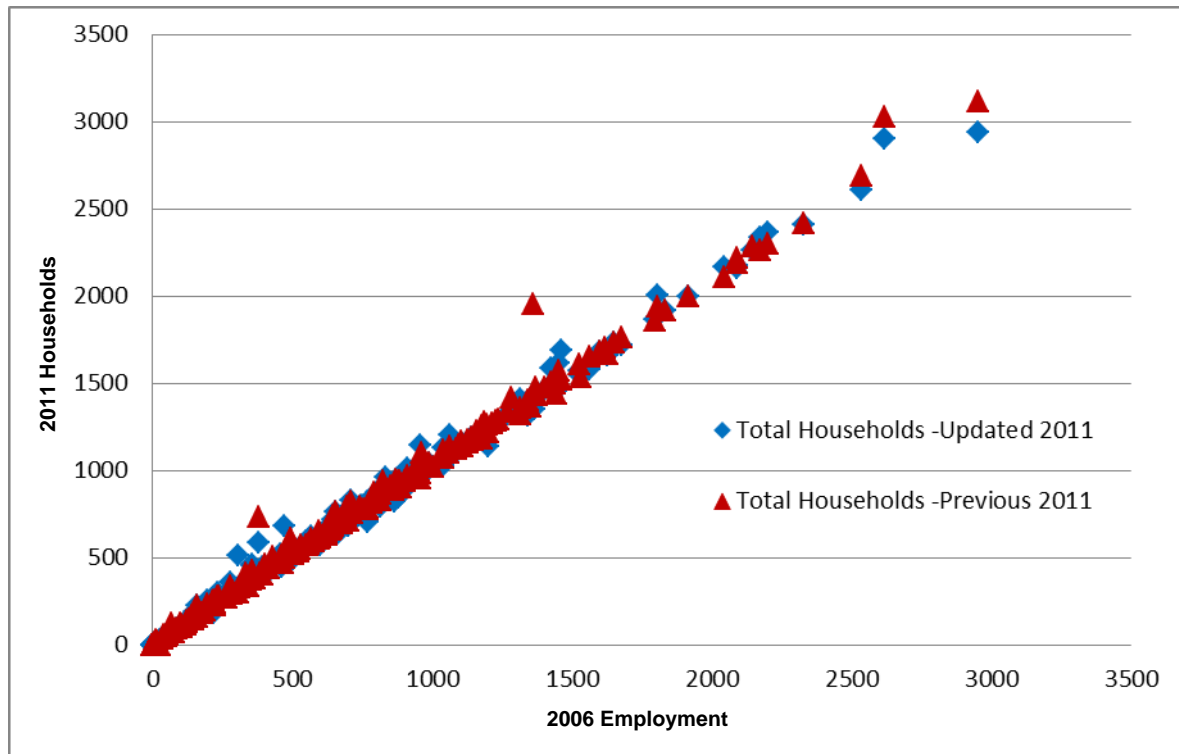


Figure 3-4: Total Households by WTSM Zone

Andy Ford of GWRC also completed some analysis and checks of the new 2011 base data. His work is documented in Appendix B. It is also important to note that this work is based on the Stats NZ population figures for 2011 which were available at the time the work was being completed. Since its completion Stats NZ have released new figures, but this work does not take them into account. Table 3-4 compares the Stats NZ population figures which were the basis of Russell Jones' work to the 2011 base he developed for WTSM along with the latest 2011 population estimates from Stats NZ. This table shows that the 2011 WTSM base estimates were 2% lower, for the Wellington region, than the Stats NZ data available during its development. Furthermore, the 2011 WTSM base estimates for the Wellington region are 4% lower than the latest Stats NZ population data.

⁶ Notes on 2011 Land Use Inputs for WTSM, produced by Russell Jones of Prism Consulting, August 2011.

Table 3-4: Comparison of Stats NZ and WTSM Population Data for 2011

Territorial Authority	(a) 2011 WTSM Base Estimates	(b) Stats NZ data available when developing new 2011 WTSM Base	b / a	(c) Latest Stats NZ 2011 Population Data	c / a
Wellington City	191,200	197,400	1.03	200,100	1.05
Porirua City	51,400	51,700	1.01	52,700	1.03
Hutt City	99,700	102,800	1.03	103,000	1.03
Upper Hutt City	40,200	40,400	1.00	41,500	1.03
Kapiti Coast District	49,100	50,500	1.03	49,800	1.01
Masterton District	23,600	23,300	0.99	23,500	1.00
Carterton District	7,000	7,400	1.06	7,600	1.09
South Wairarapa District	8,900	9,300	1.04	9,400	1.06
Total	471,100	482,800	1.02	487,700	1.04

The above checks focused on the total number of people, households and employees in each zone. However, these totals are actually broken down for use in WTSM. The population totals are broken down by age and employment status, the households by number of adults and employment status, and employment is also broken down by industry.

While the above checks found the totals for population, households and employment to be reasonable, as the project progressed it was found that within the population, the number of employed people was too high. Therefore the number of employed people was reduced by 5 percent. The reduction was done to maintain consistency between the number of jobs (as summarised in employment figures) and the number of people (as summarised in population figures). This 5 percent of people were reallocated to the non-employed categories so the total number of people within each zone was the same before and after this adjustment.

In other words, for every WTSM zone the number of people in the following categories was reduced by 5 percent:

- Young adult full-time employed,
- Young adult part-time employed,
- Adult full-time employed,
- Adult part-time employed,
- Older adult full-time employed, and
- Older adult part-time employed.

To take into account the reduction in the number of employed people, the number of people in the following categories was increased so that the total population within each age group and zone is the same:

- Young adult other,
- Adult other, and
- Older adult other.

3.3 2011 Base Data Summary

Table 3-5, Table 3-6 and Table 3-7 compare the 2011 WTSM base estimates of population, employment and households (provided by Prism Consulting) to the 2011 WTSM future low, medium and high forecasts from the 2006 WTSM model. Generally, the new 2011 estimate of population is between the previous medium and high growth forecasts.

The new 2011 employment estimate is less than the old low growth employment forecast. When the future forecasts of 2011 employment were completed in 2006 a constant rate of unemployment for all years was assumed. However, the unemployment since 2006 has in reality risen from around 4 percent to 7 percent. Therefore a decrease in the number of people employed in 2011 is accounted for by the increase in unemployment.

The new 2011 household forecast is between the low and medium growth forecasts.

Table 3-5: 2011 Population

	2011 WTSM Base	2006 WTSM					
		Low (2011)		Medium (2011)		High (2011)	
Wellington City	191,236	(-4%)	184,388	(-2%)	188,361	(1%)	192,441
Porirua City	51,443	(-4%)	49,582	(-1%)	50,837	(1%)	52,182
Lower Hutt City	99,678	(-2%)	97,812	(0%)	99,752	(2%)	101,626
Upper Hutt City	40,188	(-4%)	38,608	(-2%)	39,447	(0%)	40,370
Kapiti Coast District	49,085	(-2%)	48,148	(1%)	49,336	(3%)	50,536
Masterton District	23,588	(-2%)	23,110	(0%)	23,519	(1%)	23,841
Carterton District	6,969	(-1%)	6,881	(1%)	7,046	(2%)	7,141
S Wairarapa District	8,873	(-3%)	8,617	(-1%)	8,788	(1%)	8,959
Total	471,060	(-3%)	457,146	(-1%)	467,086	(1%)	477,096

Table 3-6: 2011 Employees

	2011 WTSM Base	2006 WTSM					
		Low (2011)		Medium (2011)		High (2011)	
Wellington City	133,976	(5%)	140,333	(6%)	142,613	(9%)	145,911
Porirua City	17,049	(5%)	17,931	(7%)	18,241	(10%)	18,689
Lower Hutt City	44,135	(9%)	47,952	(10%)	48,721	(13%)	49,828
Upper Hutt City	11,923	(11%)	13,243	(13%)	13,464	(16%)	13,783
Kapiti Coast District	15,206	(4%)	15,887	(6%)	16,147	(9%)	16,523
Masterton District	11,036	(9%)	12,050	(11%)	12,233	(13%)	12,497
Carterton District	3,518	(-1%)	3,474	(0%)	3,518	(2%)	3,581
S Wairarapa District	3,654	(13%)	4,130	(15%)	4,184	(17%)	4,261
Total	240,498	(6%)	255,001	(8%)	259,120	(10%)	265,072

Table 3-7: 2011 Households

	2011 WTSM Base	2006 WTSM					
		Low (2011)		Medium (2011)		High (2011)	
Wellington City	71,944	(-2%)	70,636	(0%)	72,074	(2%)	73,549
Porirua City	16,268	(-2%)	15,968	(1%)	16,368	(4%)	16,840
Lower Hutt City	35,936	(0%)	35,976	(2%)	36,667	(4%)	37,321
Upper Hutt City	14,673	(0%)	14,708	(2%)	15,031	(5%)	15,397
Kapiti Coast District	20,283	(0%)	20,255	(2%)	20,760	(5%)	21,243
Masterton District	9,230	(2%)	9,418	(4%)	9,574	(5%)	9,707
Carterton District	2,720	(3%)	2,797	(6%)	2,880	(7%)	2,918
S Wairarapa District	3,612	(4%)	3,772	(6%)	3,833	(8%)	3,916
Total	174,665	(-1%)	173,530	(1%)	177,187	(4%)	180,891

Appendix C contains the 2006 WTSM and 2011 WTSM forecasts.

4 Rebasing the Future Forecasts for Low, Medium and High Growth

In conjunction with the update of the base to 2011 the future year forecasts have been updated. This includes the low, medium and high growth scenarios for 2021, 2031 and 2041. The new forecasts were developed by using the new 2011 base and scaling the previous future year forecast. Further information on the methodology used is included in Appendix D. The new low, medium and high growth forecasts are summarised in Table 4-1, Table 4-2 and Table 4-3, respectively. The percentage change between 2011 and the horizon years is also shown in the tables. For comparison, the 2006 WTSM forecasts are contained in Appendix C. Appendix C also contains the household occupancy rates and the number of employees per 1000 population.

Table 4-1: Rebased Low Growth Forecasts

	Population				Employees			
	2011 (Base)	2021	2031	2041	2011 (Base)	2021	2031	2041
Wellington City	191,236	200,614 (5%)	208,483 (9%)	211,750 (11%)	133,976	137,146 (2%)	135,663 (1%)	137,789 (3%)
Porirua City	51,443	49,720 (-3%)	47,342 (-8%)	42,777 (-17%)	17,049	17,528 (3%)	17,569 (3%)	15,964 (-6%)
Lower Hutt City	99,678	97,019 (-3%)	92,885 (-7%)	85,153 (-15%)	44,135	44,631 (1%)	44,167 (0%)	40,490 (-8%)
Upper Hutt City	40,188	39,033 (-3%)	37,214 (-7%)	33,379 (-17%)	11,923	12,167 (2%)	12,182 (2%)	10,927 (-8%)
Kapiti Coast District	49,085	51,745 (5%)	54,293 (11%)	55,383 (13%)	15,206	15,522 (2%)	15,456 (2%)	15,767 (4%)
Masterton District	23,588	22,956 (-3%)	21,709 (-8%)	18,942 (-20%)	11,036	11,156 (1%)	10,888 (-1%)	9,500 (-14%)
Carterton District	6,969	6,878 (- 1%)	6,588 (-5%)	5,830 (-16%)	3,518	3,475 (-1%)	3,297 (-6%)	2,918 (-17%)
S Wairarapa District	8,873	8,652 (- 2%)	83,90 (-5%)	7,250 (-18%)	3,654	3,645 (0%)	3,493 (-4%)	3,018 (-17%)
Total	471,060	476,616 (1%)	476,904 (1%)	460,463 (-2%)	240,498	245,270 (2%)	242,716 (1%)	236,373 (-2%)

Table 4-2: Rebased Medium Growth Forecasts

	Population				Employees			
	2011 (Base)	2021	2031	2041	2011 (Base)	2021	2031	2041
Wellington City	191,236	208,662 (9%)	224,890 (18%)	237,800 (24%)	133,976	143,304 (7%)	150,416 (12%)	159,051 (19%)
Porirua City	51,443	52,330 (2%)	52,910 (3%)	51,815 (1%)	17,049	18,333 (8%)	19,330 (13%)	18,997 (11%)
Lower Hutt City	99,678	100,929 (1%)	100,934 (1%)	98,314 (-1%)	44,135	46,918 (6%)	49,057 (11%)	47,784 (8%)
Upper Hutt City	40,188	40,650 (1%)	40,489 (1%)	38,985 (-3%)	11,923	12,749 (7%)	13,392 (12%)	12,895 (8%)
Kapiti Coast District	49,085	54,022 (10%)	58,854 (20%)	62,732 (28%)	15,206	16,242 (7%)	17,047 (12%)	18,170 (19%)
Masterton District	23,588	23,621 (0%)	23,150 (-2%)	21,496 (-9%)	11,036	11,704 (6%)	12,205 (11%)	11,333 (3%)
Carterton District	6,969	7,058 (1%)	7,004 (1%)	6,711 (-4%)	3,518	3,663 (4%)	3,766 (7%)	3,608 (3%)
S Wairarapa District	8,873	8,913 (0%)	8,711 (-2%)	8,118 (-9%)	3,654	3,828 (5%)	3,953 (8%)	3,684 (1%)
Total	471,060	496,185 (5%)	516,943 (10%)	525,972 (12%)	240,498	256,741 (7%)	269,166 (12%)	275,522 (15%)

Table 4-3: Rebased High Growth Forecasts

	Population				Employees			
	2011 (Base)	2021	2031	2041	2011 (Base)	2021	2031	2041
Wellington City	191,236	216,323 (13%)	240,748 (26%)	261,476 (37%)	133,976	147,994 (10%)	160,590 (20%)	174,417 (30%)
Porirua City	51,443	54,882 (7%)	58,179 (13%)	60,181 (17%)	17,049	18,973 (11%)	20,709 (21%)	21,467 (26%)
Lower Hutt City	99,678	104,843 (5%)	108,919 (9%)	110,441 (11%)	44,135	48,473 (10%)	52,430 (19%)	53,163 (20%)
Upper Hutt City	40,188	42,300 (5%)	43,911 (9%)	44,301 (10%)	11,923	13,181 (11%)	14,323 (20%)	14,451 (21%)
Kapiti Coast District	49,085	56,061 (14%)	63,055 (28%)	68,718 (40%)	15,206	16,783 (10%)	18,213 (20%)	19,849 (31%)
Masterton District	23,588	24,419 (4%)	24,753 (5%)	23,843 (1%)	11,036	12,075 (9%)	13,016 (18%)	12,538 (14%)
Carterton District	6,969	7,337 (5%)	7,605 (9%)	7,651 (10%)	3,518	3,765 (7%)	3,991 (13%)	4,015 (14%)
S Wairarapa District	8,873	9,204 (4%)	9,338 (5%)	9,103 (3%)	3,654	3,937 (8%)	4,193 (15%)	4,088 (12%)
Total	471,060	515,369 (9%)	556,507 (18%)	585,714 (24%)	240,498	265,181 (10%)	287,466 (20%)	303,987 (26%)

A graphical representation by territorial authority, showing how the population, employment and number of households changes over time for each of the growth scenarios have also been created. Figure 4-1, Figure 4-2 and Figure 4-3 show the medium growth projections for population, employment and households, respectively. Appendix C contains more graphs showing the low, medium and high forecasts for the 2006 WTSM model, 2011 WTSM model and the Wellington Regional Strategy (WRS) projections⁷. For completeness the graphs in Figure 4-1 and Figure 4-2 are repeated in Appendix C.

⁷ WRS Projections are from the Wellington Study Area Demographic Trends, Indicative Population and Household Type Projection Scenarios 1981 to 2051 for the Wellington Strategy, prepared by James Newell of Mera Ltd, December 2004.

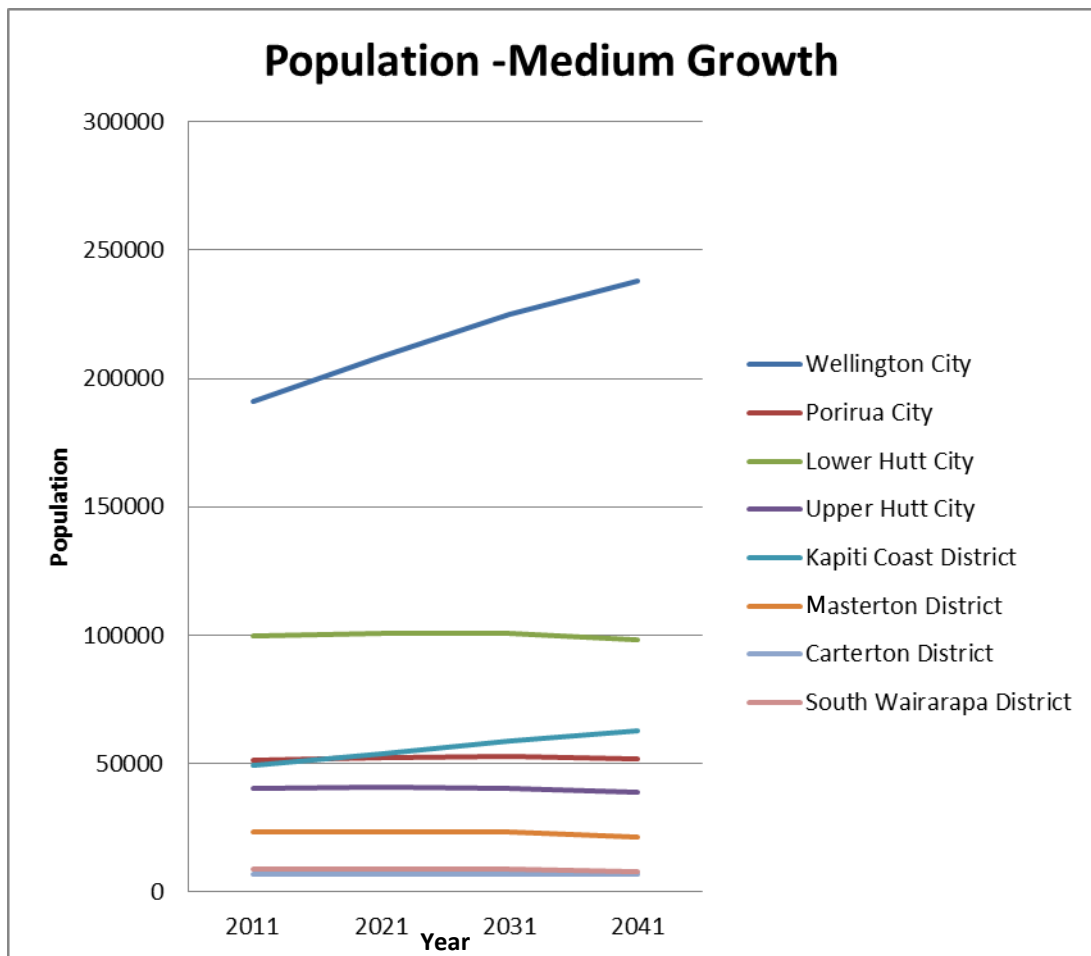


Figure 4-1: Rebased Medium Growth Population Forecasts

In the medium growth scenario, there is a significant increase in the population of Wellington and some growth in Kapiti. The projections for the remaining territorial authorities are generally flat with some reduction between 2031 and 2041.

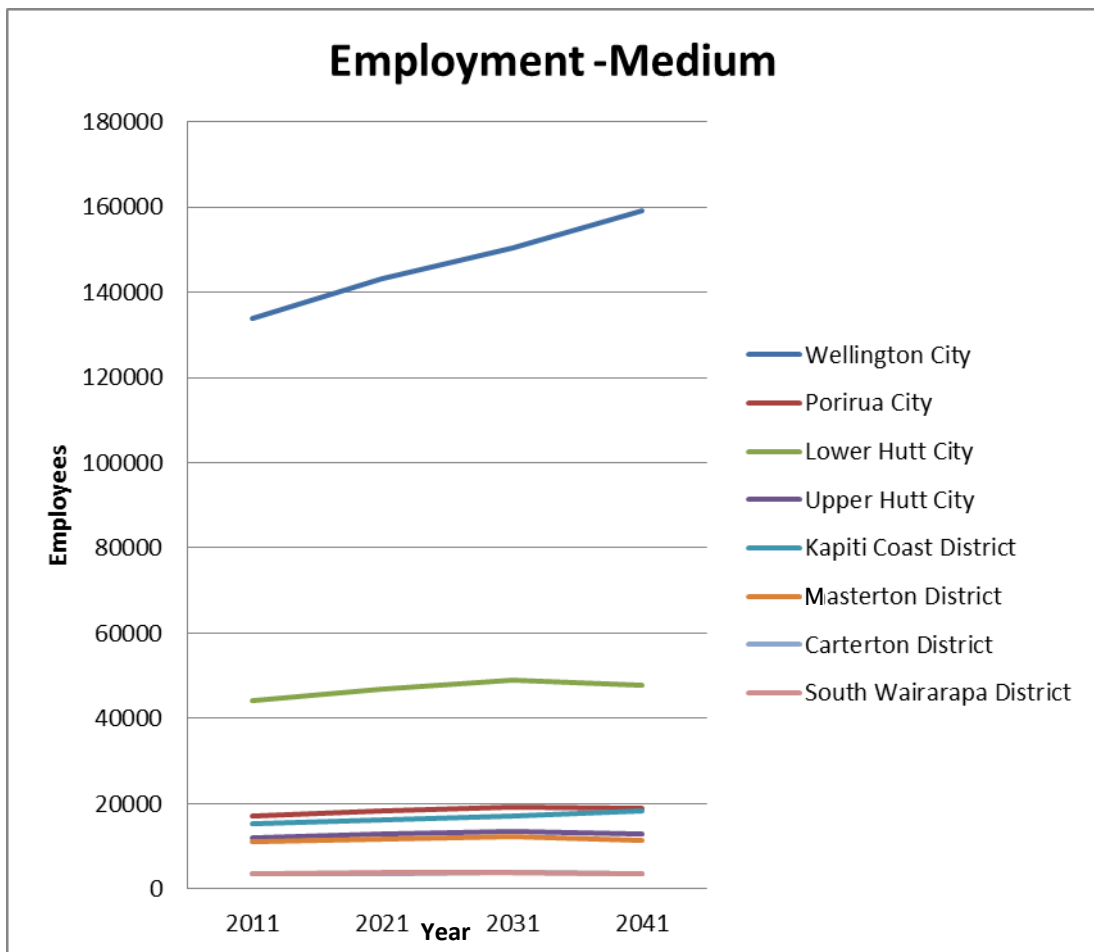


Figure 4-2: Rebased Medium Growth Employment Projection

Between 2011 and 2041 in the medium growth scenario the number of employees is forecast to increase by 15%. Significant growth is expected in Wellington City with it forecast to grow by 30% between 2011 and 2041. In most of the other territorial authorities growth is forecast between 2011 and 2031 and then between 2031 and 2041 there is a reduction in the number of employees.

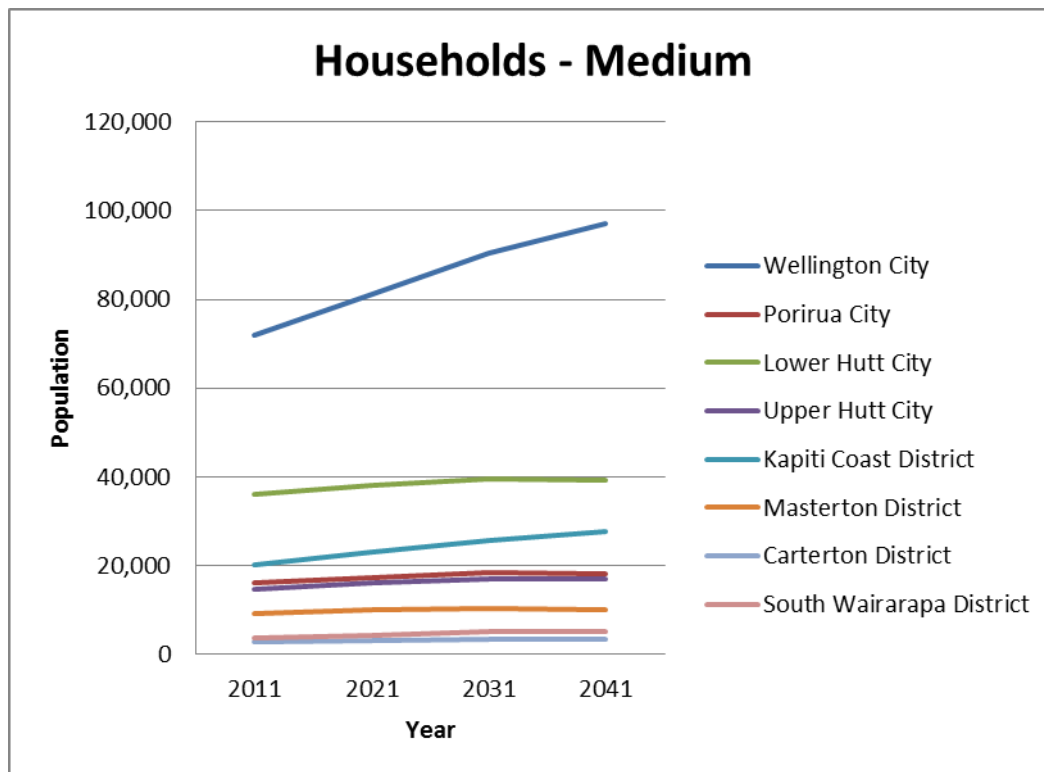


Figure 4-3: Rebased Medium Growth Household Forecasts

Significant growth in the number of households in Wellington City is expected to occur between 2011 and 2041. In most of the other territorial authorities growth is forecast between 2011 and 2031 and then between 2031 and 2041 there is less growth or a reduction in the number of households.

5 Expansion Scenarios

Three expansion scenarios have been developed. The purpose of these expansion scenarios is to enable the development of trip matrices for use with WTSM which capture the travel demands which could result if land use patterns in the future change. The scenarios have been developed in collaboration with GW officers, NZTA officers and private consultants (Opus and BECA). These expansion scenarios are based on the eight districts of the Wellington Region.

The work detailed below discusses the process to develop expansion land-use scenarios in the region that may or may not develop in to the future but has been developed to allow for sensitivity testing of options that would take into account the possibility of certain areas growing faster than others thus affecting travel demand in different ways.

The scenarios developed could be used for specific project option testing such as projects for NZTA and their Roads of National Significance and the Wellington PT Spine Project, but also for GWRC and their on-going monitoring of the network performance and options.

5.1 Expansion Scenario Development Process

The expansion land use scenario development process starts with the 2011, 2021, 2031 and 2041 forecasts for low, medium and high growth.

The expansion land use scenarios were formed by putting all WTSM zones within an identified growth area at the high growth forecast while keeping all other zones at the medium growth level. Therefore the totals for the region for population, employment, households and education do not correspond to the high growth or medium growth scenario. Rather the totals are somewhere between the medium and high growth scenario depending upon the specific land use scenario.

Three expansion land use scenarios have been developed. These scenarios are:

- Scenario One: Wellington City Expansion;
- Scenario Two: Western Expansion; and
- Scenario Three: Eastern Expansion.

Table 5-1 summarises the analysis undertaken for each growth scenario.

Table 5-1: Possible Scenarios

	From WTSM 2006 and 2011	Scenario One: Wgtn Expansion	Scenario Two: Western Expansion	Scenario Three: Eastern Expansion
High	Yes	No	No	No
Medium - High	No	Yes	Yes	Yes
Medium	Yes	No	No	No
Low	Yes	No	No	No

The total population, employment and households projected for the Wellington Region for medium and high growth, and each expansion scenario are summarised in Table 5-2, Table 5-3 and Table 5-4. The totals for each of the three scenarios are slightly different. Therefore caution must be used when comparing the results of tests using the expansion scenarios since the totals for the region are not consistent.

When discussing the spatially different scenarios with stakeholders rounded average totals for the region for the three spatially different scenarios were presented to ensure the decision makers were focused on the concept not just the highest totals.

Table 5-2: Wellington Region Total Population Comparison

	2021	2031	2041
Medium Growth (2011 WTSM)	496,000	517,000	526,000
High Growth (2011 WTSM)	515,000	557,000	586,000
Scenario 1: Wgtn Expansion	504,000	533,000	550,000
Scenario 2: Western Expansion	501,000	526,000	540,000
Scenario 3: Eastern Expansion	503,000	531,000	548,000

Table 5-3: Wellington Region Total Employment Comparison

	2021	2031	2041
Medium Growth (2011 WTSM)	257,000	269,000	276,000
High Growth (2011 WTSM)	265,000	287,000	304,000
Scenario 1: Wgtn Expansion	261,000	279,000	291,000
Scenario 2: Western Expansion	258,000	272,000	280,000
Scenario 3: Eastern Expansion	259,000	275,000	284,000

Table 5-4: Wellington Region Total Households Comparison

	2021	2031	2041
Medium Growth (2011 WTSM)	193,000	210,000	218,000
High Growth (2011 WTSM)	200,000	225,000	242,000
Scenario 1: Wgtn Expansion	195,000	215,000	226,000
Scenario 2: Western Expansion	195,000	215,000	226,000
Scenario 3: Eastern Expansion	195,000	215,000	226,000

5.2 Wellington City Expansion

This scenario has Wellington City at high growth, as schematically shown in Figure 5- below, with all other territorial authorities in the Wellington Region at medium growth.



Figure 5-1: Concept Representation of Wellington City Expansion Scenario

Table 5-5 below summarises the population for each horizon year. For comparison the figures for the medium growth and high growth scenarios are provided in addition to the Wellington City Expansion scenario. Similarly, Table 5-6 summarises the employment figures. Appendix E contains further information on the Wellington City Expansion Scenario.

Table 5-5: Population for Wellington City Expansion

Wellington City -Population			
	Medium	High	Wellington Expansion
2011	191,236	n/a	191,236
2021	208,662	216,323	216,323
2031	224,890	240,748	240,748
2041	237,800	261,476	261,476

All Other TAs -Population			
	Medium	High	Wellington Expansion
2011	279,823	n/a	279,823
2021	287,523	299,046	287,523
2031	292,052	315,759	292,052
2041	288,172	324,239	288,172

Total –Population			
	Medium	High	Wellington Expansion
2011	471,060	n/a	471,060
2021	496,185	515,369	503,846
2031	516,943	556,507	532,800
2041	525,972	585,714	549,648

Table 5-6: Employment for Wellington City Expansion

Wellington City -Employment			
	Medium	High	Wellington Expansion
2011	133,976	n/a	133,976
2021	143,304	147,994	147,994
2031	150,416	160,590	160,590
2041	159,051	174,417	174,417

All Other TAs –Employment			
	Medium	High	Wellington Expansion
2011	106,522	n/a	106,522
2021	113,437	117,187	113,437
2031	118,750	126,876	118,750
2041	116,471	129,570	116,471

Total –Employment			
	Medium	High	Wellington Expansion
2011	240,498	n/a	240,498
2021	256,741	265,181	261,431
2031	269,166	287,466	279,340
2041	275,522	303,987	290,888

5.3 Western Expansion

The second growth scenario represents increased growth in the Kapiti Coast District and Porirua City, as schematically shown in Figure 5-, below. The Kapiti Coast District and Porirua City are at high growth while all other territorial authorities in the region are at medium growth. Appendix F contains further information on the Western Expansion scenario.



Figure 5-2: Concept Representation of Western Expansion Scenario

Table 5-7 below summarises the population for each horizon year. For comparison the figures for the medium growth and high growth scenarios are provided in addition to the Western Expansion scenario. Similarly, Table 5-8 summarises the employment figures.

Table 5-7: Population for Western Expansion

Kapiti Coast District –Population			
	Medium	High	Western Expansion
2011	49,085	n/a	49,085
2021	54,022	56,061	56,061
2031	58,854	63,055	63,055
2041	62,732	68,718	68,718

Porirua City –Population			
	Medium	High	Western Expansion
2011	51,443	n/a	51,443
2021	52,330	54,882	54,882
2031	52,910	58,179	58,179
2041	51,815	60,181	60,181

All Other TAs –Population			
	Medium	High	Western Expansion
2011	370,531	n/a	370,531
2021	389,833	404,425	389,833
2031	405,178	435,273	405,178
2041	411,424	456,814	411,424

Total –Population			
	Medium	High	Western Expansion
2011	471,060	n/a	471,060
2021	496,185	515,369	500,776
2031	516,943	556,507	526,412
2041	525,972	585,714	540,324

Table 5-8: Employment for Western Expansion

Kapiti Coast District -Employment			
	Medium	High	Western Expansion
2011	15,206	n/a	15,206
2021	16,242	16,783	16,783
2031	17,047	18,213	18,213
2041	18,170	19,849	19,849

Porirua City -Employment			
	Medium	High	Western Expansion
2011	17,049	n/a	17,049
2021	18,333	18,973	18,973
2031	19,330	20,709	20,709
2041	18,997	21,467	21,467

All Other TAs -Employment			
	Medium	High	Western Expansion
2011	225,292	n/a	225,292
2021	222,166	229,426	222,166
2031	232,790	248,543	232,790
2041	238,355	262,670	238,355

Total -Employment			
	Medium	High	Western Expansion
2011	257,547	n/a	257,547
2021	256,741	265,181	257,922
2031	269,166	287,466	271,712
2041	275,522	303,987	279,672

5.4 Eastern Expansion

The third growth scenario is eastern expansion. This scenario assumes that territorial authorities to the east (Lower Hutt City, Upper Hutt City, South Wairarapa District, Carterton District, and Masterton District) reach the high growth scenario while all other territorial authorities track towards the medium growth scenario. The growth areas are schematically shown in Figure 5-, below.



Figure 5-3: Concept Representation of Eastern Expansion Scenario

Table 5-9 below summarises the population for each horizon year. For comparison the figures for the medium growth and high growth scenarios are provided in addition to the Eastern Expansion scenario. Similarly, Table 5-10 summarises the employment figures. Appendix G contains further information on the Eastern Expansion Scenario.

Table 5-9: Population for Eastern Expansion

Lower Hutt City -Population			
	Medium	High	Eastern Expansion
2011	99,678	n/a	99,678
2021	100,929	104,843	104,843
2031	100,934	108,919	108,919
2041	98,314	110,441	110,441

Upper Hutt City -Population			
	Medium	High	Eastern Expansion
2011	40,188	n/a	40,188
2021	40,650	42,300	42,300
2031	40,489	43,911	43,911
2041	38,985	44,301	44,301

Masterton District -Population			
	Medium	High	Eastern Expansion
2011	23,588	n/a	23,588
2021	23,621	24,419	24,419
2031	23,150	24,753	24,753
2041	21,496	23,843	23,843

Carterton District -Population			
	Medium	High	Eastern Expansion
2011	6,969	n/a	6,969
2021	7,058	7,337	7,337
2031	7,004	7,605	7,605
2041	6,711	7,651	7,651

South Wairarapa District -Population			
	Medium	High	Eastern Expansion
2011	8,873	n/a	8,873
2021	8,913	9,204	9,204
2031	8,711	9,338	9,338
2041	8,118	9,103	9,103

All Other TAs -Population			
	Medium	High	Eastern Expansion
2011	291,765	n/a	291,765
2021	315,014	327,266	315,014
2031	336,655	361,981	336,655
2041	352,347	390,375	352,347

Total -Population			
	Medium	High	Eastern Expansion
2011	471,060	n/a	471,060
2021	496,185	515,369	503,117
2031	516,943	556,507	531,180
2041	525,972	585,714	547,686

Table 5-10: Employment for Eastern Expansion

Lower Hutt City -Employment			
	Medium	High	Eastern Expansion
2011	44,135	n/a	44,135
2021	46,918	48,473	48,473
2031	49,057	52,430	52,430
2041	47,784	53,163	53,163

Upper Hutt City -Employment			
	Medium	High	Eastern Expansion
2011	11,923	n/a	11,923
2021	12,749	13,181	13,181
2031	13,392	14,323	14,323
2041	12,895	14,451	14,451

Masterton District -Employment			
	Medium	High	Eastern Expansion
2011	11,036	n/a	11,036
2021	11,704	12,075	12,075
2031	12,205	13,016	13,016
2041	11,333	12,538	12,538

Carterton District -Population			
	Medium	High	Eastern Expansion
2011	3,518	n/a	3,518
2021	3,663	3,765	3,765
2031	3,766	3,991	3,991
2041	3,608	4,015	4,015

South Wairarapa District -Population			
	Medium	High	Eastern Expansion
2011	3,654	n/a	3,654
2021	3,828	3,937	3,937
2031	3,953	4,193	4,193
2041	3,684	4,088	4,088

All Other TAs -Employment			
	Medium	High	Eastern Expansion
2011	166,232	n/a	166,232
2021	177,879	183,749	177,879
2031	186,793	199,513	186,793
2041	196,217	215,733	196,217

Total -Employment			
	Medium	High	Eastern Expansion
2011	240,498	n/a	240,498
2021	256,741	265,181	259,311
2031	269,166	287,466	274,746
2041	275,522	303,987	284,471

5.5 Alternative Scenario Development Process

An alternative approach to developing the expansion scenarios was considered initially as part of this work but was not eventually used in favour of the simpler approach documented in sections 5.2 and 5.3 above. This approach focused on concentrating growth within identified growth areas within each territorial authority as shown in Figure 5- below and described in the following sections. However, there is a tension between the temptation to allocate land-use spatially and the need to recognise the coarse zone system of WTSM. Therefore the approach described in Section 5.1 was adopted. Use of the more intelligent spatial distribution described in this section could be considered as part of project specific models.

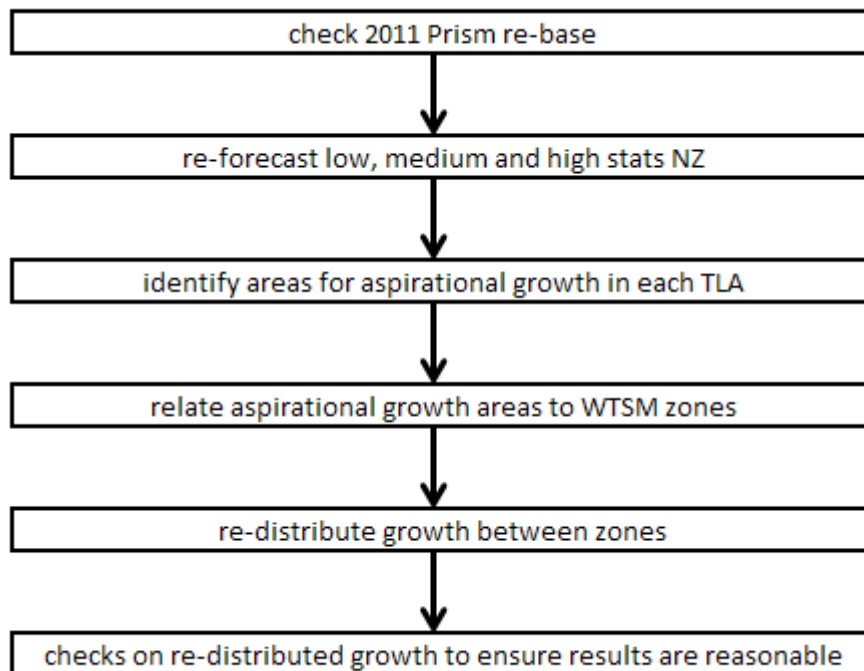


Figure 5-4: Scenario Development Process

Table 5-11 sets out the methodology for the alternative scenario development process.

Table 5-11: Methodology for growth distribution

Task	Description	Data
Identify the growth areas within each District or City	<p>The areas of focused economic growth have been identified using regional planning documents and district plan.</p> <p>The WRS identifies regional focus areas shown in Appendix H.</p> <p>This is further supported by growth documents that Councils have developed to direct and focus growth in their districts.</p>	<p>Wellington Regional Strategy</p> <p>District Growth Plans (non-stat)</p> <p>District Plan</p>
Identify the corresponding WTSM zones within the identified areas of growth	<p>A list of WTSM zones have been identified where the growth should be focused depending upon the specific scenario. See Appendix H.</p>	<p>Single out data on Employment, Households, and Population</p>
Redistribution of high growth	<p>Based on the specific scenario being considered, growth is redistributed into the applicable high growth areas identified in the previous step.</p> <p>To maintain constant overall growth for the region, any additional growth added to the high growth areas zones must be deducted from other WTSM zones outside the specified growth areas.</p> <p>During the data redistribution, none of the zones in the region have been allowed to go below the medium growth forecast.</p>	<p>WTSM data;</p> <p>NZ Stats data</p>

6 Summary

There is generally a good correlation between the new 2011 base and the 2011 forecast completed in 2006. The new 2011 base suggests that the population growth for the region is tracking between the medium and high forecasts completed in 2006, while the employment growth is tracking below the low growth forecast. The low growth in employment is unsurprising given the state of the economy between 2006 and 2011 and the reduction in the employment rate.

The new 2011 base along with the previous forecasts completed in 2006 were used to update the low, medium and high growth forecasts for 2021, 2031 and 2041.

Wellington Expansion assumes high growth occurs in Wellington City while the rest of the region grows at the medium growth level. This scenario could be used to test the effects of schemes which support growth within Wellington City, such as the PT Spine project.

Western Expansion assumes that high growth occurs in Porirua and Kapiti with the rest of the region experiencing medium growth. This scenario could be used to test the effects of schemes which support growth along SH1 such as the Wellington Northern RoNS.

Eastern Expansion assumes high growth for Lower Hutt, Upper Hutt and all of the Wairarapa while the rest of the region experiences medium growth. The approach used to develop the Wellington Expansion, Western Expansion and Eastern Expansion scenarios results in slightly different totals for population, employment and households across the three expansion scenarios.

Appendix A – 2006 Base Development

WTSM Demographic Projections Report 2006 Base Run

*for Greater Wellington the Regional Council and
Sinclair Knight Mertz (SKM)*

Prepared by James Newell



M E R A

Monitoring Evaluation Prediction

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Summary of Main Points

Over the next 20 years, the main points of note from the demographic projections of the Greater Wellington Region, are:

- The number of residents leaving the region is expected to exceed the number settling here by 8,000 (refer Table 6).
- Using a 2006 updated TA level population accounting model, MERA estimates that the region in net gained 5,800 residents through net international migration between 2001 and 2006.
- The population of the entire region is expected to increase (refer Table1), but this will be unevenly distributed between Territorial Authorities. All areas are expected to gain residents, but the usually resident populations of the Kapiti Coast District and Wellington City are expected to increase more than other areas (refer Table 5).
- According to Statistics NZ recent 2006 census based TLA medium projection of December 2007, the working age population is expected to increase at a rate lower than the Wellington Regional Strategy "business as usual" economic and corresponding labour force demand projection. A customised economic growth rate and corresponding labour demand projection was tailored for correspondence with the medium population growth rate scenario (refer Section 3). The high population projection corresponds most closely with the Wellington Regional Strategy scenario.
- This raises the issue as to whether a higher growth rate population projection scenario should be formulated to match better the BERL example of a higher "modified" Wellington Region growth rate scenario. It would also suggest that the ability to easily adapt to a high projection if it eventuated may be provided for in infrastructure planning.
- The predominant feature of the projections is a rapid aging of the population with the proportion of the population aged 65 years or over projected to increase by more than 100% over the next 20 years.
- The school age population is expected to remain fairly stable with decreases in some areas but large growth in others.
- The average number of people in a household is expected to continue to decline, contributing to the increase in the number of residences required to accommodate the population (refer Table 10).
- Under the medium growth rate scenario, the outcome is a projected increase of 23% in the number of occupied private households by 2026 compared with an increase of only 12.4% in usually resident population.

1 Purpose

1.1 Background

The purpose of this report is to summarise the work of the 2006 census base update for the demographic inputs to the WTSM model. This model update replicates the methods and model used in the 2002/2003 WTSM run updated to the corresponding 2006 census based inputs and Statistics NZ 2006 based local authority model. The methods used are documented fully in the May 2003 report "Wellington Transport Strategy Model, TN12.1 MERA Base Run Projections". The main change in method as applied in this update is to substitute a more general "uniform industry growth rate" method to allocate the regional industry projection to sub-regional areas (refer section 3.4).

1.2 Process Undertaken

Preliminary work involved putting together a "strategic overview" for each local authority area. This overview included a preliminary de facto "status quo" 2006 rebase of the then most up to date Statistics NZ demographic projection (released in February 2005). It also included a summary of long term demographic trends (with emphasis on recent 2001 to 2006 statistics) and discussion of some of the issues and options to be considered in determining a revised projection in advance of the release of Statistics NZ 2006 based projection. These results were summarised in powerpoint presentations. Where possible the consultation process involved at least one meeting with officials from the local authority to present and discuss the results. Where this was not possible, discussions were held by phone after forwarding the analysis powerpoints. From this, the net migration assumptions were increased (conservatively) based on the recent 2001 to 2006 period of demographic change as a guide as compared with the February 2005 and earlier projection expectations. The overall summary position on this was summarised and discussed at a regional meeting to which all local authorities were invited.

Relevant work and results from the Wellington Regional Strategy process were incorporated into the analysis and forecasting process. Two key results were the recent regional economic projection update prepared by BERL and released in May 2007 and the land use capacity information collated by the Greater Wellington the Regional Council GIS unit from the Wellington Regional Strategy process.

There were two major challenges arising from the preliminary work. One of these was a mismatch between labour market demand as determined from the BERL May 2007 economic projection and the other the volatile and rapidly changing characteristics of migration patterns to, from and within the region.

Initial modelling revealed that the labour demand projections arising from the BERL 2007 regional economic projection and the labour supply projections stemming from the preliminary consensus view on a "status quo" 2006 updated projection were incompatible. These different views were reconciled by assuming that labour force participation would increase at a rate corresponding to the 1996 to 2006 overall trend, commissioning a customised lower growth future economic growth scenario from BERL and tweaking upward net migration assumptions and thus the population projections used. This was then used as the basis of an interim projection run. Those revised results were then communicated back to individual local authorities, in some cases involving further meetings with staff.

Finally, when the Statistics NZ 2006 updated local authority population projection assumptions were released in early December 2007, these were incorporated in the final Wellington model base run.

The customised BERL economic scenario commissioned was modelled on a variation on the BERL 2007 regional economic projection but scaled down from the 1.4% per annum growth in full time equivalent jobs it assumed over 2006 to 2021 down to a rate of 1.14% per annum compatible with future projection scenarios. This new rate is much higher than the 0.86 % per annum growth rate assumed in the 2003 WTSM model update. The BERL 2007 "business as usual" default economic projection scenario prepared for the Wellington Regional Strategy corresponds fairly closely with the high growth scenario variant of the 2006 updated Statistics NZ projection and could be further tweaked to that scenario.

An evolving feature of the population projection rounds has been a progressive increase in the official Statistics NZ outlook for future population growth in each successive projection round. This results in part from the fact that the relatively low growth / high regional net migration loss over the period of economic and structural change in the late 1980's and early 1990's is having a declining influence on expectations for future projections. Secondly, expectation of net long term international migration gains are increasing and rates of net loss due to international migration decreasing. Migration is becoming both a more volatile and less predictable component to population projections. The 2001 to 2006 period saw an unprecedented net migration gain for the region - which usually experiences a net migration loss. This volatility and recent unprecedented net migration means that there is value in examining the likely impact that a higher than current high population projection would have on future infrastructure and matching this with future economic scenarios such as the "modified growth scenario" documented in the BERL May 2007 work for the greater Wellington Regional Strategy.

2 Updated Population Projections

2.1 Background

Travel demand within the Wellington Strategic Transport Model (WTSM) is determined by several factors, with the most critical being the demographic makeup of the region. This includes the number, age distribution, labour force status and location of residents, along with employment location. These forecasts are critical as population has a causal relationship with travel demand.

The population projections have been implemented by Monitoring and Evaluation Research Associates (MERA) in a region wide area unit level development model using the demographic assumptions from the December 2007 Statistics New Zealand local authority projection, 2006 census results and consultation with local authority officials. The demographic / development model is matched as closely as possible at area unit level with those assumptions. However, the fitting process means that summed over any individual local authority and inter-censal period the small area resulting projection can vary by around 100 from the target net migration rate.

Population change has three components:

- Residents of the area move away (migration out) and people move in from other areas (migration in), giving the change due to migration (net migration). Net

migration itself has two components: internal migration, being movement of people between locations within New Zealand, and external migration, people travelling to or from overseas.

- Residents of the area die (characterised by the mortality rate).
- Residents of the area give birth, thereby creating new residents (characterised by the fertility rate).

Net migration is the most critical of these three components, and it is the one with the greatest degree of uncertainty attached. It is also the one area over which the actions of the Territorial Authorities in the Greater Wellington region can have a positive or negative influence.

2.1.1 Population Projection Starting Point

There are three different means of determining the initial population of the region from which the population projections are made. WTSM uses the Census enumerated usually resident population, which counts the people who usually live in the Wellington region, were present in New Zealand on Census night and were enumerated in the census. It also includes Wellington region residents who were temporarily away from their homes but still in New Zealand on Census night. The selection of the census enumerated usually resident population¹ rather than an adjusted estimated actual population is influenced by the fact that the modelling process involves the synthesis of a wide range of statistical inputs arising from the population census drawn from a range of census periods. Adjustment to determine the estimated actual population relating to all of the inputs is much harder than that involved in adjusting aggregate population estimates based on one census. The forecasting process is oriented to looking at the increments of change in population, employment, households etc. rather than absolute figures. The difference between estimated actual and census enumerated populations is known as the net census undercount. Estimation of the net undercount for any one census has a high level of uncertainty and is an evolving science. Differences between the undercount estimates for successive census are much smaller than the actual undercount rate for any one census. This is the error factor that is associated with comparing census counts for different census. Of more impact on the modelling estimates are the variation (in many cases increasing) rates of unspecified or uncoded values for some census questions. The large and increasing proportion of workplace trips not coded to an area unit is a good example.

The census enumerated count does not include residents temporarily away overseas on Census night or residents “missed” by the Census (estimated at 1.3 percent for the Lower North Island²). With regard to residents not included in the Census, it is considered appropriate not to include them in the projections due to the need for information collected by the Census to allow them to be categorised into household types, employment status, etc.

The base estimates presented here can be adjusted upward at a later date to correspond with Statistics NZ assumptions about the difference between the census enumerated count and the estimated actual count using the results released as part of the Statistics

¹ Note that the effects of suppression and rounding of 2006 base population estimates during conversion from 2006 area unit to a 1996 area unit base results in slightly different estimates for the resident population as determined for the usual resident population (448,930) and the employment by residence population (451,200), a difference of about 0.5%. For convenience, the employment by residence population estimates were used in the WTSM model.

² A Report on the 2006b Post-enumeration Survey, Statistics New Zealand.

NZ 2007 projection round. Statistics NZ does more than just adjust for the differences between enumerated and estimated actual populations. It also rebases the estimates from the beginning of March to the 30th June of the census year.

Given the basis from which all demographic projections for WTSM are made, it is important to remember that the usually resident population in the region may be underestimated by 1.3 percent as at 2006, which equates to an additional 5,800 residents.

2.2 Population Projections

Statistics NZ prepare three main projection series based on differing net migration, fertility and mortality assumptions (low, medium and high). At the time of their release in December 2007 the medium series was considered the most appropriate for forecasting future population changes. The low series represents a slightly more pessimistic view of the growth in the regions' population, whilst the high series is more optimistic but notably is consistent with the labour demand growth rates arising from the BERL 2007 "business as usual" economic projections. Table 1 sets out the projected population forecasts resulting from these three scenarios, with Table 2 detailing the respective percentage changes in the regional population under each scenario.

Table 1: Historical and Projected Usually Resident Regional Population

<i>Projection Assumption</i>	<i>Year</i>							
	<i>1991</i>	<i>1996</i>	<i>2001</i>	<i>2006</i>	<i>2011</i>	<i>2016</i>	<i>2021</i>	<i>2026</i>
Low	400,400	413,900	423,600	448,900 ³	457,100	461,000	463,400	464,700
Medium					467,100	480,700	493,100	504,400
High					477,100	500,800	523,300	545,100

Table 2: Annual Percentage Change in Usually Resident Regional Population

<i>Projection Assumption</i>	<i>Five Years Ending</i>								<i>Change 2006 to 2026</i>
	<i>1991</i>	<i>1996</i>	<i>2001</i>	<i>2006</i>	<i>2011</i>	<i>2016</i>	<i>2021</i>	<i>2026</i>	
Low	0.5%	0.7%	0.5%	1.2%	0.4%	0.2%	0.1%	0.1%	3.5%
Medium					0.8%	0.6%	0.5%	0.5%	12.4%
High					1.2%	1.0%	0.9%	0.8%	21.4%

Under the medium projection, the overall the population of the region is expected to increase by twelve percent over the next twenty years, almost double the expectation of only seven percent growth over the next twenty years at the time of the last WTSM forecast round in 2002/2003. The New Zealand resident population is projected to increase by eighteen percent over the 2006 to 2026 period. Amongst New Zealand regions, Wellington's projected growth rate is above average, especially given the relatively low proportion of Maori and Pacifica population. These ethnic populations contribute considerably to natural increase for some of the faster growing regions such as Auckland, Northland, Waikato and Bay of Plenty.

Figure 1 shows the projected annual rate of change in graphical form and Figure 2 the projected regional population totals.

³ Note that the effects of suppression and rounding of 2006 base population estimates during conversion from 2006 area unit to a 1996 area unit base results in slightly different estimates for the resident population as determined for the usual resident population (448,930) and the employment by residence population (451,200), a difference of about 0.5%. For convenience, the employment by residence population estimates were used in the WTSM model.

Figure 1: Annual Percent Change in the Wellington Region Usually Resident Population

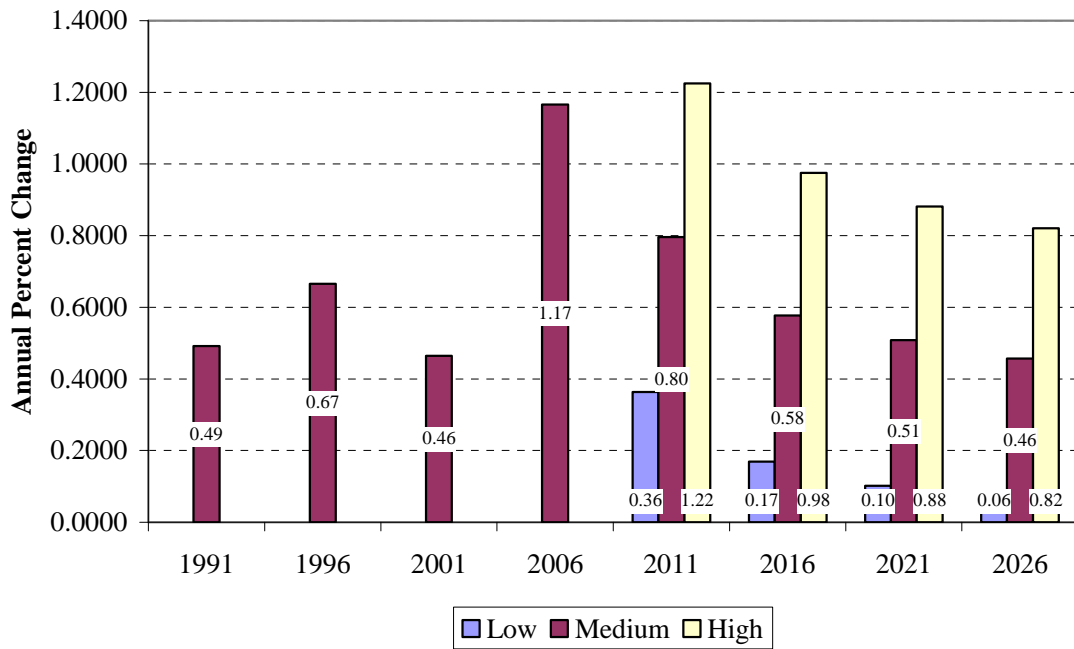


Figure 2: Projected Wellington Region Usually Resident Population

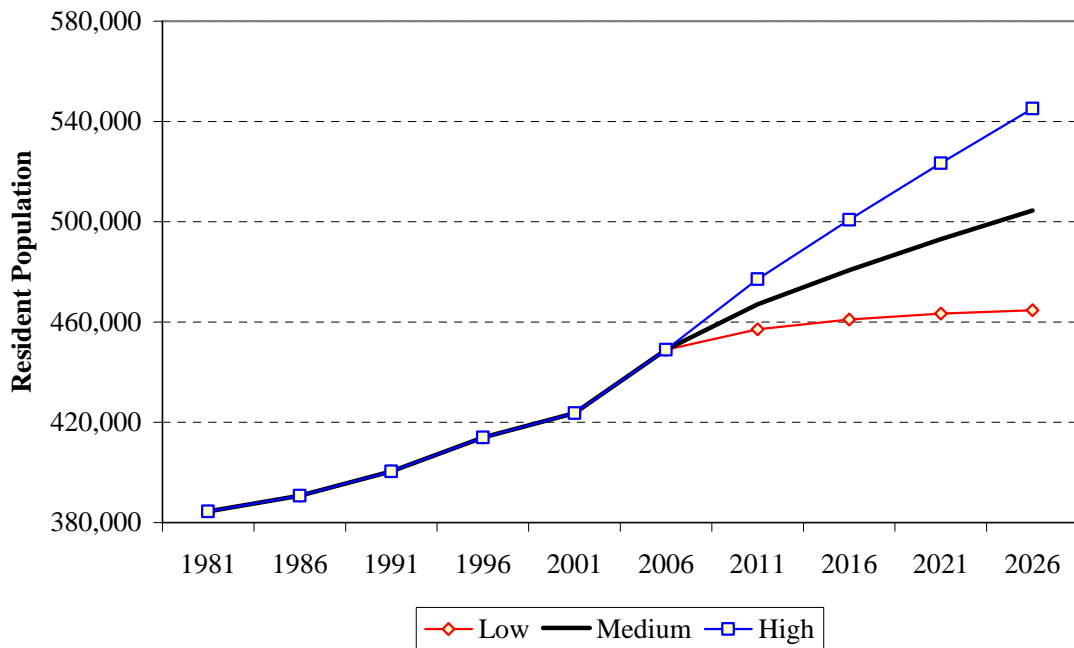


Figure 3: Components of Projected Population Change (Medium Assumptions) Greater Wellington Region

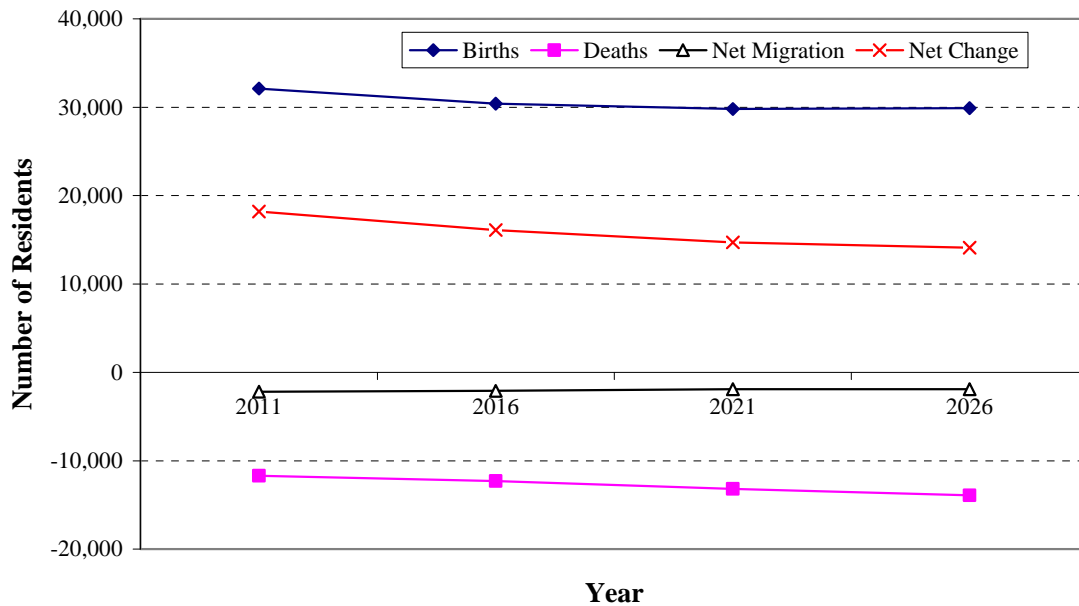


Figure 3 shows the components of regional population change. Within the region there are differences in the relative importance of the different components of population change. As detailed later in the report, Wellington City has a total fertility rate of much less than 2 (below replacement) but gains a much larger contribution from net migration than any other area. By contrast, Porirua City and the Wairarapa have total fertility rates much larger than 2 and have a much larger rate of natural increase than other parts of the region.

The population for the region (Table 1) is based on the aggregation of each Territorial Authorities population, which are shown in Table 3 at five-year intervals from 1991 through to 2006, and the projected population out to 2026 for the medium growth rate projection. The annual percentage change in each Territorial Authority population is detailed in Table 4.

Table 3: Local Authority Usually Resident Population - Medium Projection

<i>Local Authority</i>	<i>Year</i>							
	<i>1991</i>	<i>1996</i>	<i>2001</i>	<i>2006</i>	<i>2011</i>	<i>2016</i>	<i>2021</i>	<i>2026</i>
Kapiti Coast District	34,990	38,580	42,450	46,200	49,300	52,000	54,600	57,100
Porirua City	46,580	46,620	47,370	48,550	49,900	50,500	51,000	51,300
Upper Hutt City	36,930	36,730	36,360	38,430	39,400	39,800	39,900	39,900
Lower Hutt City	94,840	95,870	95,480	97,680	99,800	100,600	101,100	101,300
Wellington City	148,260	157,640	163,790	179,460	189,300	198,100	206,900	215,400
Masterton District	22,640	22,760	22,610	22,620	22,900	23,000	22,900	22,700
Carterton District	6,960	6,810	6,850	7,100	7,300	7,400	7,500	7,500
South Wairarapa District	9,260	8,940	8,740	8,900	9,100	9,200	9,100	9,000
Total	400,440	413,950	423,650	448,930	467,100	480,700	493,100	504,400

Table 4: Annual Percentage Change in Local Authority Usually Resident Population - Medium Projection

<i>Local Authority</i>	<i>Five Years Ending</i>								<i>Change 2006 to 2026</i>
	<i>1991</i>	<i>1996</i>	<i>2001</i>	<i>2006</i>	<i>2011</i>	<i>2016</i>	<i>2021</i>	<i>2026</i>	
Kapiti Coast District	3.6%	2.0%	1.9%	1.7%	1.3%	1.1%	1.0%	0.9%	23.7%
Porirua City	0.4%	0.0%	0.3%	0.5%	0.5%	0.3%	0.2%	0.1%	5.7%
Upper Hutt City	0.2%	-0.1%	-0.2%	1.1%	0.5%	0.2%	0.1%	0.0%	3.8%
Lower Hutt City	0.0%	0.2%	-0.1%	0.5%	0.4%	0.2%	0.1%	0.0%	3.7%
Wellington City	0.2%	1.2%	0.8%	1.8%	1.1%	0.9%	0.9%	0.8%	20.1%
Masterton District	0.7%	0.1%	-0.1%	0.0%	0.3%	0.0%	-0.1%	-0.2%	0.4%
Carterton District	1.7%	-0.4%	0.1%	0.7%	0.6%	0.4%	0.1%	0.1%	6.3%
South Wairarapa District	1.0%	-0.7%	-0.5%	0.4%	0.4%	0.1%	-0.1%	-0.2%	1.7%
Total	0.5%	0.7%	0.5%	1.2%	0.8%	0.6%	0.5%	0.5%	12.4%

The eight Territorial Authorities in the region are all expected to experience some net population gain over the 2006 to 2026 period (Tables 3 and 4). Although the increases in resident population are in most cases modest, the change in number of households is more significant, driven mainly by population. Kapiti Coast District and Wellington are both expected to experience growth of over 20% in their populations over the twenty years from 2006. Over time, the increase in deaths due to an aging population and decrease in births has the effect of reducing the rate of population growth over the

projection period. All Territorial Authorities are forecast to have a higher rate of net migration in the next five years than subsequent periods, which underlines the importance of net migration to the outlook for the region's population.

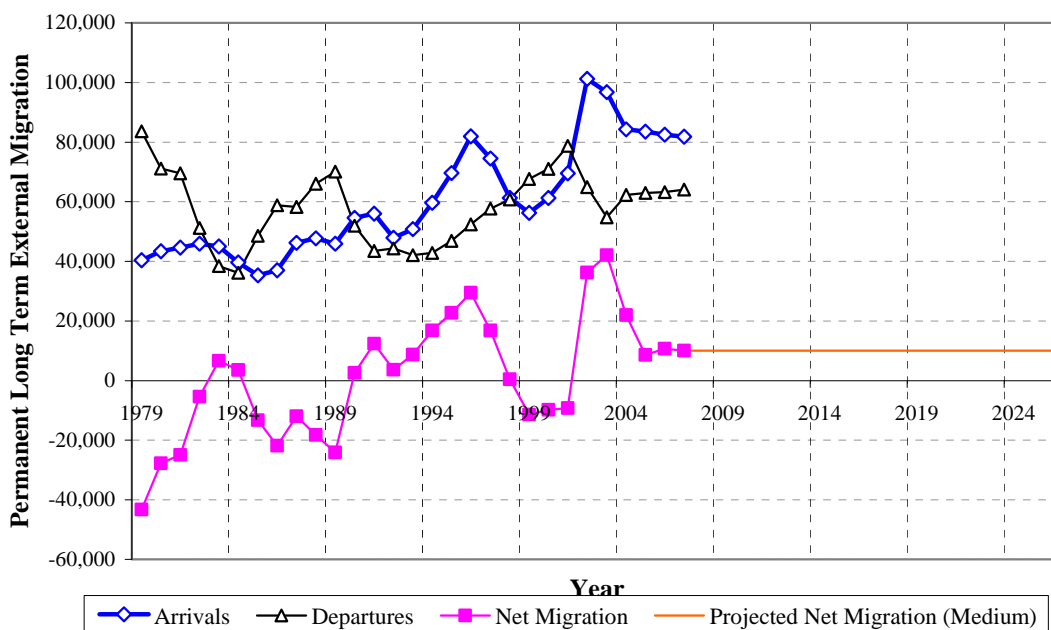
2.3 Statistics New Zealand Forecast Assumptions

2.3.1 Net External Migration - National Population Projections

Under the medium national level migration assumptions, net migration is assumed to be 50,000 in 2006 – 2011 (10,000 per annum). This is close to the 10 year moving average of 9,900 for the 10 years to November 2007 and 20 year moving average of 8,850 up to that date. Figure 4 shows national permanent long term external arrival, departures and net migration figures for the years to June 1979 through to 2007, along with the projected "medium" scenario annual net external migration out to 2026.

The three years to June 2002, 2003 and 2004 saw very large net external migration gains but annual net migration gains have since fluctuated close to the long term 20 year mean.

Figure 4: Historical and Projected NZ Permanent / Long Term External Migration Estimates and Projections



Distribution of this net increase in migrants throughout the country is based on observed net migration during five year periods from 1981, the capacity of the area for further growth (for areas with net inflow), whether historical outflows can be sustained (for areas with net outflow), the desirability of the area to new migrants and information available from and about Territorial Authorities relating to current and future developments which may affect population change¹.

¹ Hot Off The Press, Subnational Population Projections 2006 (base) – 2026, Statistics New Zealand

2.3.2 Net Migration - Subnational Population Projections

The major contribution to the high population growth over 2001 to 2006 was a big jump in net international (external) migration gain. Using a 2006 updated TA level population accounting model, MERA estimates that the region in net gained 5,800 residents through net international migration between 2001 and 2006. This compares with a net loss of 11,500 between 1996 and 2001 and a gain of only 500 between 1991 and 1996. Inter regional migration between 2001 and 2006 resulted in a net gain of 1,900 for the Wellington region. As a result of the recent international migration gain, overall the region gained 8,300 people from migration between 2001 and 2006. This raises some questions on the appropriate levels of net migration gain for Wellington in the population projections, as the rate of national international net migration gain in the base scenario is now pegged at 10,000 per annum throughout the forecast period.

MERA historical estimates and Statistics NZ projections for the levels of net migration at the regional level over the next twenty years are listed in Table 5.

Table 5: Regional Net Migration Estimates and Projections

<i>Five Years Ending</i>	<i>Migration Assumption</i>		
	<i>Low</i>	<i>Medium</i>	<i>High</i>
1996		-5,700	
2001		-8,100	
2006		8,300	
2011	-9,700	-1,900	5,900
2016	-9,650	-1,850	5,950
2021	-9,650	-1,850	5,950
2026	-9,650	-1,850	5,950
Total	-38,650	-7,450	23,750

The projected net migration loss to the region for the twenty years from 2006 is now projected to be only 7,450, compared with a projected loss of 21,900 in the projection under the earlier 2002/2003 model update. International net migration loss is a feature of most areas of New Zealand. The migration assumptions used in the WTSM model update vary slightly from the Statistics NZ base model due to the complexities of fitting local authority to an area unit distribution. Model outputs for this projection vary by up to 100 overall for any one local authority from the assumptions current five-year period. Over the whole region the fitted regional model incorporates a net migration loss of 8,000 under the medium projection compared with 7,450 in the Statistics NZ assumptions.

The projected distribution of these net migration results across the Territorial Authorities within the region is shown in Table 6. Underneath net migration rates is a complex cycling of different age groups / life cycle stages within the region, between regions and internationally. Both Kapiti and Wellington are now projected to consistently in net gain population through migration throughout the projection period and net migration losses from other local authorities are now reduced from earlier projections. Kapiti Coast District is one of a number of localities which is a hub for retirement and lifestyle migration and has a growing local market and service

industries which in turn attract working families. Wellington City is the employment hub of the region with a strong labour market attracting those entering the job market, a strong tertiary education sector also drawing students from other parts of New Zealand as well as overseas students, enjoys the jobs and service demand from its role as the capital city and has a diverse and rich arts, culture and entertainment industry that attracts migrants. There are strong intra-regional migration flows of youth/young adults to Wellington City and a counter flow to other parts of the region, especially of young families when they form households.

Table 6: WTSM Model "Fitted" Projected Net Migration by Local Authority - Medium Projection

<i>Local Authority</i>	<i>Five Years Ending</i>						<i>Net Migration (2006-26)</i>	<i>High/Low Assumption Difference</i>
	<i>1996</i>	<i>2001</i>	<i>2011</i>	<i>2016</i>	<i>2021</i>	<i>2026</i>		
Kapiti Coast District	3,600	3,700	2,900	3,000	3,000	3,000	11,900	±4,000
Porirua City	-2,600	-1,900	-2,100	-2,100	-2,000	-2,000	-8,100	±4,000
Upper Hutt City	-1,600	900	-600	-500	-500	-500	-2,100	±2,800
Lower Hutt City	-5,000	-2,000	-3,000	-3,100	-3,000	-3,000	-12,100	±6,000
Wellington City	-1,200	7,800	900	900	1,000	900	3,700	±12,000
Masterton District	-800	-300	-300	-300	-300	-200	-1,100	±1,200
Carterton District	-100	100	0	0	0	0	100	±600
South Wairarapa District	-400	0	-100	-100	-100	-100	-500	±600
Total	-8,100	8,300	-2,200	-2,100	-1,900	-1,900	-8,000	±31,200

The low and high migration assumptions vary the level of net migration by a fixed value for each local authority, which is listed in the last column of Table 6.

Net migration for the region is projected to remain constant throughout the projection with a declining rate of natural increase due to an aging population being the factor behind a gradual slowdown in the rate of population growth in each local authority. The net migration assumptions for the region have consistently become more positive in successive projection rounds as the effects of the dramatic structural changes in the economy with resulting exodus of population recedes into history.

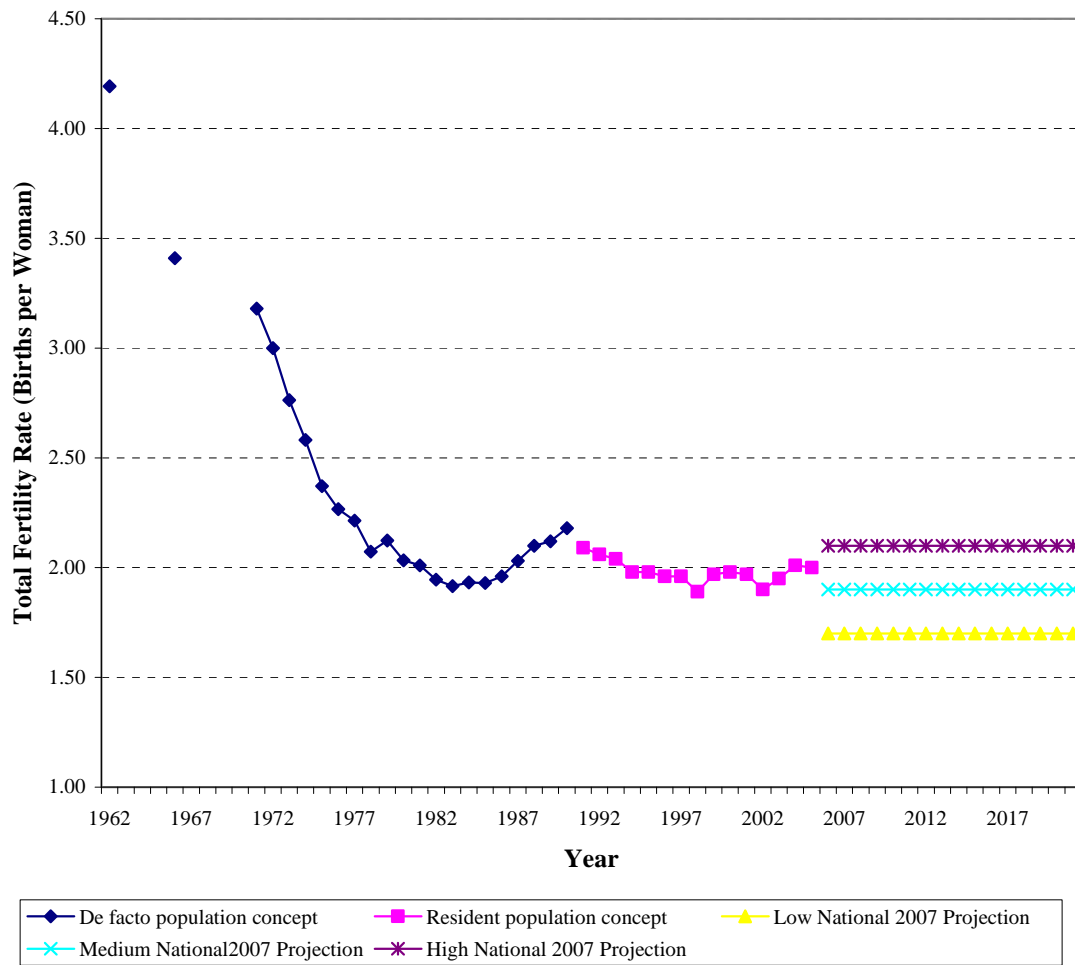
2.3.3 Projected Births Assumptions (Fertility)

Under the medium fertility assumption, on a national level the total fertility rate is expected to drop from 1.97 births per woman (1997 – 2001) to 1.85 births per woman (2007 – 2011) and then remain constant.

Figure 5 shows the trend for the fertility rate at a national level from 1962 through to 2002, with the projected values through to 2021 included. From this, the assumptions

relating to the expected fertility rate (on a national level) would appear to agree with the trend seen over the last 10 years.

Figure 5: Historical and Projected Fertility Rate (Medium Assumption) - New Zealand



The fertility rate within each Territorial Authority varies based on the historical trends within that area. Table 7 shows the projected fertility rates for each Territorial Authority, all of which predict a decline in line with the national trend. The number of women of childbearing age in each area also has an effect on the positive side of the natural increase equation.

Table 7: Projection Wellington TLA Total Fertility Rate (Births per Woman) - Medium Projection

<i>Local Authority</i>	<i>Five Years Ending</i>		
	<i>2011</i>	<i>2016</i>	<i>2026</i>
Kapiti Coast District	2.15	2.06	1.96
Porirua City	2.50	2.39	2.29
Upper Hutt City	2.20	2.11	2.01
Lower Hutt City	2.20	2.11	2.01
Wellington City	1.45	1.41	1.37
Masterton District	2.50	2.39	2.29
Carterton District	2.45	2.34	2.24
South Wairarapa District	2.85	2.72	2.61

The high and low fertility assumptions for each local authority vary by ± 0.1 births per woman from the medium assumption.

Overall for the region, the positive component of natural increase is expected to decline due to the falling birth rate despite a small increase in the number of women of child bearing age. Given the basis on which these underlying assumptions relating to births have been determined, we can treat them with confidence.

2.3.4 Deaths (Mortality) - National Projections

Over the length of the projection horizon, life expectancy for both males and females is expected to increase. Nationally, it is projected to increase from 76.1 years for males and 81.0 years for females (1997 – 2001) to 80.0 years for males and 84.5 years for females (2017 – 2021). This increase in the life expectancy of the population leads to a decrease in the expected mortality rate of the population, and appears reasonable based on historical trends.

2.3.5 Deaths (Mortality) - Subnational Projections

As with the fertility rate, the life expectancy within each of the Territorial Authorities is forecast separately, and is given in Table 8.

Table 8: Projection Wellington TLA Life Expectancy (Years) - Medium Projection

<i>Local Authority</i>	<i>Five Years Ending</i>					
	<i>Male</i>			<i>Female</i>		
	<i>2011</i>	<i>2016</i>	<i>2026</i>	<i>2011</i>	<i>2016</i>	<i>2026</i>
Kapiti Coast District	80.2	81.2	82.9	84.1	85.0	86.6
Porirua City	76.2	77.3	79.3	80.2	81.3	83.1
Upper Hutt City	78.1	79.2	81.0	82.0	83.0	84.8
Lower Hutt City	78.1	79.2	81.0	82.0	83.0	84.8
Wellington City	80.0	81.0	82.7	83.8	84.8	86.4
Masterton District	78.1	79.2	81.0	82.0	83.0	84.8
Carterton District	78.1	79.2	81.0	82.0	83.0	84.8
South Wairarapa District	79.7	80.7	82.5	83.6	84.5	86.1

The high and low mortality assumptions for life expectancy at birth for each local authority vary by ± 0.5 years from the medium assumption for each five-year period.

Across the region, the mortality rate is projected to decline following long term trends and life expectancy at birth will increase by about 3 years under the medium projection.

2.3.6 Acceptability of Statistics NZ Forecast Assumptions

Given the underlying trends and historical patterns from which the level of natural increase has been determined, the assumptions relating to fertility and mortality are acceptable. However, the assumptions from which the net migration figures have been derived are probably overly pessimistic for the region. This has been the lesson of recent years with net migration assumptions becoming progressively more favourable in each successive projection round. Further, the attractiveness of the region, both in terms of new residents settling and the retention of existing residents, is an area over which the Territorial Authorities have some direct control, so the level of net migration is somewhat dependent upon policies and actions implemented within the region (as well as nationally).

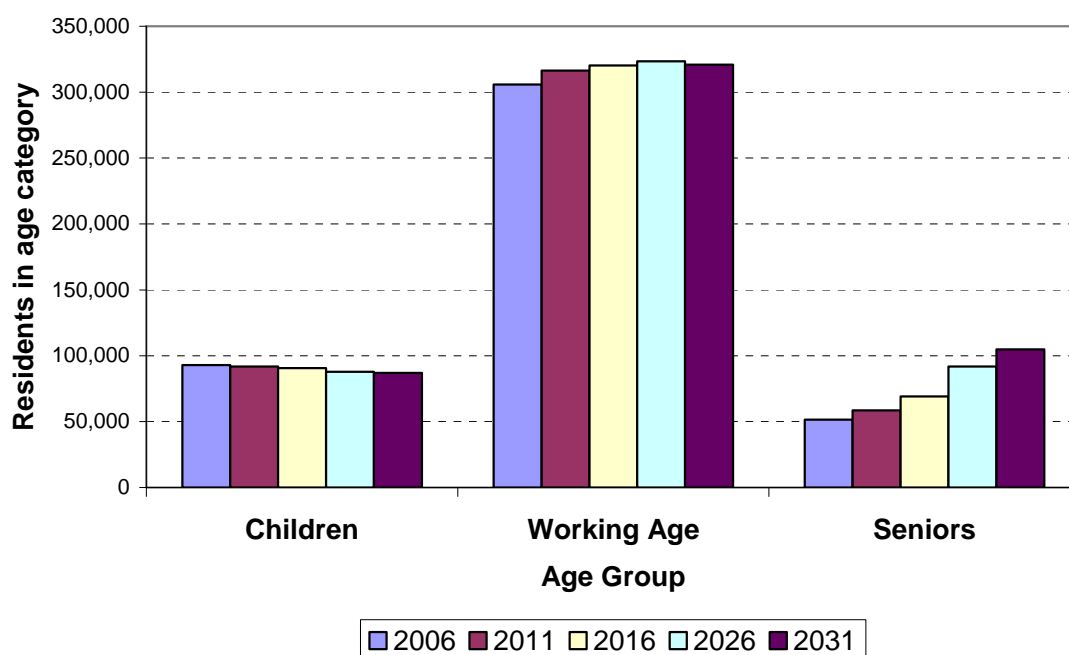
2.4 Age Composition of the Population

The age composition of the population is important as it determines the proportion of residents who are likely to be of working age or going to school, both of which have a significant impact upon the demand for travel within the region. It also determines the nature of housing formation and the character of housing and dwelling demand.

Within the Greater Wellington region, the number of children (aged 0 – 14 years) is projected to fall by 5 percent by 2026. However, this is not uniform within the region, with some areas projected to have an increase in resident children by 5% and

others a decrease of up to 15%. The “working age” population, aged 15-64, is projected to increase by 6 percent between 2006 and 2026. The number of residents aged 65 years or over is projected to increase by 79%. Aging is a feature of all local authority areas, with the most significant aging occurring in Wellington and Porirua Cities but continuing proportional growth of the retiree population of the Kapiti Coast District but on top of a much larger retirement age base to its population. Figure 6 shows the effect of these changes for the region.

Figure 6: Current and Projected Age Composition of the Wellington Region Usually Resident Population (Medium Projection)



When each Territorial Authority is looked at individually, it is projected that only Kapiti District and Wellington City within the Greater Wellington region will have an increase in the number of working age residents by 2026. It is noted that these two Territorial Authorities are expected to increase the size of their populations much more rapidly than the others over the next 20 years. They both represent key and qualitatively different employment / economic hubs in the greater region

Table 9: Change in Population Age Categories between 2006 and 2026

Local Authority	Age Category			
	Child	Adult	Retired	All
Kapiti Coast District	-0.1	16.9	59.4	23.7
Porirua City	-11.6	-0.2	108.4	5.7
Upper Hutt City	-14.3	-5.5	81.7	3.8
Lower Hutt City	-11.7	-2.7	73.1	3.7
Wellington City	5.1	15.6	87.2	20.1
Masterton District	-15.4	-14.1	73.3	0.4
Carterton District	-5.9	-10.8	94.5	6.3
South Wairarapa District	-15.5	-16.4	93.2	1.7
Total	-5.2	6.1	78.8	12.4

2.5 Households

Over the long term, household sizes have tended to decrease due to an aging population and changes to smaller family units with less children. This means that the number of households increases at a greater rate than changes in population size. The increase in the size of the resident population necessitates an increase in the number of buildings available to accommodate everybody. Decrease in the average household size (the number of people living in a residence) can create additional pressure for more homes to be built and for changes to existing dwelling stock to accommodate smaller households.

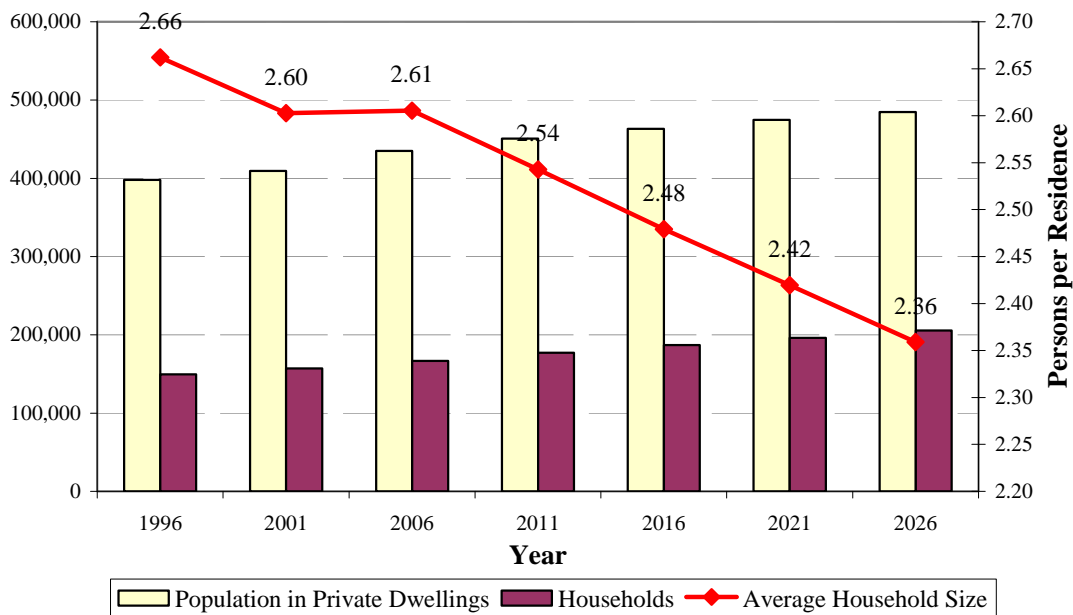
It is predicted that the average household size will decrease from 2.61 residents per household in 2006 to 2.36 in 2026. This is a decrease of close to ten percent, which combined with the twelve percent increase in population (Section 2.2), is projected to lead to a 23 percent increase in the number of residences required. Even Territorial Authority areas which are projected to have a decrease in population are expected to require more residences (Table 10).

Table 10: Projected Number of Occupied Private Households - Medium Projection

Local Authority	Households					Change 2006 to 2026	Population Change 2006 to 2026
	2006	2,011	2016	2021	2026		
Kapiti Coast District	19,110	20,800	22,300	23,800	25,100	31.3%	23.7%
Porirua City	15,390	16,000	16,600	17,100	17,700	15.0%	5.7%
Upper Hutt City	14,130	15,000	15,800	16,400	16,900	19.6%	3.8%
Lower Hutt City	35,330	36,700	37,800	38,800	39,800	12.7%	3.7%
Wellington City	67,690	72,400	77,100	81,900	86,800	28.2%	20.1%
Masterton District	8,890	9,400	9,700	10,000	10,200	14.7%	0.4%
Carterton District	2,750	3,000	3,200	3,400	3,600	30.9%	6.3%
South Wairarapa District	3,620	4,000	4,400	4,800	5,200	43.6%	1.7%
Total	166,910	177,200	186,900	196,100	205,400	23.1%	12.4%

The expected change in average household size, the number of usual residents and households in each five year period is shown in Figure 7.

Figure 7: Average Household Size, Usual Residents in Private Dwellings and Households (Medium Projection)



3 Employment Projections

3.1 Reconciling Labour Supply and Demand

Employment projections are key assumptions in transport planning. The trip to and from work is the main contributor to the morning and afternoon peak traffic flows on the roading network, as well as the demand for peak time public transport services. The number of workers, and where their workplaces are located relative to their residences, is a major determinant of the demands placed on our transport infrastructure.

The employment projections are a product of trends in the population of working age, rates of participation in paid work by age and gender and projected labour market demand by industry derived from the economic projection. One of the unknowns in reconciling labour demand and supply is what contribution changes in labour productivity will play in sustaining rates of future economic growth. This is important as a comparison of "status quo" economic projections and their corresponding labour supply derivatives and demographic projections and their labour supply derivatives strongly suggests that labour supply may be a future constraint to economic growth. This is illustrated by the mismatch between different inputs into projected future labour demand and supply in Table 11.

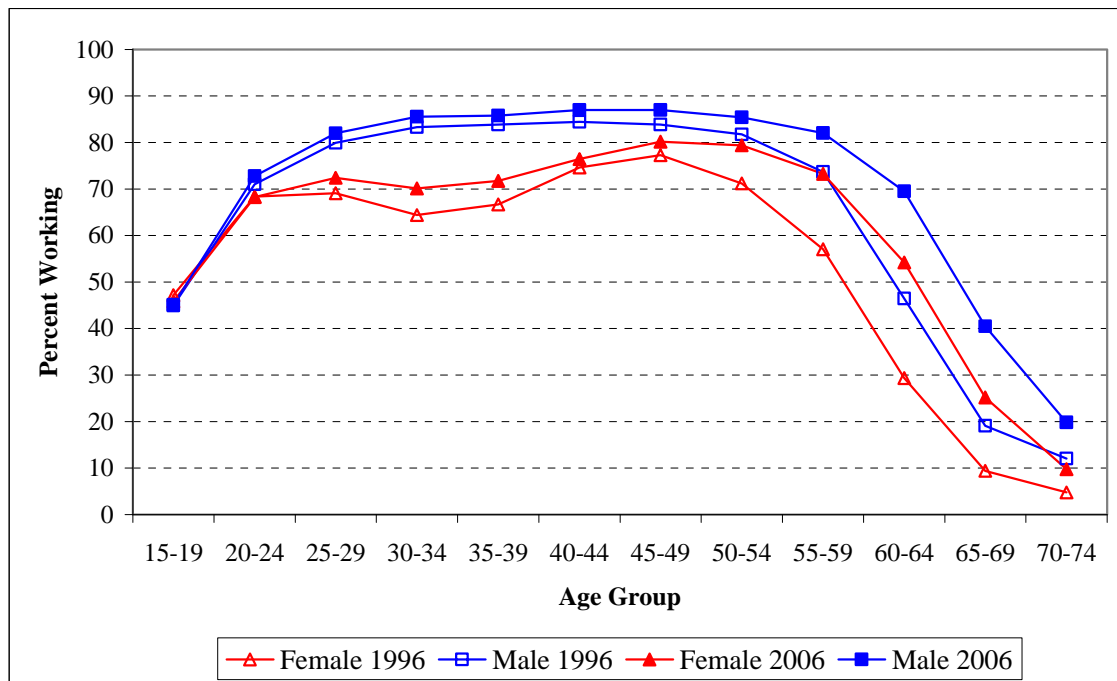
Table 11: Projected Regional per Annum Change in Key Demographic and Labour Market Attributes for the 2006 to 2021 Period

Regional Growth Scenario Measures	Annual % Change Rate
Population growth rate	0.63
Rate of growth of population aged 15 to 64	0.37
Projected growth in labour supply (FTEs) assuming 2006 work participation rates	0.64
Rate of Change in Labour Demand as FTEs under BERL "Business as usual" May 2007 projection	1.40
Rate of Change in Labour Demand as FTEs under BERL 2002/2003 projection used in the WTSM 2001 base run (2001-2016)	0.86
Projected growth in labour supply (FTE's) assuming 0.483 of the 1996-2006 rates of change in work participation rates	1.14
Modified version of BERL 2007 projection customised for MERA	1.14

3.2 Projected Labour Force Participation Trends

Projections of the number of employed residents in the region are derived directly from the population projections by applying age and gender specific employment rates to population estimates by age and gender. Participation in paid work has increased significantly over the 1996 to 2006 period, especially amongst those aged 50 years or over and women aged 30 to 39, as illustrated in Figure 7. The recent short term trend has seen big increases participation for some age and gender groups and localities. The WTSM 2006 base projection has assumed continuation of the direction of the 1996 to 2006 trends in increased participation in paid work rates by age, gender and locality, but moderated over time as extrapolation of the short term trend is not realistic for the medium term.

Figure 8: Comparing 1996 and 2006 Wellington Regional labour force participation rates by age and gender



3.3 Labour Supply and Demand Scenarios

Recent years of high economic growth have seen labour supply bottlenecks becoming a significant factor in the expansion plans for some industry sectors. The issue is highlighted by Table 11, which for the 2006 to 2021 period, projects

- annual percent growth rates of population under the most up to date (December 2007) Statistics NZ subnational (medium) projection;
- corresponding working age population (15 to 64 year olds);
- corresponding labour supply as FTE's (full time equivalents) based on the population projection based on 2006 employment participation rates;
- corresponding labour supply under a credible projected future scenario of increased labour force participation; and

- projected change in labour demand corresponding to the May 2007 "business as usual" projection prepared by BERL for the Wellington Regional Strategy.

Labour force supply is determined to be a major constraint to growth in the regional economy in the projection period, as has been the experience of the NZ labour market over the last several years.

Population growth is projected to be 0.63% per annum between 2006 and 2021. An aging population means that the growth rate of the population of traditional working age (15 to 64 years) is only 0.37% per annum. Labour participation is higher amongst older workers than young adults for whom engagement in post-school training and in parenting of young children reduces labour participation. An increase in mean age of the working population and increased participation by those post-retirement means that the working population increases faster than the working age population. If we assume that the same rates of participation in paid work as estimated for 2006 apply then the annual percent growth rate of labour supply is 0.64% per annum.

The most up to date economic projection anticipates an annual percent growth in labour demand (as full time equivalents - FTEs) at 1.4% per annum between 2006 and 2021. If it is assumed that labour market participation changes following a trend determined from the major change pattern of 1996 to 2006, but at a slower rate (0.483 of the increment of change estimated for the 1996 to 2006 period) then the projected growth in labour supply (FTEs) is 1.14% per annum over the 2006 to 2021 period. This rate of increase in labour force participation is believable in the medium term and has been used as a benchmark for an economic projection corresponding to the demographic projection. A customised version of the BERL 2007 economic projection dampened down to this 1.14% per annum growth rate was prepared by BERL for this WTSM base run. By contrast with the May 2007 economic projection, the projected rate of growth in employment in the 2002/2003 WTSM update was 0.86% full time equivalent (FTE) jobs per annum.

Projected labour force demand is based on the BERL "business as usual" June 2007 employment projection scenario customised down from 1.4% per annum growth in FTE down to 1.14% over the 2006 to 2021 period. The rate of change is calibrated to fit the projection intercensal changes in labour force supply at regional level.

The projected per annum percent growth rates of full time equivalent by industry group for the 2006 to 2021 period are summarised in Appendix B, Table B1. The corresponding per annum growth rates in full time equivalent jobs by industry for the intercensal periods 2006 to 2011 through to 2026 to 2031 are shown in Tables B2 to B6. The derivation of the industry groups used from ANZSIC 2001 categories and the manner in which these are aggregated further to arrive at the industry groups used in the main WTSM and HCV models are summarised in Table B7.

The projected population aged 15 to 64 years levels off between 2016 and 2021 under the medium growth rate scenario but drops from 2011 under the low growth scenario as illustrated in Figure 9. The effect of extrapolated continued rising work participation rates would see the population actively working rise under all three scenarios as is illustrated in Figure 10.

Figure 9: Historical and Projected Population Aged 15 to 64 years of age in the Wellington Region 1981 to 2031

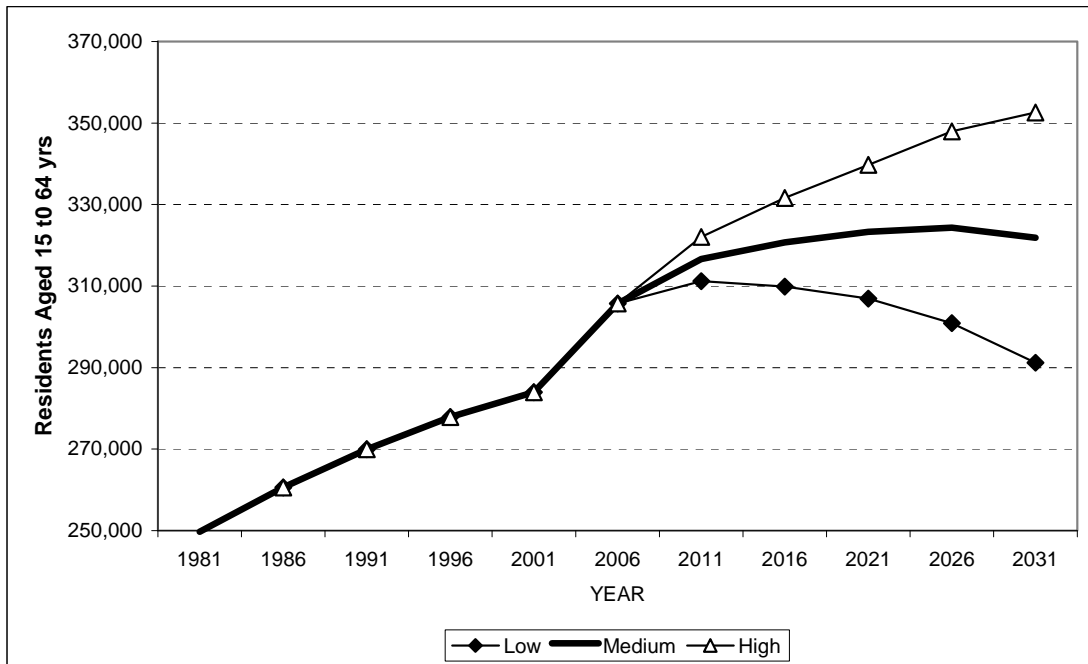
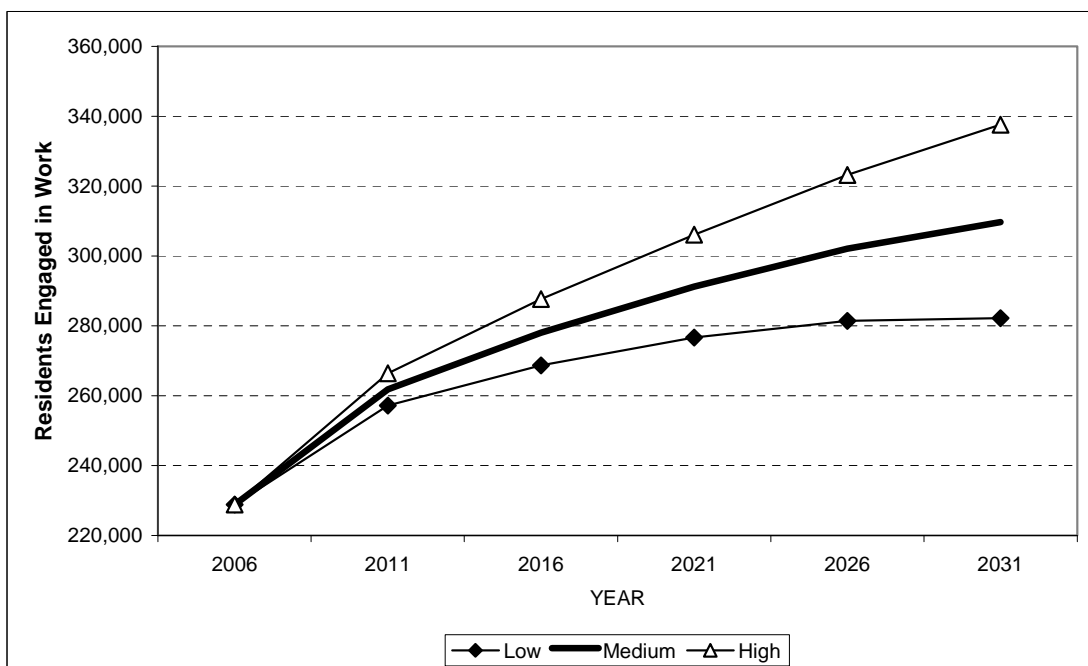


Figure 10: Projected Employed Residents in the Wellington Region 2006 to 2031



3.4 Allocation of Industry Workplace Projections to Subregional Workplaces

Performances over the 1996 to 2006 period of two different methods of allocating regional industry employment to subregional areas were compared. The method by BERL was a uniform rate of growth for any particular industry around the region. This will produce differential rates of growth within the region due to "industry mix" effects. The other alternative method was the industry specific formulas used in the 2002/2003 round and outlined in the May 2003 "Wellington Transport Strategy Model, TN12.1 MERA Base Run Projections" report. Overall, a uniform growth rate approach gave a lower "sums of squares" residual between projected and actual employment change by industry at the local authority level. This has therefore been used in this model update. There appears to be some scope for a third derivative approach that assumes local population growth rate driven growth in local employments for two or three of the 33 industry subgroups. This might be explained on random effects alone but deserves further analysis and consideration for a future projection runs.

There is also scope for conceiving and developing different methods, but this goes beyond the scope of this base run. One possibility explored was to apply estimated differences in between local (local authority - TA) and regional growth rates for each industry as a template for future subregional differences in industry growth. For this simple approach to have credibility, the direction of differences between the TA and regional growth rate of an industry would expect to be consistent over the 1996-2001 and 2001-2006 periods at minimum. Applying this rule to the estimated changes in industry employment (FTEs) over the two historical periods did not show any overall consistency across the region and only weakly for any individual TA. Some of such apparently consistent differences would be expected by random probability but further work on alternative sub-regional allocation strategies is warranted. Ideally, the margin of difference in growth rates should also be similar. Work by Baxendine, Cochrane and Poot (2005) at the University of Waikato suggests that population growth over the previous intercensal period explains some of the industry competitive effects between regions and this lagged effect might be worth exploring in the future. The resulting medium projection numbers of full time equivalent jobs by workplace territorial authority is summarised in Table 12.

Table 12: Projected Full Time Equivalent Jobs by Workplace Local Authority - 2006 to 2026 Period

	2006	2011	2016	2021	2026
Kapiti Coast District	12,186	13,535	14,064	14,458	14,806
Porirua City	12,794	14,345	14,973	15,446	15,863
Upper Hutt City	10,524	11,712	12,179	12,526	12,834
Lower Hutt City	39,256	43,369	44,915	46,033	47,019
Wellington City	117,613	130,686	135,929	139,814	143,212
Masterton District	9,381	10,336	10,704	10,969	11,200
Carterton District	2,930	3,154	3,230	3,278	3,318
South Wairarapa District	3,468	3,741	3,837	3,901	3,955
Wellington TA's	208,152	230,878	239,831	246,425	252,207

4 Updating Land Use Assumptions

Understanding the distribution of the population around the region is also critically important to allow accurate forecasting of travel demand. Projections used in WSTM are based on historical trends in behaviour based on local net migration by age and gender and the estimated amount of suitable land available for residential use. From this each Census Area Unit (area unit) is classified into one of six 'suburb' types, which determines how future population projections are allocated to the area units in each Territorial Authority. As the projection progresses, local development characteristics feedback to the typing of each suburb. Table 13 sets out the parameters used to determine the suburb typing included in the new WSTM, along with the number of area units within each suburb type. The detailed list of which suburbs are included in each type is shown in Appendix A.

Table 13: MERA Suburb Types

Suburb Type	Description
<i>High Density Residential</i> (7)	Inner city urban areas with major high density/ high rise redevelopment during 1990's and early 2000's (includes seven area units in Wellington City CBD and parts of Hutt City).
<i>High Growth Greenfield</i> (8)	Estimated net migration gain over previous five-year period of <u>more</u> than +100, and <u>more</u> than 10% of residential land vacant.
<i>Low Growth Greenfield</i> (27)	Estimated net migration over previous five-year period of <u>between</u> -100 and +100, and <u>more</u> than 10% of residential land vacant.
<i>Shrinking</i> (74)	Estimated net migration loss of <u>more</u> than 100 over previous five-year period.
<i>Developed</i> (55)	<u>Less</u> than 2% of residential land vacant and not in any of the above categories.
<i>Normal</i> (16)	All remaining area units.

The land use modelling process in the demographic / development projection model involves allocating future demand at the local authority level down to area units based on recent historical market preferences reflected in net migration by age and gender, suburb capacity in terms of estimated vacant residential or infill capacity and specific details of some future green field developments for which there is no historical migration history to work with.

Land use capacity was determined by analysis of land parcel data and associated attributes to determine vacant residential land area and infill capacity in existing residential properties. The input LIS (land information system) base was obtained for the update from the Greater Wellington the Regional Council GIS unit and incorporated the results of the review of land use capacity issues in the Wellington Regional Strategy process. This was supplemented with information on some specific developments including the Waikanae Central potential from the Kapiti Coast District Council and information on the future development plans for the Aotea Block, Silverwood, Whitby and Duck Creek from published information by the Porirua City Council and developers.

The recent real estate boom has seen the range of prospective green field and other infill redevelopments proliferate. The information on recent market trends implicit in past migration patterns does not provide a ready guide to which new developments are most likely to proceed and when. The potential now exists to use information on intercensal migration movements of *households* (as compared with *individuals*) by type of household to better define housing market demand segments and then relate this to classifications of the likely market supply segment profiles of areas of new green field potential within the region.

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Appendix A: WTSM Area Unit Typing

Table A.1: High Density Area Units

Local Authority	Area Unit
Lower Hutt City	Esplanade
	Petone Central
Wellington City	Brooklyn
	Lambton
	Mt Cook-Wallace Street
	Mt Victoria West
	Thorndon-Tinakori Road
	Willis Street-Cambridge Terrace

Table A.2: High Growth Greenfield Area Units

Local Authority	Area Unit
Kapiti Coast District	Maungakotukutuku
	Waikanae Beach
	Waikanae East
Porirua City	Endeavour
	Papakowhai
Upper Hutt City	Mangaroa
	Nabhra
Lower Hutt City	Belmont
Wellington City	Adelaide
	Churton
	Churton Park
	Happy Valley-Owhiro Bay
	Makara-Ohariu
	Newlands East

Table A.3: Low Growth Greenfield Area Units

Local Authority	Area Unit
Kapiti Coast District	Kaitawa
	Otaihanga
	Paraparaumu Beach North
	Te Horo
Porirua City	Mana-Camborne
	Paremata-Postgate
	Pauatahanui
	Pukerua Bay
	Ranui Heights
	Resolution
Upper Hutt City	Clouston Park
	Cloustonville

	Maoribank
	Pinehaven
	Trentham North
	Wallaceville
Lower Hutt City	Eastbourne
	Haywards-Manor Park
	Manuka
	Maungaraki
	Normandale
Wellington City	Brooklyn South
	Grenada
	Grenada North
	Island Bay West
	Kaiwharawhara
	Karori Park
	Newlands North
	Ngauranga East
	Seatoun
Masterton District	Homebush-Te Ore Ore
	Kopuaranga
	Lansdowne
	Masterton West
	Opaki
	Solway North
	Solway South
Carterton District	Te Wharau
South Wairarapa District	Featherston
	Greytown
	Martinborough

Table A.4: Shrinking Area Units

Local Authority	Area Unit
Kapiti Coast District	Otaki
	Paekakariki
Porirua City	Ascot Park
	Cannons Creek East
	Cannons Creek North
	Cannons Creek South
	Elsdon-Takapuwahia
	Waitangirua
Upper Hutt City	Emerald Hill
	Moonshine
	Totara Park
Lower Hutt City	Alicetown
	Arakura
	Delaney
	Fernlea
	Glendale

	Holburn
	Homedale East
	Homedale West
	Kelson
	Moera
	Naenae South
	Parkway
Wellington City	Awarua
	Linden
Masterton District	Masterton East
	Whareama

Table A.4: Developed Area Units

Local Authority	Area Unit
Kapiti Coast District	Kapiti Island
	Paraparaumu Central
Porirua City	Discovery
	Inlet-Porirua Harbour
	Mana Island
	Paekakariki Hill
	Porirua Central
Upper Hutt City	Brentwood
	Ebdentown
	Elderslea
	Heretaunga Park
	Heretaunga-Silverstream
	Trentham South
	Upper Hutt Central
Lower Hutt City	Boulcott-Avalon
	Epuni West
	Hutt Central
	Naenae North
	Naenae West
	Pencarrow
	Taita North
	Taita South
	Waiwhetu South
	Waterloo
	Wilford
	Woburn North
	Woburn South
Wellington City	Hataitai
	Island Bay East
	Johnsonville North

	Johnsonville South
	Johnston Hill
	Karori East
	Kilbirnie East
	Kilbirnie West
	Lyall Bay
	Maupuia
	Miramar North
	Miramar South
	Ngauranga West
	Tawa South
Carterton District	Waingawa
South Wairarapa District	Tuturumuri

Table A.4: Normal Area Units

Local Authority	Area Unit
Kapiti Coast District	Otaki Forks
	Paraparaumu Beach South
	Raumati Beach
	Raumati South
	Waikanae Central
Porirua City	Adventure
	Onepoto
	Plimmerton
	Porirua East
	Titahi Bay North
	Titahi Bay South
Upper Hutt City	Akatarawa
	Maidstone
	Te Marua
Lower Hutt City	Epuni East
	Gracefield
	Korokoro
	Melling
	Tawhai
	Waiwhetu North
Wellington City	Aro Street-Nairn Street
	Berhampore
	Central Tawa
	Greenacres
	Johnsonville East
	Karaka Bay-Worser Bay
	Kelburn
	Khandallah Park
	Kingston
	Melrose
Mitchelltown	

	Newlands South
	Newtown East
	Newtown West
	Ngaio
	Northland
	Oriental Bay
	Paparangi
	Rangoon Heights
	Raroa
	Roseneath
	Strathmore Park
	Taitville
	Te Kainga
	Vogeltown
	Wadestown
	Wilton-Otari
	Wright Hill
Masterton District	Masterton Central
	Masterton Railway
	Ngaumutawa
Carterton District	Carterton
	Mt Holdsworth
South Wairarapa District	Kahutara

Appendix B: Economic Projection Assumptions

Table B.1: Projected Wellington Region percent per annum full time equivalent growth rates (medium projection) 2006 to 2021

Industry Code	Industry Description	% FTE PA 2006-2021
1	Agriculture, Hunting and Trapping	-0.18
2	Other Farming and Services to Agriculture, Hunting and Trapping	0.01
3	Forestry and Logging	1.90
4	Commercial Fishing	-3.00
5	Coal Mining	.
6	Oil and Gas Extraction and Exploration	1.08
7	Other Mining and quarrying and services to mining	1.22
8	Food Beverage and Tobacco	-0.49
9	Textile Clothing Footwear and Leather Manufacturing	1.66
10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	1.44
11	Printing Publishing and Recorded Media	-0.27
12	Petroleum Coal Chemical and Associated Product Manufacturing	0.54
13	Non-Metallic Mineral Product Manufacturing	-4.13
14	Metal Product Manufacturing	-0.27
15	Machinery and Equipment Manufacturing	-2.11
16	Other Manufacturing	1.23
17	Electricity and Gas Supply	0.81
18	Water Supply	1.38
19	Construction	2.13
20	Wholesale and Retail Trade	0.95
21	Accommodation, Cafes and Restaurants	1.38
22	Road Transport	0.11
23	Water and Rail Transport	-0.45
24	Air Transport, Services to Transport, Storage	1.98
25	Storage and Communication Services	1.05
26	Finance and Insurance	-0.26
27	Property Services	0.57
28	Business Services	1.17
29	Government Administration and Defence	1.81
30	Education	1.53
31	Health Services	1.95
32	Cultural and Recreational Services	0.96
33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	0.87
35	All Industries	1.14

Table B.2: Projected Wellington Region percent per annum full time equivalent growth rates 2006 to 2011

Industry Code	Industry Description	% FTE PA 2006-2011		
		Low	Medium	High
1	Agriculture, Hunting and Trapping	-0.13	-0.10	-0.08
2	Other Farming and Services to Agriculture, Hunting and Trapping	0.01	0.01	0.02
3	Forestry and Logging	2.95	3.47	4.19
4	Commercial Fishing	-2.27	-1.89	-1.47
5	Coal Mining	0.00	0.00	0.00
6	Oil and Gas Extraction and Exploration	1.64	1.93	2.33
7	Other Mining and quarrying and services to mining	1.84	2.16	2.62
8	Food Beverage and Tobacco	-0.36	-0.29	-0.23
9	Textile Clothing Footwear and Leather Manufacturing	2.55	3.00	3.63
10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	2.21	2.59	3.14
11	Printing Publishing and Recorded Media	-0.20	-0.16	-0.12
12	Petroleum Coal Chemical and Associated Product Manufacturing	0.79	0.93	1.12
13	Non-Metallic Mineral Product Manufacturing	-3.18	-2.66	-2.07
14	Metal Product Manufacturing	-0.27	-0.22	-0.17
15	Machinery and Equipment Manufacturing	-1.65	-1.37	-1.06
16	Other Manufacturing	1.87	2.19	2.65
17	Electricity and Gas Supply	1.22	1.43	1.74
18	Water Supply	2.10	2.47	2.99
19	Construction	3.33	3.91	4.72
20	Wholesale and Retail Trade	1.43	1.67	2.03
21	Accommodation, Cafes and Restaurants	2.10	2.47	2.99
22	Road Transport	0.16	0.19	0.23
23	Water and Rail Transport	-0.33	-0.27	-0.21
24	Air Transport, Services to Transport, Storage	3.09	3.63	4.39
25	Storage and Communication Services	1.58	1.86	2.25
26	Finance and Insurance	-0.19	-0.15	-0.12
27	Property Services	0.84	0.98	1.19
28	Business Services	1.77	2.08	2.52
29	Government Administration and Defence	2.80	3.29	3.98
30	Education	2.34	2.75	3.33
31	Health Services	3.03	3.56	4.31
32	Cultural and Recreational Services	1.45	1.70	2.06
33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	1.31	1.53	1.86
35	All Industries	1.69	2.05	2.53

Table B.3: Projected Wellington Region percent per annum full time equivalent growth rates 2011 to 2016

Industry Code	Industry Description	% FTE PA 2011-2016		
		Low	Medium	High
1	Agriculture, Hunting and Trapping	-0.53	-0.25	-0.20
2	Other Farming and Services to Agriculture, Hunting and Trapping	0.00	0.01	0.01
3	Forestry and Logging	0.79	1.31	1.81
4	Commercial Fishing	-9.42	-4.22	-3.35
5	Coal Mining	0.00	0.00	0.00
6	Oil and Gas Extraction and Exploration	0.45	0.75	1.04
7	Other Mining and quarrying and services to mining	0.50	0.84	1.16
8	Food Beverage and Tobacco	-1.42	-0.67	-0.54
9	Textile Clothing Footwear and Leather Manufacturing	0.69	1.14	1.58
10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	0.60	1.00	1.38
11	Printing Publishing and Recorded Media	-0.76	-0.36	-0.29
12	Petroleum Coal Chemical and Associated Product Manufacturing	0.22	0.37	0.52
13	Non-Metallic Mineral Product Manufacturing	-13.50	-5.84	-4.63
14	Metal Product Manufacturing	-0.76	-0.36	-0.29
15	Machinery and Equipment Manufacturing	-6.44	-2.95	-2.35
16	Other Manufacturing	0.51	0.84	1.17
17	Electricity and Gas Supply	0.34	0.56	0.78
18	Water Supply	0.57	0.95	1.32
19	Construction	0.88	1.46	2.02
20	Wholesale and Retail Trade	0.39	0.66	0.91
21	Accommodation, Cafes and Restaurants	0.57	0.95	1.32
22	Road Transport	0.04	0.07	0.10
23	Water and Rail Transport	-1.30	-0.62	-0.49
24	Air Transport, Services to Transport, Storage	0.82	1.36	1.88
25	Storage and Communication Services	0.43	0.72	1.00
26	Finance and Insurance	-0.73	-0.35	-0.28
27	Property Services	0.24	0.40	0.55
28	Business Services	0.49	0.81	1.12
29	Government Administration and Defence	0.75	1.25	1.72
30	Education	0.63	1.06	1.46
31	Health Services	0.81	1.34	1.85
32	Cultural and Recreational Services	0.40	0.66	0.92
33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	0.36	0.61	0.84
35	All Industries	0.45	0.79	1.12

Table B.4: Projected Wellington Region percent per annum full time equivalent growth rates 2016 to 2021

Industry Code	Industry Description	% FTE PA 2016-2021		
		Low	Medium	High
1	Agriculture, Hunting and Trapping	-1.15	-0.32	-0.27
2	Other Farming and Services to Agriculture, Hunting and Trapping	0.00	0.01	0.01
3	Forestry and Logging	0.44	0.95	1.39
4	Commercial Fishing	-23.89	-4.92	-4.05
5	Coal Mining	0.00	0.00	0.00
6	Oil and Gas Extraction and Exploration	0.26	0.56	0.82
7	Other Mining and quarrying and services to mining	0.29	0.63	0.92
8	Food Beverage and Tobacco	-3.22	-0.88	-0.72
9	Textile Clothing Footwear and Leather Manufacturing	0.39	0.83	1.22
10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	0.34	0.73	1.07
11	Printing Publishing and Recorded Media	-1.77	-0.49	-0.41
12	Petroleum Coal Chemical and Associated Product Manufacturing	0.13	0.28	0.41
13	Non-Metallic Mineral Product Manufacturing	-55.24	-6.91	-5.68
14	Metal Product Manufacturing	-1.27	-0.35	-0.29
15	Machinery and Equipment Manufacturing	-15.30	-3.57	-2.95
16	Other Manufacturing	0.29	0.63	0.93
17	Electricity and Gas Supply	0.20	0.43	0.63
18	Water Supply	0.33	0.71	1.03
19	Construction	0.49	1.05	1.54
20	Wholesale and Retail Trade	0.23	0.49	0.72
21	Accommodation, Cafes and Restaurants	0.33	0.71	1.03
22	Road Transport	0.03	0.06	0.09
23	Water and Rail Transport	-2.98	-0.81	-0.67
24	Air Transport, Services to Transport, Storage	0.45	0.98	1.44
25	Storage and Communication Services	0.25	0.55	0.80
26	Finance and Insurance	-1.66	-0.46	-0.38
27	Property Services	0.14	0.30	0.44
28	Business Services	0.28	0.61	0.89
29	Government Administration and Defence	0.42	0.91	1.33
30	Education	0.36	0.77	1.13
31	Health Services	0.45	0.97	1.43
32	Cultural and Recreational Services	0.23	0.50	0.73
33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	0.21	0.45	0.66
35	All Industries	0.25	0.59	0.89

Table B.5: Projected Wellington Region percent per annum full time equivalent growth rates 2021 to 2026

Industry Code	Industry Description	% FTE PA 2021-2026		
		Low	Medium	High
1	Agriculture, Hunting and Trapping	-2.11	-0.34	-0.21
2	Other Farming and Services to Agriculture, Hunting and Trapping	0.00	0.01	0.01
3	Forestry and Logging	0.23	0.80	1.24
4	Commercial Fishing		-5.14	-3.11
5	Coal Mining	0.00	0.00	0.00
6	Oil and Gas Extraction and Exploration	0.14	0.49	0.76
7	Other Mining and quarrying and services to mining	0.15	0.54	0.84
8	Food Beverage and Tobacco	-6.00	-0.92	-0.57
9	Textile Clothing Footwear and Leather Manufacturing	0.20	0.71	1.10
10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	0.18	0.63	0.98
11	Printing Publishing and Recorded Media	-3.22	-0.52	-0.32
12	Petroleum Coal Chemical and Associated Product Manufacturing	0.07	0.25	0.39
13	Non-Metallic Mineral Product Manufacturing		-7.16	-4.30
14	Metal Product Manufacturing	-2.04	-0.33	-0.20
15	Machinery and Equipment Manufacturing	-44.77	-3.70	-2.26
16	Other Manufacturing	0.15	0.55	0.85
17	Electricity and Gas Supply	0.11	0.37	0.58
18	Water Supply	0.17	0.61	0.95
19	Construction	0.25	0.87	1.36
20	Wholesale and Retail Trade	0.12	0.43	0.67
21	Accommodation, Cafes and Restaurants	0.17	0.61	0.95
22	Road Transport	0.01	0.05	0.08
23	Water and Rail Transport	-5.52	-0.86	-0.53
24	Air Transport, Services to Transport, Storage	0.23	0.82	1.28
25	Storage and Communication Services	0.13	0.48	0.74
26	Finance and Insurance	-3.02	-0.48	-0.30
27	Property Services	0.08	0.27	0.42
28	Business Services	0.15	0.53	0.82
29	Government Administration and Defence	0.22	0.77	1.19
30	Education	0.19	0.66	1.03
31	Health Services	0.23	0.82	1.27
32	Cultural and Recreational Services	0.12	0.44	0.68
33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	0.11	0.40	0.62
35	All Industries	0.11	0.50	0.83

Table B.6: Projected Wellington Region percent per annum full time equivalent growth rates 2026 to 2031

Industry Code	Industry Description	% FTE PA 2026-2031		
		Low	Medium	High
1	Agriculture, Hunting and Trapping	8.28	-0.41	-0.22
2	Other Farming and Services to Agriculture, Hunting and Trapping	0.00	0.01	0.01
3	Forestry and Logging	-0.05	0.67	1.18
4	Commercial Fishing	47.54	-6.25	-3.29
5	Coal Mining	0.00	0.00	0.00
6	Oil and Gas Extraction and Exploration	-0.03	0.41	0.72
7	Other Mining and quarrying and services to mining	-0.03	0.46	0.80
8	Food Beverage and Tobacco	17.96	-1.10	-0.60
9	Textile Clothing Footwear and Leather Manufacturing	-0.04	0.60	1.05
10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	-0.04	0.53	0.93
11	Printing Publishing and Recorded Media	11.58	-0.61	-0.33
12	Petroleum Coal Chemical and Associated Product Manufacturing	-0.01	0.21	0.37
13	Non-Metallic Mineral Product Manufacturing	54.08	-8.80	-4.55
14	Metal Product Manufacturing	8.05	-0.39	-0.22
15	Machinery and Equipment Manufacturing	41.04	-4.47	-2.38
16	Other Manufacturing	-0.03	0.46	0.81
17	Electricity and Gas Supply	-0.02	0.31	0.55
18	Water Supply	-0.04	0.51	0.90
19	Construction	-0.05	0.73	1.29
20	Wholesale and Retail Trade	-0.03	0.36	0.64
21	Accommodation, Cafes and Restaurants	-0.04	0.51	0.90
22	Road Transport	0.00	0.04	0.08
23	Water and Rail Transport	17.01	-1.02	-0.56
24	Air Transport, Services to Transport, Storage	-0.05	0.69	1.21
25	Storage and Communication Services	-0.03	0.40	0.70
26	Finance and Insurance	11.01	-0.58	-0.31
27	Property Services	-0.02	0.23	0.40
28	Business Services	-0.03	0.44	0.78
29	Government Administration and Defence	-0.05	0.65	1.13
30	Education	-0.04	0.56	0.98
31	Health Services	-0.05	0.69	1.21
32	Cultural and Recreational Services	-0.03	0.37	0.64
33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	-0.02	0.34	0.59
35	All Industries	-0.02	0.42	0.79

Table B.7: Industry Classifications as used in the Growth Projections

ANZIC 2001 Lvl 2	Ind Code	Industry Description	WTSM Industry	HCV Industry
A01 Agriculture	1	Agriculture, Hunting and Trapping	5 Other	5 Agr/Min/Constr
A02 Services to Agriculture; Hunting and Trapping	2	Other Farming and Services to Agriculture, Hunting and Trapping	5 Other	5 Agr/Min/Constr
A03 Forestry and Logging	3	Forestry and Logging	5 Other	5 Agr/Min/Constr
A04 Commercial Fishing	4	Commercial Fishing	5 Other	5 Agr/Min/Constr
B11 Coal Mining	5	Coal Mining	2 Manuf	5 Agr/Min/Constr
B12 Oil and Gas Extraction	6	Oil and Gas Extraction and Exploration	2 Manuf	5 Agr/Min/Constr
B13 Metal Ore Mining	7	Other Mining and quarrying and services to mining	2 Manuf	5 Agr/Min/Constr
B14 Other Mining	7	Other Mining and quarrying and services to mining	2 Manuf	5 Agr/Min/Constr
B15 Services to Mining	7	Other Mining and quarrying and services to mining	2 Manuf	5 Agr/Min/Constr
C21 Food Beverage and Tobacco	8	Food Beverage and Tobacco	2 Manuf	2 Manuf
C22 Textile Clothing Footwear and Leather Manufacturing	9	Textile Clothing Footwear and Leather Manufacturing	2 Manuf	2 Manuf
C23 Wood and Paper Product Manufacturing	10	Log Sawmilling, Timber Dressing and Other Wood Product Manufacturing	2 Manuf	2 Manuf
C24 Printing Publishing and Recorded Media	11	Printing Publishing and Recorded Media	2 Manuf	2 Manuf
C25 Petroleum Coal Chemical and Associated Product Manufacturing	12	Petroleum Coal Chemical and Associated Product Manufacturing	2 Manuf	2 Manuf
C26 Non-Metallic Mineral Product Manufacturing	13	Non-Metallic Mineral Product Manufacturing	2 Manuf	2 Manuf
C27 Metal Product Manufacturing	14	Metal Product Manufacturing	2 Manuf	2 Manuf
C28 Machinery and Equipment Manufacturing	15	Machinery and Equipment Manufacturing	2 Manuf	2 Manuf
C29 Other Manufacturing	16	Other Manufacturing	2 Manuf	2 Manuf
D36 Electricity and Gas Supply	17	Electricity and Gas Supply	2 Manuf	2 Manuf
D37 Water Supply Sewerage and Drainage Services	18	Water Supply	2 Manuf	2 Manuf
E41 General Construction	19	Construction	2 Manuf	5 Agr/Min/Constr
E42 Construction Trade Services	19	Construction	2 Manuf	5 Agr/Min/Constr
F45 Basic Material Wholesaling	20	Wholesale and Retail Trade	1 Retail	1 Retail
F46 Machinery and Motor Vehicle Wholesaling	20	Wholesale and Retail Trade	1 Retail	1 Retail
F47 Personal and Household Good Wholesaling	20	Wholesale and Retail Trade	1 Retail	1 Retail
G51 Food Retailing	20	Wholesale and Retail Trade	1 Retail	1 Retail
G52 Personal and Household Good Retailing	20	Wholesale and Retail Trade	1 Retail	1 Retail
G53 Motor Vehicle Retailing and Services	20	Wholesale and Retail Trade	1 Retail	1 Retail
H57 Accommodation Cafes and Restaurants	21	Accommodation, Cafes and Restaurants	1 Retail	1 Retail
I61 Road Transport	22	Road Transport	3 Trspt or Comms	3 Trspt or Comms
I62 Rail Transport	23	Water and Rail Transport	3 Trspt or Comms	3 Trspt or Comms

I63 Water Transport	23	Water and Rail Transport	3 Trspt or Comms	3 Trspt or Comms
I64 Air and Space Transport	24	Air Transport, Services to Transport, Storage	3 Trspt or Comms	3 Trspt or Comms
I65 Other Transport	24	Air Transport, Services to Transport, Storage	3 Trspt or Comms	3 Trspt or Comms
I66 Services to Transport	24	Air Transport, Services to Transport, Storage	3 Trspt or Comms	3 Trspt or Comms
I67 Storage	25	Storage and Communication Services	3 Trspt or Comms	3 Trspt or Comms
J71 Communication Services	25	Storage and Communication Services	3 Trspt or Comms	3 Trspt or Comms
K73 Finance	26	Finance and Insurance	4 Services	4 Services
K74 Insurance	26	Finance and Insurance	4 Services	4 Services
K75 Services to Finance and Insurance	26	Finance and Insurance	4 Services	4 Services
L77 Property Services	27	Property Services	4 Services	4 Services
L78 Business Services	28	Business Services	4 Services	4 Services
M81 Government Administration	29	Government Administration and Defence	4 Services	4 Services
M82 Defence	29	Government Administration and Defence	4 Services	4 Services
N84 Education	30	Education	4 Services	4 Services
O86 Health Services	31	Health Services	4 Services	4 Services
O87 Community Services	31	Health Services	4 Services	4 Services
P91 Motion Picture Radio and Television Services	32	Cultural and Recreational Services	4 Services	4 Services
P92 Libraries Museums and the Arts	32	Cultural and Recreational Services	4 Services	4 Services
P93 Sport and Recreation	32	Cultural and Recreational Services	4 Services	4 Services
Q95 Personal Services	33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	4 Services	4 Services
Q96 Other Services	33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	4 Services	4 Services
Q97 Private Households Employing Staff	33	Personal and Other Services, Pest Control and Cleaning Services, Waste Disposal and Sewerage Services	4 Services	4 Services
R99 Not specified	34	Not Specified	6 Missing	
TTT Total	35	All Industries	7 Total	6 Total

Appendix C: Local Authority Level Results Summary

Table C.1: Low Growth Scenario Projected Wellington Territorial Local Authority Usually Resident Population, Net Migration, Occupied Private Dwellings, Jobs at Local Workplaces and Residents Employed - 2006 to 2021

Territorial Local Authority	year	Usually Resident NZ Population	Net Migration	Occupied Private Households	Mean Occupied Private Household Size	Workplace Employed Full-time	Workplace Employed Part-time	Total Jobs by Workplace	Residents Employed Full-time	Residents Employed Part-time
Kapiti Coast District	2006	46,329	3,753	19,110	2.33	9,834	4,706	14,539	14,838	5,202
	2011	48,148	1,970	20,255	2.28	10,745	5,142	15,887	17,187	5,758
	2016	49,679	2,003	21,325	2.23	10,925	5,245	16,170	18,719	6,043
	2021	51,066	1,961	22,283	2.19	10,944	5,282	16,226	19,823	6,333
	2026	52,412	1,946	23,078	2.17	10,887	5,279	16,166	20,502	6,734
	2031	53,618	1,922	23,821	2.15	10,874	5,287	16,161	20,694	7,049
Porirua City	2006	48,888	-1,604	15,390	3.07	10,916	3,757	14,673	17,589	4,689
	2011	48,680	-3,048	15,658	3.00	12,035	4,125	16,160	19,642	5,585
	2016	48,086	-2,998	15,922	2.90	12,298	4,219	16,518	20,672	5,828
	2021	47,226	-2,996	15,963	2.83	12,384	4,260	16,644	21,197	6,034
	2026	46,193	-3,018	15,975	2.76	12,378	4,272	16,650	21,031	6,161
	2031	44,958	-2,924	15,875	2.70	12,426	4,291	16,717	20,372	6,143
Upper Hutt City	2006	38,727	1,227	14,127	2.61	8,949	3,150	12,099	14,709	3,918
	2011	38,608	-1,235	14,708	2.49	9,795	3,448	13,243	16,406	4,713
	2016	38,190	-1,120	15,182	2.39	9,961	3,524	13,486	16,727	4,795
	2021	37,475	-1,150	15,451	2.30	9,979	3,556	13,535	16,692	4,849
	2026	36,715	-1,031	15,708	2.21	9,948	3,561	13,509	16,358	5,027
	2031	35,717	-1,112	15,885	2.12	9,993	3,575	13,568	15,779	5,094
Lower Hutt City	2006	98,132	-1,808	35,325	2.70	34,444	9,624	44,068	38,451	10,275
	2011	97,815	-4,426	35,983	2.65	37,419	10,533	47,952	41,857	11,946

	2016	96,807	-4,464	36,412	2.59	37,852	10,749	48,601	42,971	12,307
	2021	95,303	-4,491	36,708	2.52	37,637	10,819	48,456	43,271	12,720
	2026	93,511	-4,489	36,880	2.46	37,169	10,807	47,976	42,841	13,220
	2031	91,327	-4,422	36,799	2.40	37,076	10,834	47,910	41,765	13,545
Wellington City	2006	180,287	9,478	67,689	2.57	105,307	24,612	129,918	80,016	21,174
	2011	185,290	-2,078	70,946	2.52	115,121	26,953	142,074	88,269	24,616
	2016	190,020	-2,080	74,183	2.48	117,326	27,555	144,881	93,254	25,369
	2021	194,607	-2,085	77,265	2.43	117,656	27,784	145,440	97,077	26,475
	2026	198,878	-2,148	80,617	2.38	116,628	27,751	144,379	99,334	27,965
	2031	202,374	-2,203	83,496	2.33	116,075	27,781	143,856	100,191	29,764
Masterton District	2006	22,743	-330	8,886	2.44	7,884	2,994	10,878	7,527	2,679
	2011	22,551	-584	9,203	2.33	8,551	3,259	11,809	8,853	3,221
	2016	22,294	-469	9,422	2.25	8,666	3,317	11,982	9,114	3,263
	2021	21,889	-484	9,545	2.18	8,630	3,326	11,956	9,055	3,289
	2026	21,345	-502	9,644	2.10	8,494	3,303	11,797	8,852	3,319
	2031	20,635	-475	9,680	2.01	8,410	3,290	11,700	8,552	3,250
Carterton District	2006	7,161	175	2,754	2.47	2,537	785	3,322	2,619	846
	2011	7,143	-152	2,887	2.36	2,696	838	3,534	2,978	953
	2016	7,153	-59	3,065	2.22	2,700	845	3,545	3,085	1,018
	2021	7,122	-54	3,231	2.09	2,646	836	3,483	3,083	1,073
	2026	7,040	-58	3,405	1.96	2,551	815	3,366	3,045	1,147
	2031	6,898	-65	3,676	1.77	2,487	801	3,288	2,998	1,123
South Wairarapa District	2006	8,937	-30	3,624	2.36	2,897	1,142	4,039	3,282	1,005
	2011	8,914	-283	3,897	2.19	3,079	1,232	4,310	3,943	1,292
	2016	8,793	-264	4,182	2.01	3,088	1,250	4,338	4,107	1,373
	2021	8,688	-153	4,521	1.83	3,037	1,250	4,286	4,209	1,437
	2026	8,610	-63	5,010	1.64	2,943	1,231	4,174	4,284	1,586
	2031	8,421	-109	5,553	1.44	2,875	1,215	4,091	4,240	1,667

Table C.2: Medium Growth Scenario Projected Wellington Territorial Local Authority Usually Resident Population, Net Migration, Occupied Private Dwellings, Jobs at Local Workplaces and Residents Employed - 2006 to 2021

Territorial Local Authority	year	Usually Resident NZ Population	Net Migration	Occupied Private Households	Mean Occupied Private Household Size	Workplace Employed Full-time	Workplace Employed Part-time	T Total	Residents Employed Full-time	Residents Employed Part-time
Kapiti Coast District	2006	46,329	3,753	19,110	2.33	9,834	4,706	14,539	14,838	5,202
	2011	49,336	2,942	20,760	2.28	10,922	5,225	16,147	17,558	5,880
	2016	52,043	3,005	22,306	2.23	11,347	5,434	16,781	19,509	6,295
	2021	54,613	2,999	23,751	2.20	11,662	5,592	17,254	21,051	6,719
	2026	57,139	2,999	25,070	2.18	11,940	5,732	17,672	22,199	7,278
	2031	59,541	2,978	26,334	2.16	12,235	5,878	18,113	22,915	7,744
Porirua City	2006	48,888	-1,604	15,390	3.07	10,916	3,757	14,673	17,589	4,689
	2011	49,880	-2,071	16,036	3.00	12,248	4,194	16,442	20,053	5,702
	2016	50,505	-2,059	16,633	2.92	12,786	4,374	17,160	21,552	6,074
	2021	50,954	-1,995	17,143	2.85	13,191	4,510	17,700	22,625	6,432
	2026	51,309	-1,974	17,690	2.77	13,548	4,631	18,178	23,127	6,765
	2031	51,435	-1,970	18,066	2.71	13,923	4,757	18,679	23,140	6,944
Upper Hutt City	2006	38,727	1,227	14,127	2.61	8,949	3,150	12,099	14,709	3,918
	2011	39,447	-572	15,031	2.49	9,960	3,504	13,464	16,715	4,804
	2016	39,830	-494	15,812	2.39	10,355	3,649	14,003	17,355	4,977
	2021	39,936	-505	16,402	2.31	10,647	3,759	14,405	17,671	5,124
	2026	39,909	-494	16,948	2.23	10,906	3,856	14,761	17,687	5,414
	2031	39,796	-443	17,541	2.14	11,181	3,957	15,138	17,556	5,620
Lower Hutt City	2006	98,132	-1,808	35,325	2.70	34,444	9,624	44,068	38,451	10,275
	2011	99,755	-2,973	36,674	2.65	38,016	10,705	48,721	42,532	12,140
	2016	100,614	-3,075	37,763	2.59	39,345	11,141	50,486	44,355	12,702
	2021	101,100	-3,007	38,793	2.53	40,299	11,469	51,768	45,465	13,360
	2026	101,318	-3,005	39,753	2.47	41,139	11,759	52,899	45,939	14,202

	2031	101,199	-2,930	40,544	2.42	42,045	12,063	54,108	45,879	14,890
Wellington City	2006	180,287	9,478	67,689	2.57	105,307	24,612	129,918	80,016	21,174
	2011	189,318	943	72,406	2.53	116,991	27,389	144,380	89,771	25,035
	2016	198,130	907	77,108	2.48	121,664	28,530	150,193	96,397	26,210
	2021	206,918	961	81,893	2.44	125,118	29,391	154,509	101,968	27,758
	2026	215,445	900	86,848	2.39	128,137	30,149	158,287	106,139	29,919
	2031	223,246	813	91,531	2.35	131,297	30,937	162,234	109,052	32,525
Masterton District	2006	22,743	-330	8,886	2.44	7,884	2,994	10,878	7,527	2,679
	2011	22,947	-300	9,356	2.34	8,682	3,309	11,991	8,979	3,271
	2016	22,996	-262	9,716	2.25	8,987	3,434	12,421	9,350	3,351
	2021	22,906	-257	10,009	2.17	9,206	3,527	12,733	9,406	3,412
	2026	22,706	-245	10,248	2.10	9,396	3,609	13,005	9,358	3,493
	2031	22,356	-200	10,444	2.02	9,598	3,694	13,292	9,231	3,479
Carterton District	2006	7,161	175	2,754	2.47	2,537	785	3,322	2,619	846
	2011	7,315	-9	2,970	2.35	2,730	849	3,579	3,040	975
	2016	7,449	36	3,198	2.22	2,794	872	3,666	3,196	1,057
	2021	7,502	7	3,387	2.10	2,834	888	3,722	3,238	1,122
	2026	7,548	40	3,642	1.96	2,868	902	3,769	3,259	1,222
	2031	7,560	56	3,988	1.79	2,905	916	3,821	3,286	1,230
South Wairarapa District	2006	8,937	-30	3,624	2.36	2,897	1,142	4,039	3,282	1,005
	2011	9,091	-141	3,961	2.19	3,117	1,249	4,365	4,012	1,314
	2016	9,156	-108	4,369	2.00	3,191	1,290	4,482	4,257	1,422
	2021	9,131	-107	4,766	1.83	3,240	1,321	4,561	4,401	1,502
	2026	9,047	-103	5,222	1.65	3,281	1,347	4,629	4,478	1,660
	2031	8,923	-87	5,764	1.48	3,327	1,375	4,701	4,464	1,751

Table C.3: High Growth Scenario Projected Wellington Territorial Local Authority Usually Resident Population, Net Migration, Occupied Private Dwellings, Jobs at Local Workplaces and Residents Employed - 2006 to 2021

Territorial Local Authority	year	Usually Resident NZ Population	Net Migration	Occupied Private Households	Mean Occupied Private Household Size	Workplace Employed Full-time	Workplace Employed Part-time	T Total	Residents Employed Full-time	Residents Employed Part-time
Kapiti Coast District	2006	46,329	3,753	19,110	2.33	9,834	4,706	14,539	14,838	5,202
	2011	50,536	3,943	21,243	2.28	11,178	5,344	16,523	17,935	6,003
	2016	54,452	4,023	23,330	2.24	11,817	5,652	17,469	20,305	6,546
	2021	58,085	3,893	25,208	2.20	12,339	5,905	18,244	22,217	7,085
	2026	61,783	4,000	27,021	2.19	12,851	6,151	19,002	23,823	7,785
	2031	65,376	3,995	28,773	2.17	13,394	6,411	19,806	25,031	8,394
Porirua City	2006	48,888	-1,604	15,390	3.07	10,916	3,757	14,673	17,589	4,689
	2011	51,153	-1,014	16,483	2.99	12,556	4,294	16,850	20,543	5,846
	2016	53,066	-1,052	17,491	2.92	13,350	4,555	17,906	22,539	6,355
	2021	54,862	-994	18,436	2.85	14,004	4,771	18,775	24,157	6,875
	2026	56,546	-1,039	19,397	2.79	14,638	4,980	19,619	25,254	7,400
	2031	58,037	-1,056	20,263	2.73	15,310	5,201	20,511	25,917	7,761
Upper Hutt City	2006	38,727	1,227	14,127	2.61	8,949	3,150	12,099	14,709	3,918
	2011	40,370	170	15,397	2.49	10,198	3,584	13,783	17,046	4,908
	2016	41,573	157	16,500	2.39	10,791	3,795	14,586	18,011	5,169
	2021	42,511	127	17,404	2.32	11,275	3,969	15,244	18,664	5,414
	2026	43,373	191	18,351	2.24	11,750	4,138	15,888	19,099	5,841
	2031	44,152	221	19,333	2.16	12,254	4,315	16,569	19,414	6,177
Lower Hutt City	2006	98,132	-1,808	35,325	2.70	34,444	9,624	44,068	38,451	10,275
	2011	101,629	-1,547	37,328	2.65	38,874	10,954	49,828	43,189	12,330
	2016	104,473	-1,589	39,164	2.59	40,926	11,595	52,521	45,758	13,106
	2021	106,977	-1,531	40,925	2.54	42,577	12,122	54,699	47,664	14,001
	2026	109,226	-1,531	42,647	2.49	44,219	12,634	56,853	49,036	15,186

	2031	111,219	-1,449	44,266	2.44	45,968	13,174	59,142	49,995	16,243
Wellington City	2006	180,287	9,478	67,689	2.57	105,307	24,612	129,918	80,016	21,174
	2011	193,470	4,030	73,906	2.53	119,696	28,022	147,718	91,287	25,478
	2016	206,417	3,974	80,166	2.49	126,613	29,680	156,293	99,551	27,088
	2021	219,346	3,974	86,572	2.45	132,260	31,047	163,307	106,833	29,078
	2026	232,175	3,978	93,247	2.40	137,754	32,368	170,122	112,927	31,908
	2031	244,441	3,975	99,867	2.35	143,560	33,758	177,318	117,919	35,320
Masterton District	2006	22,743	-330	8,886	2.44	7,884	2,994	10,878	7,527	2,679
	2011	23,263	-89	9,487	2.34	8,871	3,382	12,253	9,082	3,310
	2016	23,704	35	10,015	2.25	9,336	3,568	12,903	9,591	3,441
	2021	24,000	37	10,454	2.18	9,710	3,720	13,429	9,794	3,552
	2026	24,183	43	10,873	2.11	10,078	3,867	13,946	9,918	3,697
	2031	24,225	91	11,263	2.03	10,470	4,024	14,493	9,974	3,742
Carterton District	2006	7,161	175	2,754	2.47	2,537	785	3,322	2,619	846
	2011	7,410	55	3,007	2.35	2,778	864	3,642	3,061	983
	2016	7,682	146	3,306	2.21	2,883	900	3,784	3,271	1,087
	2021	7,902	149	3,587	2.09	2,964	929	3,893	3,386	1,177
	2026	8,118	182	3,922	1.96	3,047	957	4,004	3,492	1,307
	2031	8,308	199	4,334	1.81	3,135	987	4,122	3,611	1,340
South Wairarapa District	2006	8,937	-30	3,624	2.36	2,897	1,142	4,039	3,282	1,005
	2011	9,268	1	4,047	2.19	3,171	1,273	4,444	4,086	1,336
	2016	9,455	-25	4,519	2.00	3,293	1,336	4,629	4,379	1,463
	2021	9,614	45	5,027	1.83	3,388	1,386	4,774	4,604	1,576
	2026	9,705	40	5,614	1.65	3,483	1,435	4,919	4,772	1,778
	2031	9,755	54	6,273	1.48	3,586	1,487	5,073	4,854	1,903

From : James Newell (MERA)

To : Andrew Bell (SKM) and Michael Vincent (GWRC)

Subject : Difference between 2006 starting usual resident population estimates from Usually Resident Population and Employment by Residence Layers

Date : 4th April 2008

1. This is a note to document the reasons for the 0.5% difference between the total usually resident population estimates for 2006 in the usually resident population and employment by residence layers and how this issue has been managed in the formulation of WTSM inputs.
2. Rounded to the nearest 10, the specifics are that the usually resident census enumeration count population of the region is estimated as 448,930 on a purely population base after rebasing to a 1996 area unit base. By comparison, the usually resident census enumeration count of the population extended to employment status is estimated as 451,200 on a purely population base after estimating area unit rebase to 1996 area units. The 1996 area unit level detail is shown in the attached appendix.
3. This is not considered to be significant, but it is important to be aware of which estimates are being used and where. For consistency with employment by residence estimates, the usually resident population subtotal in the employment by residence layers was used in the inputs to the WTSM model.
4. The source data for the two estimates are 2006 area unit based customised statistics. The small differences between these layers are due to the different effects of successive rounding and embedded cell suppression on the two sets of input data which are derived from separate customised 2006 census tables.
5. The process of rebasing these two tables from a 2006 area unit base to 1996 area units involved two separate estimation pathways at different levels of aggregation involving difference conversion tables. The results at subcategory level are then summed to produce the final result. The different pathways and any differences in the level of suppression of individual cells by SNZ produces a slightly different estimate.

James Newell

MERA

Appendix : Estimated 2006 census counts rebased to 1996 area units from the usually resident population and the employment by residence population "layers"

1996 Census Area Unit of Usual Residence	Usually Resident Popn Base	Employment by Residence Total	Diff	% Diff
563701 Waikanae Beach	2,895	2,895	0	0.0
563702 Waikanae Central	5,607	5,619	-12	-0.2
563703 Waikanae East	1,986	2,001	-15	-0.7
563920 Kaitawa	474	492	-18	-3.7
564022 Otaki Forks	1,410	1,407	3	0.2
564023 Te Horo	675	690	-15	-2.2
564400 Otaki	5,466	5,463	3	0.1
564510 Heretaunga Park	1,200	1,206	-6	-0.5
564520 Trentham South	1,023	1,023	0	0.0
564530 Pinehaven	3,141	3,159	-18	-0.6
564600 Nabhra	867	903	-36	-4.0
564800 Glendale	3,633	3,651	-18	-0.5
564900 Parkway	3,012	3,024	-12	-0.4
565000 Fernlea	1,956	1,968	-12	-0.6
565100 Arakura	2,469	2,475	-6	-0.2
565200 Homedale West	2,484	2,487	-3	-0.1
565300 Homedale East	3,117	3,138	-21	-0.7
565400 Pencarrow	540	552	-12	-2.2
565601 Pauatahanui	945	963	-18	-1.9
565602 Endeavour	3,084	3,103	-19	-0.6
565603 Resolution	435	440	-5	-1.1
565604 Adventure	1,266	1,284	-18	-1.4
565700 Paekakariki Hill	132	144	-12	-8.3
565901 Paraparaumu Beach North	3,255	3,270	-15	-0.5
565902 Otaihanga	1,110	1,122	-12	-1.1
565903 Paraparaumu Beach South	4,674	4,689	-15	-0.3
566000 Paraparaumu Central	8,238	8,232	6	0.1
566101 Raumati Beach	4,455	4,461	-6	-0.1
566102 Raumati South	3,507	3,510	-3	-0.1
566200 Paekakariki	1,599	1,623	-24	-1.5
566301 Kapiti Island	9	0	9	#DIV/0!
566302 Maungakotukutuku	837	855	-18	-2.1
566500 Te Marua	1,068	1,083	-15	-1.4
566610 Akatarawa	618	636	-18	-2.8
566620 Emerald Hill	2,721	2,745	-24	-0.9
566700 Maoribank	2,553	2,562	-9	-0.4
566800 Clouston Park	2,328	2,331	-3	-0.1
566900 Totara Park	2,853	2,874	-21	-0.7
567000 Ebdentown	2,142	2,160	-18	-0.8
567100 Upper Hutt Central	324	329	-5	-1.5
567200 Maidstone	138	156	-18	-11.5

567300 Wallaceville	2,157	2,173	-16	-0.7
567400 Elderslea	3,198	3,201	-3	-0.1
567500 Moonshine	2,220	2,232	-12	-0.5
567600 Brentwood	2,097	2,121	-24	-1.1
567700 Trentham North	2,766	2,772	-6	-0.2
567800 Heretaunga-Silverstream	3,198	3,210	-12	-0.4
567901 Cloustonville	354	360	-6	-1.7
567902 Mangaroa	1,464	1,491	-27	-1.8
568101 Tawhai	3,225	3,239	-14	-0.4
568102 Holburn	1,986	1,991	-5	-0.3
568103 Delaney	2,385	2,382	3	0.1
568104 Manuka	1,635	1,656	-21	-1.3
568201 Taita North	3,018	3,045	-27	-0.9
568202 Taita South	3,036	3,044	-8	-0.3
568301 Naenae West	2,295	2,307	-12	-0.5
568302 Naenae North	4,746	4,761	-15	-0.3
568303 Naenae South	3,546	3,551	-5	-0.1
568400 Boulcott-Avalon	4,818	4,830	-12	-0.2
568501 Epuni West	3,090	3,096	-6	-0.2
568502 Epuni East	2,976	2,994	-18	-0.6
568600 Waterloo	5,136	5,157	-21	-0.4
568701 Waiwhetu North	1,434	1,431	3	0.2
568702 Waiwhetu South	2,424	2,446	-22	-0.9
568800 Gracefield	150	95	55	57.9
568900 Moera	1,608	1,620	-12	-0.7
569001 Woburn North	1,317	1,335	-18	-1.3
569002 Woburn South	420	436	-16	-3.7
569100 Hutt Central	3,738	3,750	-12	-0.3
569201 Melling	618	633	-15	-2.4
569202 Alicetown	1,854	1,869	-15	-0.8
569301 Normandale	2,082	2,096	-14	-0.7
569302 Maungaraki	3,552	3,570	-18	-0.5
569400 Belmont	3,765	3,802	-37	-1.0
569500 Kelson	2,616	2,643	-27	-1.0
569600 Haywards-Manor Park	381	396	-15	-3.8
569800 Korokoro	1,284	1,295	-11	-0.8
569900 Petone Central	879	894	-15	-1.7
570000 Esplanade	2,361	2,358	3	0.1
570100 Wilford	3,372	3,384	-12	-0.4
570300 Eastbourne	4,719	4,731	-12	-0.3
570400 Titahi Bay North	2,433	2,451	-18	-0.7
570500 Onepoto	1,845	1,863	-18	-1.0
570600 Titahi Bay South	3,246	3,273	-27	-0.8
570700 Elsdon-Takapuwahia	2,268	2,274	-6	-0.3
570800 Porirua Central	315	324	-9	-2.8
570900 Porirua East	2,055	2,079	-24	-1.2
571000 Ranui Heights	1,344	1,350	-6	-0.4
571100 Cannons Creek North	3,312	3,311	1	0.0
571200 Cannons Creek South	1,560	1,575	-15	-1.0
571300 Cannons Creek East	3,774	3,785	-11	-0.3

571400 Waitangirua	4,074	4,106	-32	-0.8
571500 Papakowhai	2,457	2,460	-3	-0.1
571600 Ascot Park	2,706	2,736	-30	-1.1
571800 Pukerua Bay	1,722	1,749	-27	-1.5
571900 Plimmerton	2,055	2,070	-15	-0.7
572000 Mana-Camborne	2,283	2,289	-6	-0.3
572100 Paremata-Postgate	2,397	2,421	-24	-1.0
572200 Discovery	2,820	2,838	-18	-0.6
572300 Mana Island	0	0	0	#DIV/0!
572500 Tawa South	3,582	3,594	-12	-0.3
572600 Central Tawa	4,287	4,287	0	0.0
572701 Linden	3,813	3,822	-9	-0.2
572702 Greenacres	1,464	1,470	-6	-0.4
572900 Thorndon-Tinakori Road	3,840	3,852	-12	-0.3
573000 Lambton	4,776	4,776	0	0.0
573100 Willis Street-Cambridge Terrace	4,518	4,533	-15	-0.3
573200 Aro Street-Nairn Street	3,825	3,834	-9	-0.2
573300 Mt Cook-Wallace Street	4,851	4,854	-3	-0.1
573400 Mt Victoria West	5,226	5,238	-12	-0.2
573511 Churton Park	339	345	-6	-1.7
573512 Churton	5,177	5,195	-18	-0.3
573521 Grenada	465	480	-15	-3.1
573522 Grenada North	336	348	-12	-3.4
573523 Paparangi	984	993	-9	-0.9
573524 Newlands East	597	603	-6	-1.0
573600 Johnsonville North	1,857	1,884	-27	-1.4
573700 Johnsonville South	2,922	2,946	-24	-0.8
573800 Johnsonville East	1,938	1,956	-18	-0.9
573900 Newlands North	5,166	5,181	-15	-0.3
574001 Newlands South	3,525	3,534	-9	-0.3
574002 Ngauranga East	30	0	30	#DIV/0!
574100 Raroa	3,252	3,278	-26	-0.8
574200 Khandallah Park	2,646	2,662	-16	-0.6
574302 Te Kainga	3,633	3,639	-6	-0.2
574303 Ngauranga West	3	0	3	#DIV/0!
574304 Rangoon Heights	2,235	2,258	-23	-1.0
574401 Awarua	3,213	3,227	-14	-0.4
574402 Ngaio	3,054	3,069	-15	-0.5
574500 Kaiwharawhara	66	0	66	#DIV/0!
574600 Wadestown	3,252	3,276	-24	-0.7
574700 Wilton-Otari	4,263	4,296	-33	-0.8
574800 Johnston Hill	2,520	2,553	-33	-1.3
574900 Karori Park	4,122	4,140	-18	-0.4
575000 Karori East	3,465	3,471	-6	-0.2
575100 Wright Hill	3,903	3,951	-48	-1.2
575200 Northland	2,574	2,607	-33	-1.3
575300 Kelburn	3,642	3,654	-12	-0.3
575400 Taitville	450	465	-15	-3.2
575500 Mitchelltown	591	600	-9	-1.5

575600 Brooklyn	3,858	3,876	-18	-0.5
575700 Vogelstown	1,893	1,932	-39	-2.0
575800 Kingston	2,256	2,268	-12	-0.5
575901 Brooklyn South	906	921	-15	-1.6
575902 Happy Valley-Owhiro Bay	1,614	1,627	-13	-0.8
576001 Island Bay West	3,372	3,386	-14	-0.4
576002 Island Bay East	3,585	3,609	-24	-0.7
576100 Melrose	3,234	3,255	-21	-0.6
576200 Berhampore	2,595	2,604	-9	-0.3
576300 Newtown West	3,693	3,702	-9	-0.2
576400 Newtown East	4,719	4,734	-15	-0.3
576500 Adelaide	945	960	-15	-1.6
576600 Oriental Bay	1,116	1,128	-12	-1.1
576700 Roseneath	1,584	1,593	-9	-0.6
576800 Hataitai	4,584	4,595	-11	-0.2
576901 Kilbirnie East	3,333	3,333	0	0.0
576902 Kilbirnie West	3,102	3,129	-27	-0.9
577000 Lyall Bay	3,006	3,006	0	0.0
577100 Strathmore Park	4,434	4,458	-24	-0.5
577200 Miramar South	3,471	3,480	-9	-0.3
577300 Miramar North	4,866	4,872	-6	-0.1
577400 Karaka Bay-Worser Bay	1,200	1,218	-18	-1.5
577500 Seatoun	2,130	2,148	-18	-0.8
577600 Maupuia	1,995	2,007	-12	-0.6
577700 Makara-Ohariu	1,564	1,575	-11	-0.7
578301 Homebush-Te Ore Ore	576	597	-21	-3.5
578302 Opaki	1,251	1,281	-30	-2.3
578401 Kopuaranga	1,443	1,467	-24	-1.6
578402 Whareama	1,686	1,701	-15	-0.9
578600 Masterton Central	585	591	-6	-1.0
578700 Masterton West	2,988	2,999	-11	-0.4
578800 Masterton East	3,393	3,399	-6	-0.2
578901 Solway North	2,232	2,233	-1	0.0
578902 Solway South	2,907	2,907	0	0.0
579000 Ngaumutawa	1,380	1,383	-3	-0.2
579100 Masterton Railway	297	300	-3	-1.0
579200 Lansdowne	3,885	3,885	0	0.0
579400 Waingawa	312	327	-15	-4.6
579501 Mt Holdsworth	1,179	1,212	-33	-2.7
579502 Te Wharau	1,488	1,500	-12	-0.8
579700 Carterton	4,122	4,122	0	0.0
579801 Kahutara	2,799	2,804	-5	-0.2
579802 Tuturumuri	444	459	-15	-3.3
579900 Greytown	2,001	2,010	-9	-0.4
580000 Featherston	2,340	2,343	-3	-0.1
580100 Martinborough	1,311	1,321	-10	-0.8
622201 Inlet-Porirua Harbour	21	0	21	#DIV/0!
Wellington Region(excl Rara)	448,929	451,204	-2,275	-0.5

Appendix B – 2011 Base Development

Demographic Review and Land Use Inputs for WTSM

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October 2011



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Introduction

This demographic review was commissioned by Greater Wellington Regional Council and New Zealand Transport Agency and covers the following:

- Changes in population from 2006 to 2011, including the impact of migration on changes in population.
- Changes in household occupancy from 1991 to 2006.
- The most recent set of Statistics NZ population projections – called 2006 update by SNZ.
- Comparison between low, medium & high population projections and the estimated changes from 2006 to 2011.
- Changes between the two sets of population projections since the 2006 Census.
- Household projections.
- Possible futures for the Wellington Region.
- Likely future performance of the New Zealand Economy as this has an impact on migration patterns.
- Issues relating to future scenarios for transport modelling.
- How to incorporate 2013 Census data into the transport model inputs.

The report therefore covers the big picture issues which impact on what land use inputs will be suitable for modelling the future in WTSM.

Normally the 2011 land use data for WTSM would have been derived from Census data. Unfortunately there has been no Census in 2011, with it having been delayed to 2013. Therefore the 2011 population, households and employment have been based on growth rates applied to the 2006 land use. The derivation of the growth rates used is described in the following sections. The school and tertiary rolls were supplied by the Ministry of Education.

It is strongly recommended to read these notes before using the 2011 land use in WTSM as there are limitations to them that wouldn't exist with Census data. Understanding these limitations is important as they could potentially cause problems with the WTSM model.

The next section is a discussion of the previous demographic trends. This is then followed by a section which discusses the Statistics NZ projections for population, households and employment. The report concludes with a section discussing the methodology used to develop the 2011 base for WTSM. This report is a compilation of the work and supporting documents completed in August 2011¹ and October 2011².

¹ Notes on 2011 Land Use Inputs for WTSM, by Russell Jones of Prism Consulting for GWRC, August 2011.

² Demographic Review for WTSM, by Russell Jones of Prism Consulting for GWRC, October 2011.

Commentary on Previous Demographic Trends

Table 1 shows the population estimates for the Wellington Region TAs from 2006 to 2010. 2011 estimates will be available later in 2011.

Table 1 - Population estimates for Wellington Region TAs

Territorial Authority	2006	2007	2008	2009	2010	CAGR 06 to 10
Wellington City	187,700	190,500	192,800	195,500	197,700	1.3%
Porirua City	50,600	50,700	51,000	51,500	52,100	0.7%
Kapiti Coast District	47,500	48,000	48,400	48,900	49,400	1.0%
Lower Hutt City	101,300	101,500	101,700	102,100	102,700	0.3%
Upper Hutt City	39,700	40,000	40,200	40,600	41,100	0.9%
South Wairarapa District	9,120	9,140	9,190	9,250	9,340	0.6%
Carterton District	7,260	7,300	7,360	7,410	7,540	1.0%
Masterton District	23,200	23,100	23,200	23,300	23,400	0.2%
Total	466,380	470,240	473,850	478,560	483,280	0.9%

Note: CAGR is Compound Annual Growth Rate

Source: Statistics NZ

International Migration

Table 2 - International net permanent and long-term migration by region

Year ended June 1996–2010

Region	Year ended June														
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Northland	-87	-151	-381	-762	-808	-785	-43	234	-29	-172	-210	-441	-677	-692	-183
Auckland	17,825	10,332	3,523	-1,169	361	377	18,496	22,129	12,150	6,814	7,753	8,319	6,134	8,611	8,805
Waikato	139	-39	-760	-2,081	-2,005	-2,050	387	1,209	747	-236	-157	-401	-809	-327	160
Bay of Plenty	216	-309	-830	-1,726	-1,617	-1,568	-153	346	-177	-831	-895	-1,023	-1,366	-1,092	-209
Gisborne	-106	-119	-106	-262	-143	-388	-143	131	-77	-141	-78	-184	-388	-261	-99
Hawke's Bay	-141	-277	-488	-970	-952	-845	-137	-125	-61	-361	-272	-324	-815	-762	-56
Taranaki	-155	-357	-486	-805	-631	-576	-24	373	84	-123	9	-165	-90	73	79
Manawatu-Wanganui	106	-182	-676	-891	-1,086	-1,317	28	582	234	-158	42	-334	-702	-111	210
Wellington	-274	-862	-1,999	-3,232	-3,460	-3,266	752	1,578	1,122	-7	412	477	-333	445	312
Tasman & Nelson	13	-51	-369	-456	-443	-324	87	370	231	15	42	-37	-125	-120	223
Marlborough	-28	-109	-128	-218	-246	-151	-32	95	89	-23	-21	-33	119	12	-19
West Coast	-53	-86	-51	-234	-150	-53	-34	49	-6	-13	21	-26	-33	141	72
Canterbury	1,903	571	-977	-1,973	-2,510	-1,378	2,556	4,334	3,068	1,409	1,575	1,490	803	1,630	2,081
Otago	106	-357	-750	-944	-769	-470	465	912	724	512	442	235	3	67	519
Southland	-201	-334	-545	-701	-434	-277	-22	188	54	-72	-56	-106	-276	201	294
Other/not stated ⁽¹⁾	10,243	9,100	5,475	5,055	5,133	3,805	10,632	10,112	3,855	1,980	2,081	2,631	3,287	4,700	4,315
Total	29,506	16,770	452	-11,369	-9,760	-9,266	32,815	42,517	22,008	8,593	10,688	10,078	4,732	12,515	16,504

1. Includes the Chatham Islands.

Source: Statistics New Zealand³

The above table shows net migration into and out of New Zealand by region. Statistics NZ say that "caution is needed when examining net migration for each region, due to the relatively high number

³ An Introduction to International Migration by Region: 1996–2010, Statistics NZ (2011) ISSN 1178-3877

of migrants for whom a region of last/next residence was not known. Nationally, the number of ‘not stated’ residence records is higher for arrivals than departures, which means net migration is likely to be understated for most regions.”(Statistics NZ, 2011)

We can see that between 1998 and 2001 Wellington in common with the rest of New Zealand lost residents, but since then has gained residents – the noticeable exception being 2008, this was a year nationally when the net migration gain was much lower than other recent years.

The key point that can be taken from this table is that international migration varies widely from year to year which makes projecting population difficult.

Part of the reason for this is that net migration is the sum of two larger numbers; during the period 1996 to 2010 Wellington had permanent and long term arrivals in the range of 5,700 to 8,400 per year and permanent and long term departures 7400 to 9700, with net migration being the difference between the two.

Internal migration

The following table shows inter-censual migration for the five year periods preceding the 1981 to 2006 Censuses.

Table 3 - Wellington Region migration within NZ

Region	Year					
	1981	1986	1991	1996	2001	2006
Wellington – in migrants	39,933	37,044	37,296	36,510	41,505	42,210
Wellington out migrants	49,302	44,412	43,797	43,683	39,660	42,237
Wellington – net migration	-9,366	-7,365	-6,501	-7,173	1,848	-27

Source: Statistics NZ

Again it can be seen that net migration is the difference between two large numbers. Internal net migration also fluctuates, with the most significant change being after 1996 when Wellington started to either gain people or not lose them.

Other data⁴ shows that for all the inter-censual periods under consideration in & out migrants were each about 10% of Wellington Region’s population.

Table 4 shows where residents of each TA in the Wellington region in 2006 were living in 2001. It can be seen that most were living in the same TA, with the lowest percentage being in Wellington City and Carterton District. In-migrants to a TA were most likely to come from outside the Wellington region for most of the TAs; this was most apparent in the case of Wellington City. In contrast for Carterton & South Wairarapa Districts the majority of in-movers came from within the region.

⁴ Statistics New Zealand. *Trends in migration between regions.*

http://www.stats.govt.nz/browse_for_stats/population/Migration/internal-migration/trends-in-migration.aspx.

Table 4 - Changes in Usual Residence from 2001 to 06

UR 5 Years Ago ->	Same TA	Elsewhere in Wellington region	Usual Residence outside Wellington Region	Overseas	Residual	Total
<i>2006 usual residence</i>						
Kapiti Coast District	66%	13%	9%	6%	7%	100%
Porirua City	69%	9%	6%	6%	9%	100%
Upper Hutt City	68%	12%	8%	5%	7%	100%
Lower Hutt City	73%	7%	7%	7%	6%	100%
Wellington City	63%	5%	12%	13%	6%	100%
Masterton District	72%	9%	8%	4%	7%	100%
Carterton District	63%	18%	8%	4%	7%	100%
South Wairarapa District	64%	16%	8%	4%	8%	100%

Source: Statistics NZ Census data

It appears that Wellington City has the most mobile population; this suggests that it is likely to experience the most volatility in population growth as migration fluctuates. It also seems likely that people move within the region for different reasons, than those who migrate into or out of the region. For example, Table 4 suggests that Carterton & South Wairarapa Districts have a role as a lifestyle destination that people in the urban part of Wellington move out to.

Wellington City

Wellington City grew by 10000 people or 5.33% between 2006 & 10. The fastest growing Area Unit was Willis Street-Cambridge Terrace which grew by 1150 persons or 24.3%, followed by Churton which grew by 970 persons or 15.5, Mt Cook-Wallace St which grew by 580 persons or 11.4% and then Lambton which grew by 480 persons or 9.6%. It is interesting to note that much of the growth is occurring in the existing urban area.

Table 5 on page 12 shows the estimated population from 2006 to 2010 for all Area Units in the Wellington Region. Figure 1 shows the percentage change in population by Area Unit for Wellington City.

Kapiti Coast District

Kapiti grew by 1900 persons or 4.0% between 2006 & 10. The fastest growing Area Unit was Paraparaumu Central which gained 560 persons to go from 8420 persons in 2006 to 8980 in 2010. The adjacent Area Units of Paraparaumu Beach South & Raumati Beach were in second and third place gaining 210 & 180 persons respectively. Percentage wise the fastest growing Area Unit was Peka Peka which grew by 19.2% to go from 260 to 310 persons, followed by Kaitawa (14.3% & 70 persons).

Figure 2 shows the percentage change in population by Area Unit.

Porirua City

Porirua grew by 1500 persons or 3.0% between 2006 & 10. The fastest growing Area Unit was Papakowhai which grew by 1100 persons or 43.5%. This AU accounted for 36.4% of the City's growth, although it should be noted that several AUs lost population. The second fastest growing AU was Endeavour which grew by 360 persons or 10.2%. In percentage terms it was outstripped by Porirua Central which grew by 21.2%, although this was off a low base of 70 persons.

Figure 3 shows the percentage change in population by Area Unit.

Hutt City

Hutt City's population grew by 1400 person or 1.38% between 2006 & 10. The fastest growing Area Unit in numbers of persons was Naenae North which grew by 280 persons or 5.67%; while in percentage terms Waiwhetu South was the fastest growing and grew by 9.20% or 240 persons. In contrast a number of Area Units lost population; including: Arakura (100 persons), Fernlea & Moera (both 70 persons).

Figure 4 shows the percentage change in population by Area Unit.

Upper Hutt City

Upper Hutt City's population grew by 1400 person or 3.53% between 2006 & 10. The fastest growing Area Unit in numbers of persons was Riverstone Terraces which grew by 520 persons or 76.5%. The next fastest growing was Clouston Park which grew by 310 persons or 12.9%. In contrast some Area Units recorded minor declines in population; the largest being Moonshine which lost 60 persons or 2.61%.

Figure 5 shows the percentage change in population by Area Unit.

Figure 1 - Wellington City Estimated Percentage Population Change 2006-10

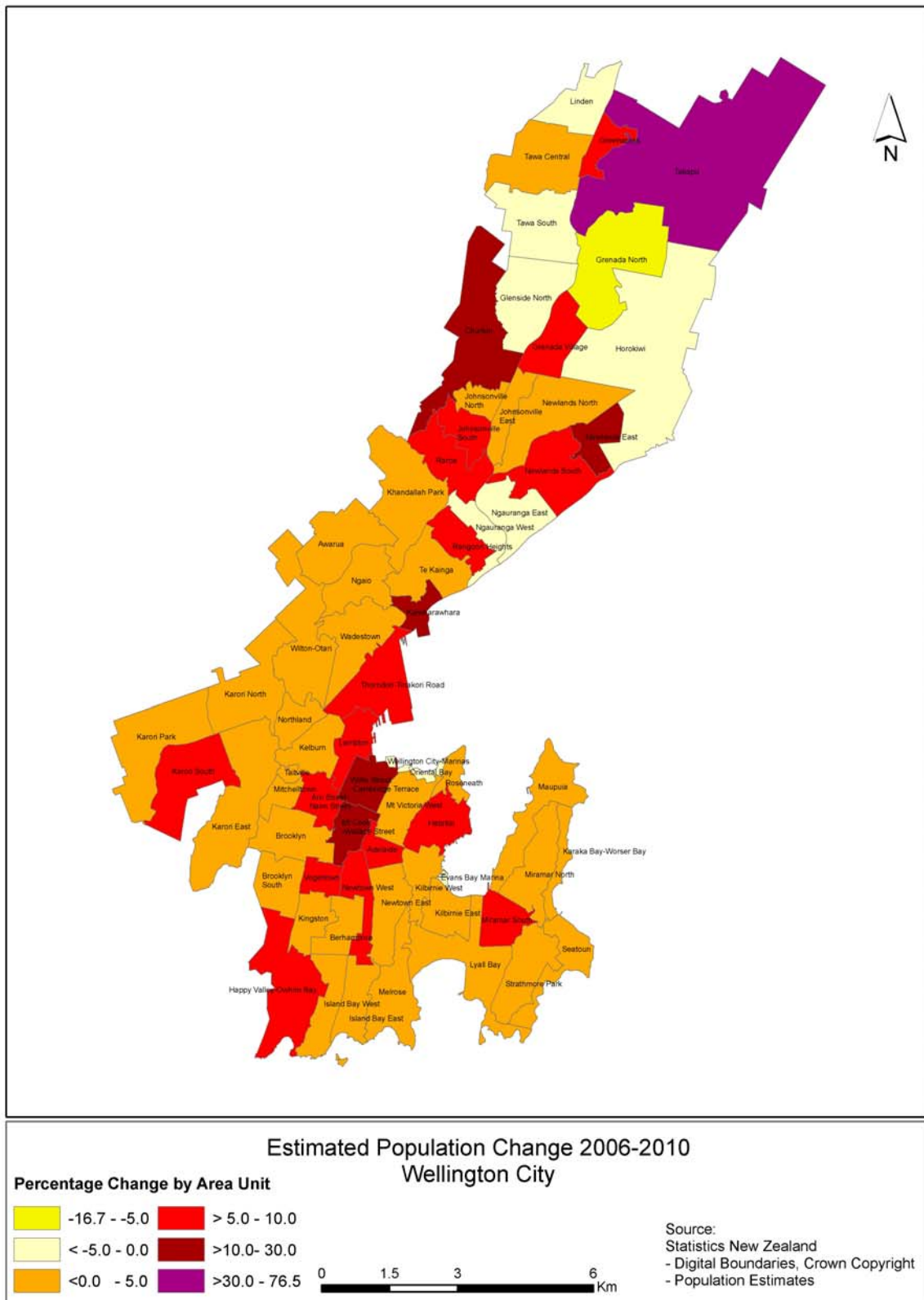


Figure 2 - Kapiti Coast District Estimated Percentage Population Change 2006-10

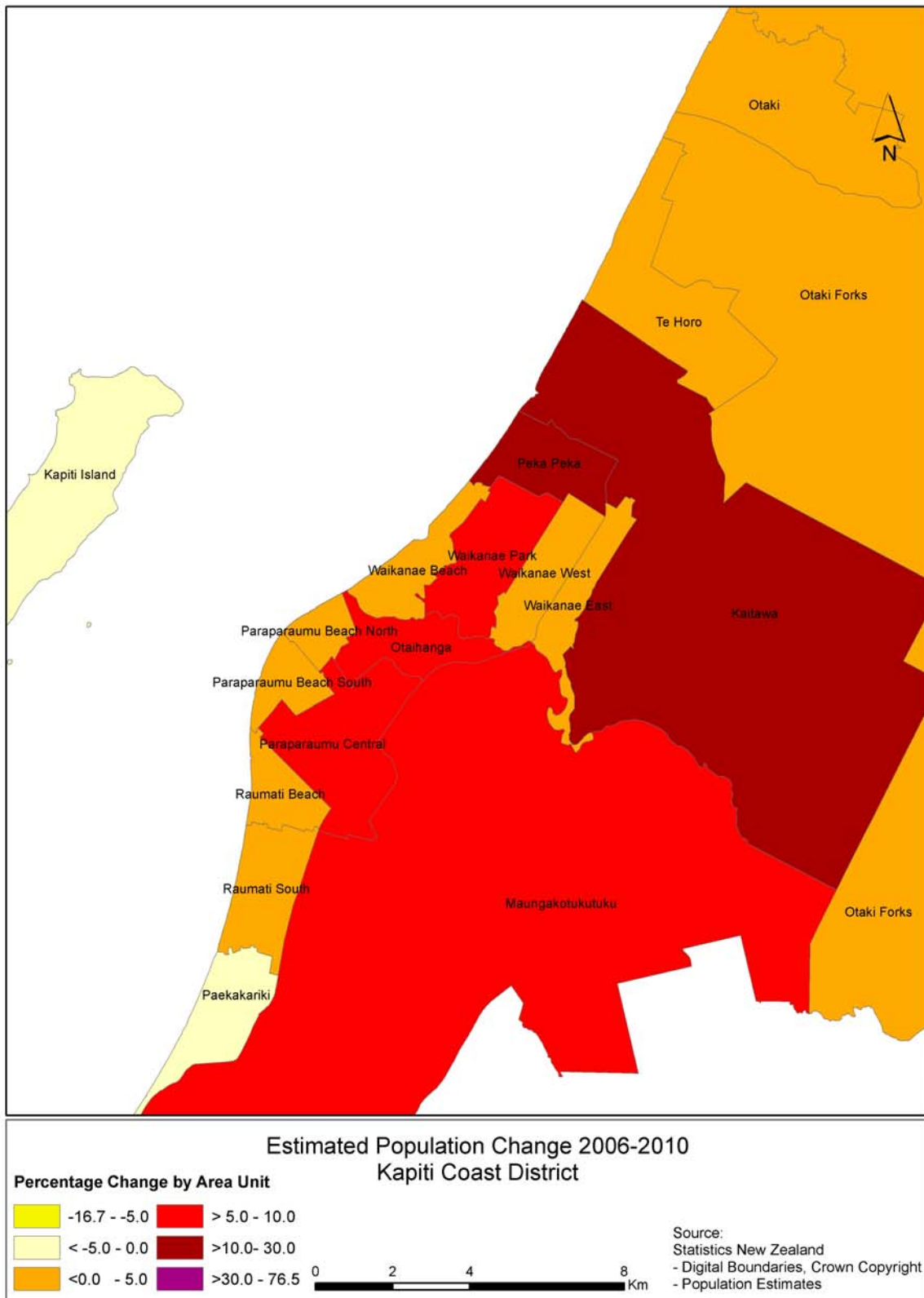


Figure 3 - Porirua City Estimated Percentage Population Change 2006-10

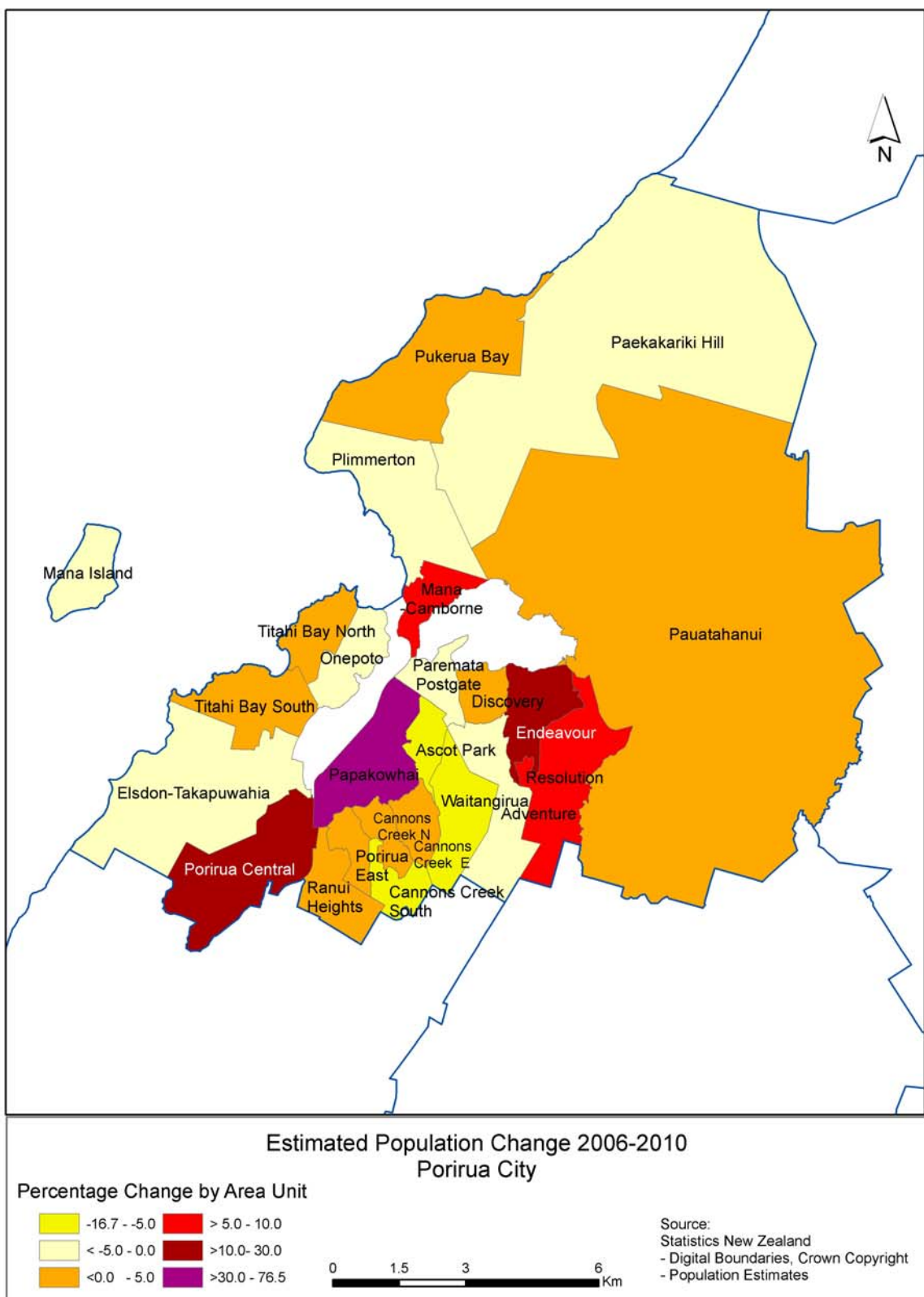


Figure 4 - Hutt City Estimated Percentage Population Change 2006-10

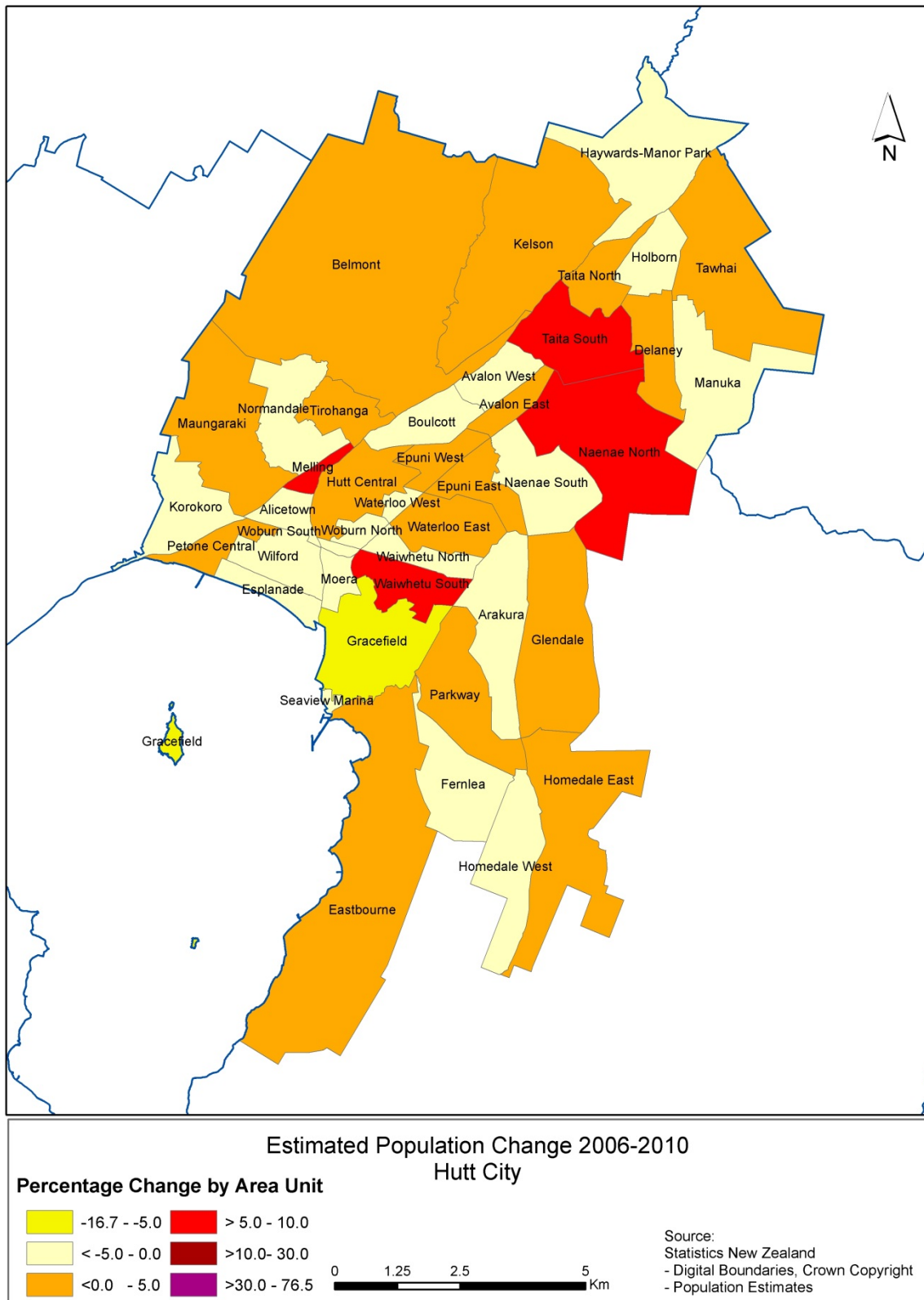


Figure 5 - Upper Hutt City Estimated Percentage Population Change 2006-10

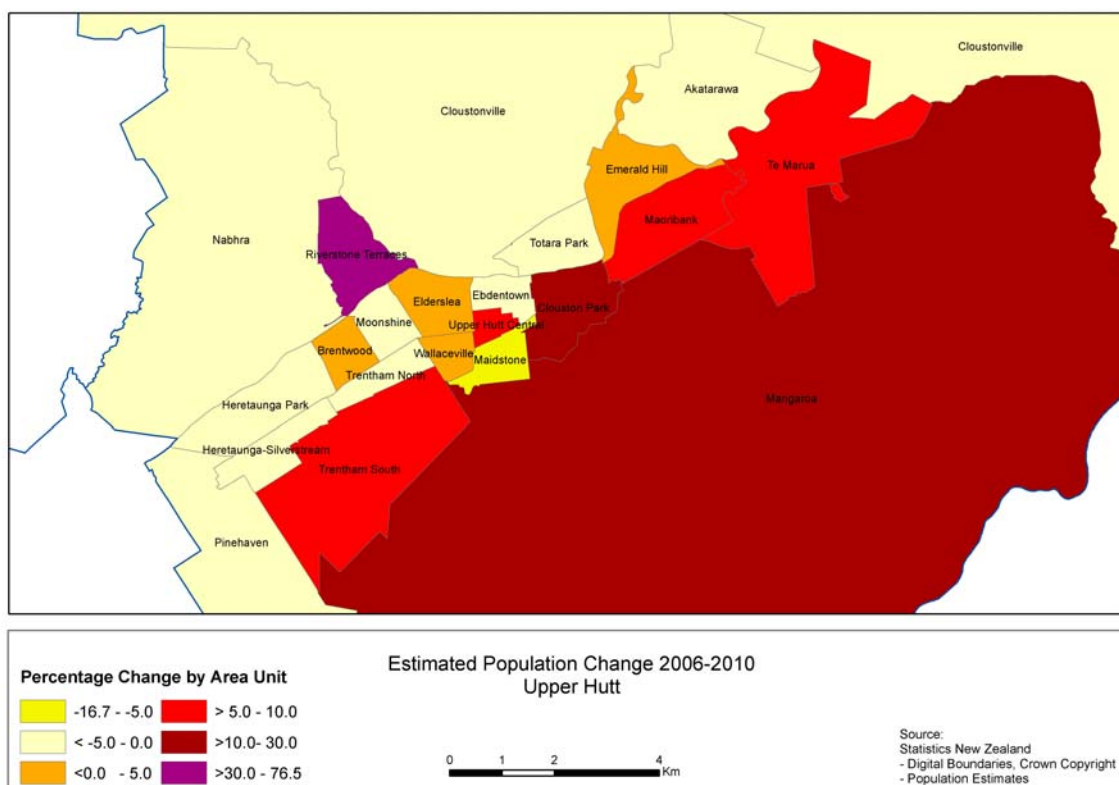


Table 5 - Area Unit estimated population from 2006 to 2010

Area	2006	2007	2008	2009	2010	Growth Rate 06 to 10
Kapiti Coast district	47500	48000	48400	48900	49400	4.00%
563701 Waikanae Beach	2970	3020	3060	3080	3090	4.04%
563703 Waikanae East	2030	2050	2070	2100	2130	4.93%
563704 Peka Peka	260	280	290	300	310	19.23%
563705 Waikanae Park	1930	1960	1980	2000	2030	5.18%
563706 Waikanae West	3540	3560	3580	3610	3660	3.39%
563920 Kaitawa	490	500	520	540	560	14.29%
564022 Otaki Forks	1460	1450	1440	1480	1530	4.79%
564023 Te Horo	700	700	710	720	730	4.29%
564400 Otaki	5650	5610	5650	5660	5680	0.53%
565901 Paraparaumu Beach North	3350	3340	3370	3390	3430	2.39%
565902 Otaihanga	1140	1160	1190	1190	1220	7.02%
565903 Paraparaumu Beach South	4810	4870	4900	4960	5020	4.37%
566000 Paraparaumu Central	8420	8680	8790	8910	8980	6.65%
566101 Raumatī Beach	4600	4660	4700	4750	4780	3.91%
566102 Raumatī South	3640	3680	3700	3730	3760	3.30%
566200 Paekakariki	1650	1620	1580	1590	1620	-1.82%
566301 Kapiti Island	10	10	10	10	10	0.00%
566302 Maungakotukutuku	840	850	870	880	900	7.14%
Porirua city	50600	50700	51000	51500	52100	2.96%
565601 Pauatahanui	970	990	1000	1010	1010	4.12%

Area	2006	2007	2008	2009	2010	Growth Rate 06 to 10
565602 Endeavour	3520	3600	3660	3740	3880	10.23%
565603 Resolution	100	110	110	110	110	10.00%
565604 Adventure	1310	1310	1310	1310	1310	0.00%
565700 Paekakariki Hill	140	140	140	140	140	0.00%
570400 Titahi Bay North	2540	2540	2540	2570	2580	1.57%
570500 Onepoto	1920	1920	1930	1930	1920	0.00%
570600 Titahi Bay South	3400	3410	3440	3470	3490	2.65%
570700 Elsdon-Takapuwahia	2390	2380	2370	2380	2380	-0.42%
570800 Porirua Central	330	350	360	380	400	21.21%
570900 Porirua East	2160	2180	2190	2200	2210	2.31%
571000 Ranui Heights	1410	1410	1410	1420	1440	2.13%
571100 Cannons Creek North	3490	3480	3510	3550	3580	2.58%
571200 Cannons Creek South	1640	1600	1580	1560	1550	-5.49%
571300 Cannons Creek East	3960	3930	3940	3990	4010	1.26%
571400 Waitangirua	4290	4200	4130	4100	4070	-5.13%
571500 Papakowhai	2530	2820	3090	3420	3630	43.48%
571600 Ascot Park	2830	2750	2690	2630	2610	-7.77%
571800 Pukerua Bay	1770	1770	1770	1780	1800	1.69%
571900 Plimmerton	2120	2090	2070	2050	2060	-2.83%
572000 Mana-Camborne	2350	2330	2340	2340	2470	5.11%
572100 Paremata-Postgate	2500	2500	2490	2500	2490	-0.40%
572200 Discovery	2920	2910	2920	2930	2940	0.68%
572300 Mana Island	0	0	0	0	0	
622201 Inlet-Porirua Harbour	20	20	20	20	20	0.00%
Upper Hutt city	39700	40000	40200	40600	41100	3.53%
564510 Heretaunga Park	1230	1220	1210	1200	1180	-4.07%
564520 Trentham South	1060	1090	950	1140	1130	6.60%
564530 Pinehaven	3220	3220	3210	3190	3190	-0.93%
564601 Nabhra	210	200	200	200	200	-4.76%
564602 Riverstone Terraces	680	890	1000	1080	1200	76.47%
566500 Te Marua	1110	1140	1170	1180	1200	8.11%
566610 Akatarawa	640	640	630	620	630	-1.56%
566620 Emerald Hill	2810	2830	2820	2830	2850	1.42%
566700 Maoribank	2640	2660	2700	2760	2830	7.20%
566800 Clouston Park	2410	2420	2540	2670	2720	12.86%
566900 Totara Park	2940	2920	2900	2860	2900	-1.36%
567000 Ebdentown	2210	2190	2180	2170	2180	-1.36%
567100 Upper Hutt Central	340	340	340	340	360	5.88%
567200 Maidstone	150	140	140	140	140	-6.67%
567300 Wallaceville	2230	2240	2260	2280	2300	3.14%
567400 Elderslea	3300	3310	3330	3340	3370	2.12%
567500 Moonshine	2300	2280	2280	2260	2240	-2.61%
567600 Brentwood	2180	2190	2210	2230	2270	4.13%
567700 Trentham North	2860	2870	2880	2870	2860	0.00%
567800 Heretaunga-Silverstream	3300	3310	3280	3270	3280	-0.61%
567901 Cloustonville	360	350	350	350	360	0.00%
567902 Mangaroa	1510	1550	1590	1640	1680	11.26%
Lower Hutt city	101300	101500	101700	102100	102700	1.38%
564800 Glendale	3790	3810	3860	3880	3920	3.43%
564900 Parkway	3130	3160	3170	3210	3250	3.83%
565000 Fernlea	2030	2010	1990	1980	1960	-3.45%

Area	2006	2007	2008	2009	2010	Growth Rate 06 to 10
565100 Arakura	2570	2540	2520	2490	2470	-3.89%
565200 Homedale West	2570	2560	2550	2550	2550	-0.78%
565300 Homedale East	3230	3240	3230	3240	3250	0.62%
565400 Pencarrow	560	570	570	580	580	3.57%
568101 Tawhai	3290	3300	3320	3330	3350	1.82%
568102 Holborn	2060	2050	2040	2040	2040	-0.97%
568103 Delaney	2480	2500	2510	2530	2530	2.02%
568104 Manuka	1740	1740	1730	1740	1730	-0.57%
568201 Taita North	3150	3180	3210	3240	3270	3.81%
568202 Taita South	3170	3210	3270	3330	3390	6.94%
568301 Avalon East	2380	2430	2430	2450	2460	3.36%
568302 Naenae North	4940	5010	5060	5150	5220	5.67%
568303 Naenae South	3680	3660	3650	3640	3630	-1.36%
568401 Avalon West	2440	2410	2380	2380	2430	-0.41%
568402 Boulcott	2520	2530	2530	2530	2520	0.00%
568501 Epuni West	3190	3210	3250	3280	3320	4.08%
568502 Epuni East	3080	3090	3090	3110	3110	0.97%
568601 Waterloo West	950	940	930	930	930	-2.11%
568602 Waterloo East	4360	4370	4380	4410	4430	1.61%
568701 Waiwhetu North	1490	1490	1490	1490	1490	0.00%
568702 Waiwhetu South	2610	2690	2750	2790	2850	9.20%
						-
568800 Gracefield	60	50	50	50	50	16.67%
568900 Moera	1680	1660	1640	1630	1610	-4.17%
569001 Woburn North	1360	1350	1340	1340	1330	-2.21%
569002 Woburn South	430	430	430	430	430	0.00%
569100 Hutt Central	3840	3860	3880	3910	3990	3.91%
569201 Melling	640	650	660	670	690	7.81%
569202 Alicetown	1920	1920	1900	1900	1900	-1.04%
569301 Normandale	2150	2150	2140	2140	2140	-0.47%
569302 Maungaraki	3680	3680	3700	3710	3720	1.09%
569401 Tirohanga	1240	1250	1260	1280	1290	4.03%
569402 Belmont	2660	2680	2700	2720	2740	3.01%
569500 Kelson	2720	2730	2720	2720	2740	0.74%
569600 Haywards-Manor Park	390	400	390	390	380	-2.56%
569800 Korokoro	1330	1320	1320	1310	1300	-2.26%
569900 Petone Central	910	910	920	930	930	2.20%
570000 Esplanade	2450	2460	2440	2430	2390	-2.45%
570100 Wilford	3500	3450	3410	3410	3410	-2.57%
570300 Eastbourne	4860	4850	4820	4830	4940	1.65%
622102 Seaview Marina	20	20	20	20	20	0.00%
Wellington city	187700	190500	192800	195500	197700	5.33%
572500 Tawa South	3730	3730	3730	3740	3730	0.00%
572600 Tawa Central	4470	4520	4560	4590	4630	3.58%
572701 Linden	3990	4010	3980	3970	3950	-1.00%
572702 Greenacres	1530	1550	1600	1640	1660	8.50%
572900 Thorndon-Tinakori Road	4000	4100	4170	4250	4370	9.25%
573000 Lambton	5010	5230	5350	5480	5490	9.58%
573101 Willis Street-Cambridge Terrace	4740	4700	5100	5620	5890	24.26%
573102 Wellington City-Marinas	20	20	20	20	20	0.00%

Area	2006	2007	2008	2009	2010	Growth Rate 06 to 10
573200 Aro Street-Nairn Street	4010	4090	4200	4290	4370	8.98%
573300 Mt Cook-Wallace Street	5100	5320	5500	5630	5680	11.37%
573400 Mt Victoria West	5460	5490	5480	5480	5470	0.18%
573511 Glenside North	350	340	320	340	350	0.00%
573512 Churton	6260	6560	6800	7010	7230	15.50%
573522 Grenada North	350	350	340	340	330	-5.71%
573523 Grenada Village	1030	1040	1050	1060	1110	7.77%
573524 Newlands East	630	650	670	700	710	12.70%
573525 Takapu	290	310	350	390	450	55.17%
573526 Horokiwi	190	190	190	190	190	0.00%
573600 Johnsonville North	1950	1960	1960	1970	1970	1.03%
573700 Johnsonville South	3070	3130	3160	3200	3250	5.86%
573800 Johnsonville East	2020	2050	2060	2070	2080	2.97%
573900 Newlands North	5420	5500	5520	5570	5620	3.69%
574001 Newlands South	3690	3770	3790	3850	3890	5.42%
574002 Ngauranga East	30	30	30	30	30	0.00%
574100 Raroa	3380	3420	3450	3480	3590	6.21%
574200 Khandallah Park	2780	2800	2800	2830	2820	1.44%
574302 Te Kainga	3780	3800	3820	3860	3940	4.23%
574303 Ngauranga West	10	10	10	10	10	0.00%
574304 Rangoon Heights	2330	2380	2410	2460	2470	6.01%
574401 Awarua	3360	3390	3380	3420	3460	2.98%
574402 Ngaio	3190	3230	3250	3300	3330	4.39%
574500 Kaiwharawhara	60	70	70	70	70	16.67%
574600 Wadestown	3390	3440	3460	3470	3490	2.95%
574700 Wilton-Otari	4440	4490	4540	4600	4630	4.28%
574800 Karori North	2630	2650	2650	2680	2700	2.66%
574900 Karori Park	4320	4360	4390	4430	4470	3.47%
575000 Karori East	3600	3610	3600	3630	3650	1.39%
575100 Karori South	4080	4120	4320	4370	4410	8.09%
575200 Northland	2690	2730	2730	2770	2800	4.09%
575300 Kelburn	3810	3850	3870	3900	3920	2.89%
575400 Taitville	470	480	480	490	490	4.26%
575500 Mitchelltown	620	620	620	630	630	1.61%
575600 Brooklyn	4020	4040	4070	4110	4120	2.49%
575700 Vogeltown	1980	2010	2020	2050	2080	5.05%
575800 Kingston	2370	2390	2410	2430	2460	3.80%
575901 Brooklyn South	950	960	960	970	960	1.05%
575902 Happy Valley-Owhiro Bay	1740	1790	1830	1860	1900	9.20%
576001 Island Bay West	3480	3530	3570	3610	3630	4.31%
576002 Island Bay East	3780	3810	3830	3840	3880	2.65%
576100 Melrose	3330	3380	3410	3440	3470	4.20%
576200 Berhampore	2710	2750	2750	2770	2810	3.69%
576300 Newtown West	3870	3990	4060	4110	4130	6.72%
576400 Newtown East	4940	5030	5060	5100	5130	3.85%
576500 Adelaide	980	1040	1050	1060	1060	8.16%
576600 Oriental Bay	1160	1160	1160	1160	1160	0.00%
576700 Roseneath	1650	1660	1670	1700	1730	4.85%
576800 Hataitai	4800	4910	5040	5190	5260	9.58%
576901 Kilbirnie East	3490	3530	3540	3580	3610	3.44%
576903 Kilbirnie West	3240	3280	3310	3330	3360	3.70%

Area	2006	2007	2008	2009	2010	Growth Rate 06 to 10
576904 Evans Bay Marina	10	10	10	10	10	0.00%
577000 Lyall Bay	3150	3170	3190	3200	3210	1.90%
577100 Strathmore Park	4650	4690	4700	4740	4750	2.15%
577200 Miramar South	3630	3690	3760	3820	3870	6.61%
577300 Miramar North	5090	5140	5170	5210	5220	2.55%
577400 Karaka Bay-Worser Bay	1250	1270	1270	1280	1290	3.20%
577500 Seatoun	2220	2250	2250	2280	2290	3.15%
577600 Maupuia	2090	2100	2110	2040	2110	0.96%
577700 Makara-Ohariu	790	790	810	820	850	7.59%
Masterton district	23200	23100	23200	23300	23400	0.86%
578301 Homebush-Te Ore Ore	590	600	620	630	640	8.47%
578302 Opaki-Fernridge	1280	1270	1270	1280	1290	0.78%
578401 Kopuaranga	1470	1490	1500	1530	1560	6.12%
578402 Whareama	1730	1710	1710	1730	1730	0.00%
578600 Masterton Central	600	570	560	540	560	-6.67%
578700 Masterton West	3060	3040	3040	3050	3040	-0.65%
578800 Masterton East	3500	3470	3470	3450	3430	-2.00%
578901 Solway North	2270	2290	2260	2250	2240	-1.32%
578902 Solway South	2980	2980	3050	3100	3130	5.03%
579000 Ngaumutawa	1420	1430	1440	1450	1470	3.52%
579100 Masterton Railway	310	310	310	310	320	3.23%
579200 Lansdowne	3970	3940	3920	3920	3990	0.50%
Carterton district	7260	7300	7360	7420	7540	3.86%
579400 Waingawa	320	330	350	380	390	21.88%
579501 Mt Holdsworth	1210	1230	1270	1270	1280	5.79%
579502 Te Wharau	1520	1530	1530	1560	1570	3.29%
579700 Carterton	4210	4210	4210	4210	4300	2.14%
South Wairarapa district	9140	9190	9250	9340		
579802 Tukurumuri	450	450	460	470		
579803 Kahutara	2890	2920	2970	3020		
579900 Greytown	2060	2060	2050	2050		
580000 Featherston	2390	2380	2380	2400		
580100 Martinborough	1360	1380	1380	1400		

Source: Statistics NZ

Changes in Household Occupancy – 1991 to 2006⁵

Table 6 shows the trends in occupancy for usually resident households from 1991 to 2006. The trend from 1991 to 2001 was for household occupancy to decline, with this trend continuing in all Wellington Region TAs, except Wellington City which mirrored national trends and increased slightly. In all regions – except Auckland – household occupancy continued to decline between 2001 & 06. Wellington City was therefore similar to all the Auckland Region TAs - with the exception of Franklin – in that household occupancy increased between 2001 & 06.

It is difficult to know why this is the case, but it may be related to the cost of housing as Wellington City and Auckland have amongst the most expensive housing in the country. The significant rise in house prices between 2001 & 06 is likely to have been a factor. As there has only been minimal rises

⁵ This section has been added as a result of comments from Tony Brennand.

in house prices since 2007 if this is the case household occupancy may have declined in Wellington City (& Auckland) at the next Census in 2013.

Statistics New Zealand also publish statistics for household occupancy excluding one person households; as during some inter-censal periods (e.g. 1996 to 2001) the decline in household occupancy has been much lower once they're removed. The above mentioned period was one of relatively stable house prices.

Forecasting future household occupancy is difficult; however we can state the following:

- Household formation is affected by the future structure of the population; for example, an aging population is likely to lead to more single person households.
- House prices and rents also have an effect on household formation. For example, high house prices and rents affect whether young people leave home or flat together.

A thorough review would look at these and other factors.

Table 6 - Household Occupancy

Territorial Authority	1991	1996	2001	2006
National	2.78	2.76	2.67	2.68
Wellington Region	2.75	2.71	2.63	2.61
Kapiti Coast District	2.52	2.45	2.37	2.32
Porirua City	3.33	3.23	3.12	3.07
Upper Hutt City	2.87	2.77	2.66	2.61
Lower Hutt City	2.81	2.77	2.71	2.70
Wellington City	2.61	2.62	2.56	2.57
Masterton District	2.72	2.63	2.52	2.44
Carterton District	2.79	2.65	2.53	2.47
South Wairarapa Dist	2.73	2.59	2.46	2.36

Source: Statistics NZ Census data

Analysis of Statistics NZ Projections

2006 update population projections

Table 7 shows SNZ's latest set of 2006 population projections for the Wellington Region. While the low projection has almost no growth between 2006 & 31 the high set has growth of 152,500 or almost 33% in regional population. Over half this growth is concentrated in Wellington City, increasing its population by 42%, with Kapiti experiencing higher percentage growth at almost 45%. In contrast both the TAs in the Hutt valley experience more modest growth of 21%.

Table 7 - 2006 update Wellington region population projections

Series ⁽²⁾	Population at 30 June	Population change 2006–31						
	2006 ⁽³⁾	2011	2016	2021	2026	2031	Number	Average annual ⁽⁴⁾ (percent)
High		500,800	532,000	561,800	591,000	618,700	152,500	1.1
Medium	466,300	489,100	506,100	519,900	531,700	541,200	75,000	0.6
Low		477,400	480,500	478,800	474,100	466,500	200	0.0

Source: Statistics NZ

Table 8 - 2006 update Wellington region medium population projections

Year	Population ⁽²⁾ by age group (years), at 30 June					Components of population change, five years ended 30 June				Median age ⁽⁷⁾ (years) at 30 June
	0–14	15–39	40–64	65+	Total	Births ⁽³⁾	Deaths ⁽⁴⁾	Natural increase ⁽⁵⁾	Net migration ⁽⁶⁾	
1996	94,400	171,600	115,400	45,500	426,900	32.6
2001	96,200	166,900	129,100	48,000	440,200	32,400	14,500	17,900	-4,600	34.2
2006	94,900	173,200	145,100	53,100	466,300	31,300	14,400	16,900	9,100	35.3
2011	95,300	177,000	156,100	60,700	489,100	34,300	14,900	19,300	3,500	36.0
2016	96,200	178,900	158,900	72,100	506,100	33,400	16,200	17,300	-200	36.7
2021	97,000	180,800	159,400	82,700	519,900	32,800	17,400	15,400	-1,700	37.6
2026	94,900	181,600	160,000	95,300	531,700	32,300	18,700	13,500	-1,700	38.6
2031	93,100	179,100	161,500	107,600	541,200	31,600	20,400	11,200	-1,700	39.8

Source: Statistics NZ

Comparison between low, medium & high regional population projections

Table 8 to Table 10 have the low, medium & high 2006 population projections issued by Statistics NZ broken down into components. It can be seen from Table 11 that the biggest source of the difference between the low and high projections are the migration assumptions, although natural increase increases as a source of the difference further into the future. This is because the net migration is an assumed number, whereas the births and deaths which make up the natural increase are derived using factors on the population numbers and therefore even if the rate is held constant, actual numbers will increase in the future as the population increases.

Table 9- 2006 update Wellington region low population projections

Year	Births (Live) - 5 years ended 30 June	Deaths - 5 years ended 30 June	Natural Increase - 5 years ended 30 June	Net Migration - 5 years ended 30 June	Population at 30 June	Median Age (Years) at 30 June
2006	-	-	-	-	466300	35.3
2011	32700	15300	17300	-6250	477400	36.4
2016	29700	16700	13100	-9900	480500	37.5
2021	27600	17900	9600	-11400	478800	38.6
2026	26100	19400	6700	-11400	474100	39.8
2031	24900	21100	3800	-11400	466500	41.2

Source: Statistics NZ

Table 10 - 2006 update Wellington region high population projections

Year	Births (Live) - 5 years ended 30 June	Deaths - 5 years ended 30 June	Natural Increase - 5 years ended 30 June	Net Migration - 5 years ended 30 June	Population at 30 June	Median Age (Years) at 30 June
2006	-	-	-	-	466300	35.3
2011	36000	14600	21400	13150	500800	35.6
2016	37400	15700	21700	9500	532000	36
2021	38600	16800	21800	8000	561800	36.7
2026	39200	18000	21200	8000	591000	37.7
2031	39300	19600	19700	8000	618700	38.7

Source: Statistics NZ

Table 11 - Difference between low & high projections

Year	Births (Live) - 5 years ended 30 June	Deaths - 5 years ended 30 June	Natural Increase - 5 years ended 30 June	Net Migration - 5 years ended 30 June	Population at 30 June
2011	3300	-700	4100	19400	23400
2016	7700	-1000	8600	19400	51500
2021	11000	-1100	12200	19400	83000
2026	13100	-1400	14500	19400	116900
2031	14400	-1500	15900	19400	152200

Note: This table is the low projections subtracted from the high projections.

The low projections have quite high net migration losses; although they have occurred in the past as Wellington lost 10,971 people through net migration between 1996 & 2001. (Refer Table 2 & Table 3). However there has not been an intercensal period shown in the tables where the high migration assumptions have been true.

Table 12 - Wellington TA 2006 update population projections

Territorial authority area	Series	Population at 30 June						Population change 2006-31	
		2006	2011	2016	2021	2026	2031	Number	Average annual %
Kapiti Coast district	High		51,800	56,000	60,300	64,600	68,800	21,300	1.5
	Medium	47,500	50,600	53,400	56,000	58,500	60,900	13,400	1.0
	Low	49,400	50,800	51,800	52,700	53,300	5,800	0.5	
Porirua city	High		53,900	56,700	59,500	62,200	64,600	14,000	1.0
	Medium	50,600	52,700	53,900	54,700	55,300	55,600	4,900	0.4
	Low	51,400	51,000	50,100	48,700	46,800	-3,800	-0.3	
Upper Hutt city	High		42,500	44,100	45,600	47,100	48,400	8,700	0.8
	Medium	39,700	41,500	41,900	42,100	42,000	41,800	2,100	0.2
	Low	40,600	39,800	38,600	37,200	35,400	-4,300	-0.5	
Lower Hutt city	High		106,000	110,300	114,600	118,700	122,500	21,300	0.8
	Medium	101,300	103,500	104,700	105,300	105,500	105,100	3,900	0.2
	Low	101,100	99,200	96,300	92,700	88,400	-12,900	-0.5	
Wellington city	High		205,300	222,000	237,600	253,000	267,800	80,100	1.4
	Medium	187,700	200,500	211,800	221,400	230,400	238,700	51,000	1.0
	Low	195,700	201,700	205,500	208,500	210,500	22,800	0.5	
Masterton district	High		24,000	24,700	25,500	26,200	26,700	3,500	0.6
	Medium	23,200	23,400	23,400	23,200	22,900	22,500	-700	-0.1
	Low	22,800	22,000	21,000	19,800	18,400	-4,800	-0.9	
	High		7,800	8,200	8,600	9,000	9,300	2,000	1.0

Carterton district	Medium	7,300	7,500	7,700	7,800	7,800	7,800	500	0.3
	Low		7,300	7,200	7,000	6,700	6,300	-900	-0.5
South Wairarapa district	High		9,600	10,000	10,200	10,400	10,600	1,500	0.6
	Medium	9,100	9,400	9,400	9,300	9,200	8,900	-200	-0.1
	Low		9,100	8,900	8,500	7,900	7,300	-1,800	-0.9

Source: Statistics NZ

Comparing the growth rates in Table 12 with the growth rates in Table 1 for population from 2006 to 10 gives the results in the following table:

Table 13 - Comparison between 06 to 10 population growth rate and projection series

TA	Population projections that 06 to 10 growth rate is tracking
Wellington City	Medium
Porirua	Medium
Kapiti Coast	Low-Medium
Lower Hutt	Medium
Upper Hutt	Medium
South Wairarapa District	Medium
Carterton District	Medium-High
Masterton	Medium

In terms of their growth rate between 2006 & 10 most of the TAs are tracking the medium series of the 2006 update population projections. This suggests if current trends continue the medium series will be suitable as a central scenario. However it should be noted that if the high net migration outflows seen in the past recur then the region's population will grow more slowly or possibly not at all. Substantial international outflows have been seen during periods when the New Zealand economy has underperformed relative to offshore economies where New Zealanders might go to work (e.g. the late 1990s). It is difficult to predict whether this will happen again; at the moment the country is riding a commodity price boom, with Australia being the only country NZ is losing population to - apart from a small number to Korea.⁶

Changes in Population Projections

Statistics New Zealand has produced two sets of subnational population projections on a 2006 base, with the later set being shown in the section 2006 update population projections. Table 14 compares the changes between the two sets of projections (i.e. the earlier set has been subtracted from the later set shown in the section 2006 update population projections)

Table 14 - Changes in components of population changes between successive Wellington Region medium population projections

⁶ Statistics NZ international migration data for year ending June 2011

Components of population change, five years ended 30 June					Change in Median age ⁽⁷⁾ (years) at 30 June
	Change in Births ⁽³⁾	Change in Deaths ⁽⁴⁾	Change in Natural increase ⁽⁵⁾	Change in Net migration ⁽⁶⁾	
2001	0	0	0	0	0.00
2006	0	0	0	0	0.00
2011	1,100	100	900	5,400	-0.40
2016	1,500	500	1,100	1,700	-0.60
2021	1,700	700	900	200	-0.70
2026	1,700	800	900	200	-0.80
2031	1,700	800	900	200	-0.80

Source: Statistics NZ

It can be seen that the biggest component of changes up to 2016 is net migration, with the increase in natural increase being higher than the increase in net migration after 2016. It can also be seen that the net migration assumption for the five years ending 2011 & 2016 has been increased significantly. This is in response to population estimates which show that the population in Wellington has grown strongly since 2006 with regional population in 2010 being higher than the medium projections done in 2007 assumed for 2011.⁷ This illustrates how the volatility in net migration illustrated in the sections on International Migration and Internal migration impact on population projections. Table 8 illustrates how the projections tend to adopt a conservative assumption for net migration further into the future; in this case net migration is assumed to become negative after 2011. This illustrates a key risk when planning infrastructure; while a conservative assumption is sensible, past volatility means that it may not happen, although high sustained net in-migration seems unlikely given the information in Table 2 & Table 3.

Household Projections

Table 15 shows the latest set of household projections from Statistics NZ for the Wellington Region & TAs. SNZ is projecting regional growth in households that is higher than for population implying that household occupancy is likely to drop. However for Masterton & South Wairarapa Districts the number of households is projected to drop slightly by 2031 under the low projections, which reflects the projected drop in population under the corresponding low population projections. For the Wellington Region urban TAs, excluding Wellington City & Kapiti the household growth under the low scenario is very low at less than 0.3% per year. The corresponding low population projections for those TAs has a slight decline in population.

Table 15 - Household projections (2006 base update)

Territorial authority area	Series	Households at 30 June	2011	2016	2021	2026	2031	Number	Average annual (percent)
		2006							
Kapiti Coast district	High		22,500	24,700	26,900	29,000	31,200	11,000	1.8
	Medium	20,200	21,900	23,600	25,100	26,600	28,000	7,800	1.3
	Low		21,400	22,500	23,400	24,200	24,900	4,700	0.8
Porirua city	High		18,000	19,300	20,600	21,700	22,800	6,400	1.3
	Medium	16,500	17,500	18,400	19,200	19,700	20,200	3,700	0.8
	Low		17,100	17,600	17,800	17,900	17,700	1,200	0.3

⁷ Ref: WTSM Input Tracking Spreadsheet

Upper Hutt city	High		16,400	17,400	18,300	19,100	19,900	4,900	1.1
	Medium	15,100	16,100	16,700	17,200	17,600	17,800	2,800	0.7
	Low		15,800	16,000	16,200	16,100	15,900	900	0.2
Lower Hutt city	High		39,900	42,100	44,300	46,400	48,500	11,100	1.0
	Medium	37,500	39,100	40,500	41,700	42,700	43,500	6,000	0.6
	Low		38,300	38,800	39,100	39,100	38,700	1,300	0.1
Wellington city	High		81,000	88,900	96,200	103,800	111,600	38,700	1.7
	Medium	73,000	79,400	85,200	90,500	95,800	101,000	28,000	1.3
	Low		77,600	81,700	84,900	88,000	90,700	17,700	0.9
Masterton district	High		10,000	10,600	11,100	11,400	11,800	2,400	0.9
	Medium	9,400	9,800	10,100	10,300	10,400	10,400	1,000	0.4
	Low		9,600	9,700	9,600	9,500	9,200	-200	-0.1
Carterton district	High		3,100	3,400	3,600	3,800	4,000	1,100	1.3
	Medium	2,900	3,100	3,200	3,300	3,400	3,500	600	0.7
	Low		3,000	3,000	3,000	3,000	3,000	100	0.2
South Wairarapa district	High		4,100	4,300	4,500	4,600	4,800	900	0.9
	Medium	3,800	4,000	4,100	4,200	4,200	4,200	400	0.4
	Low		3,900	3,900	3,900	3,800	3,700	-200	-0.2
Wellington region	High		195,000	210,600	225,400	240,000	254,700	76,400	1.4
	Medium	178,300	190,900	201,900	211,500	220,400	228,500	50,200	1.0
	Low		186,700	193,300	198,100	201,700	203,800	25,500	0.5

Source: Statistics NZ

Possible futures for the Wellington Region

The Statistics NZ population projections are explicitly based on demographic factors, such as migration, fertility & mortality. International migration is strongly affected by the economic situation in New Zealand relative to the rest of the world and likewise migration into and out of Wellington is affected by the performance of Wellington's economy relative to the rest of New Zealand. Wellington's industry structure.

Table 16 - Industry Employment Shares in Wellington Region vs NZ as a whole

	Agriculture, Forestry and Fishing	Mining	Manufacturing	Electricity, Gas and Water Supply	Construction	Wholesale Trade	Retail Trade	Accommodation, Cafes and Restaurants	Transport and Storage	Communication Services	Finance and Insurance	Property and Business Services	Government Administration and Defence	Education	Health and Community Services	Cultural and Recreational Services	Personal and Other Services	Not Elsewhere Included	Total Industry	
1996																				
Total NZ Wellington Region	9.2	0.3	14.3	0.5	5.8	5.8	12.3	4.3	3.8	1.5	3.2	9.9	4.1	6.4	6.6	2.1	3.8	6.2	100	
2001																				
Total NZ Wellington Region	2.6	0.1	10.1	0.5	5.1	5.8	10.9	3.9	3.5	2.4	6.4	14.1	8.3	6.9	6.4	2.8	4.9	5.3	100	
2006																				
Total NZ Wellington Region	8.3	0.2	13.0	0.3	6.0	5.8	12.1	4.7	3.8	1.3	3.0	11.3	3.5	7.3	8.1	2.4	3.7	5.3	100	
Location Quotient	2.4	0.1	8.3	0.4	5.7	5.1	11.2	4.4	3.5	2.1	5.4	16.4	8.2	7.3	7.8	3.2	4.6	4.0	100	
Total NZ Wellington Region	6.9	0.2	11.4	0.3	7.4	5.4	12.0	4.8	3.8	1.2	3.2	12.8	3.4	7.0	8.1	2.6	3.8	5.6	100	
Location Quotient	2.0	0.1	6.9	0.3	6.7	4.3	11.2	4.5	3.1	1.5	5.2	17.2	9.3	7.2	7.8	3.4	4.8	4.5	100	

Note: All numbers in this table are percentages.

Source: Statistics New Zealand

Table 16 shows the shares each industry had of employment in Wellington region and NZ as a whole at the 1996, 2001 and 2006 Censuses. The final row of the table is the location quotient which is the share in Wellington divided by the share in NZ as a whole. If it is less than 1 then the industry is underrepresented in Wellington relative to the country as a whole and if it is more than one it is over represented. Agriculture, Forestry & Fishing, Mining and Manufacturing are significantly underrepresented with Finance and Insurance, Property and Business Services, Government Administration and Defence being significantly overrepresented. This means that the Wellington region's economy will be more sensitive than the country as a whole to the Government or Finance and Insurance sectors declining or growing less slowly than the rest of the economy. Conversely if they grow faster than the rest of the economy Wellington's economy will tend outperform the rest of New Zealand.

The sectors in which Wellington has a high location quotient service New Zealand as a whole and are not export industries. Employment in them is affected by the performance of the NZ economy as a whole and how much politicians wish to spend on state employees. Rhetoric from the current government has been that it wants to cut state sector spending and the number of employees, however between Business Demography data shows that between 2009 & 10 the number of state sector employees in Wellington and nationally rose slightly at the same as employment in Wellington and nationally fell slightly. Employment in Finance & Insurance and Property & Business Services also fell slightly both in Wellington and nationally between 2009 & 10.

We can therefore conclude that:

- **The future performance of the Wellington economy depends upon the performance of the NZ economy as a whole and how much money politicians decide to spend on the state sector. To some extent the latter is dependent on how well the NZ economy performs.**
- **The Wellington economy services the rest of NZ and is not export orientated.**

This leads us onto to a discussion about how the NZ economy is likely to perform in the future

Likely future performance of the NZ Economy

Most economic forecasts concentrate on the short to medium term. This is hardly surprising as longer term economic forecasts are subject to more uncertainties than demographic projections. Economic shocks - such as the Global Financial Crisis - arrive periodically, which is not the case with population.

An internet search revealed that most commentators are reasonably upbeat about the longer term outlook for the NZ economy; one example being the Economist Intelligence Unit which projects real GDP growth per head of between 2.5% to 2.7% per annum between now and 2030.⁸ This is better than has occurred during some periods in the past and if it happens should enable NZ to continue to attract skilled workers and maintain its population. However some caution has to be exercised as these projections are based on current knowledge and subject to unexpected future events.

Suitable population scenarios to use for future regional modelling

The review of future economic possibilities above suggests a reasonably bright future for the NZ economy and by implication Wellington's economy. While this suggests some level of in-migration into the Wellington region it is hard to argue for a high level as historically the region has tended to either lose people or experience minor gains. The latest set (2006 update) medium population

⁸ See:

<http://country.eiu.com/article.aspx?articleid=1777336162&Country=New%20Zealand&topic=Economy&subtopic=Long-term+outlook&subsubtopic=New+Zealand--highlights%3A+Long-term+outlook#>

projections have gains until 2011 and minor losses thereafter. Due to the historical loss of population this is an understandably conservative assumption. The low projections have a loss of around 2000 people a year through emigration, which has occurred in the past. The high projections have rates of migration into the region which have not occurred in the past and seem unlikely in the future. This is because Wellington is competing for population with the rest of the country and historically has tended to suffer losses. As Wellington's economic performance is tied to the rest of the country it is hard to conceive of a situation where it outperforms the rest of the country and attracts lots of people. Discussions with Richard Speirs at Statistics NZ (phone call on 8/8/11) revealed that they do their projections with a symmetrical range around the medium and that he agrees with me that the high projection is unlikely to happen in Wellington region.

It is therefore suggested that the 2006 update medium population projection is used as the base scenario for future modelling, with the low projections being considered as a variant in which Wellington loses people through emigration. If it is desired to test a high variant then the high series could be used or new projections could be created that are somewhere between the medium and high.

Development of 2011 Base for WTSM

Population

The 2011 population numbers are based on the 2006 WTSM numbers, which were then adjusted based on Area Unit population estimates from June 2006 to 2010. The 2011 population estimates won't be available until later in the year and are therefore unavailable for this work. The trend in the change in population from 2006 to 2010 was extrapolated to 2011. This was difficult in the case of some AUs as the changes in population from year to year were quite erratic. The 2011 projections in the 2006 update Area Unit population projections done by Statistics NZ which used population estimates to June 2009 were also looked at. The biggest uncertainty about the 2011 population is in the few AUs which have shown significant growth. Building consents could have been used to help estimate the change for 2010 to 11; this was not pursued and is problematic for a number of reasons.

The AU populations for 2011 were divided by those for 2006 to give a growth rate which was then applied to the 2006 WTSM zone population input. In many cases the WTSM zone has bits of two or more AUs in it. The AU growth rates were apportioned based on what percentage of the area of the WTSM zone they made up. For example if AU 1 (AU2) makes up 60% (40%) of the area of a WTSM zone and had a 5% (4%) growth rate over the five years, then the growth rate for the WTSM zone would be $0.6 * 0.05 + 0.4 * 0.04 = 0.046$ or 4.6%. Where an AU comprised less than 5% of the area of a WTSM zone it was not included. This was because even where one AU falls completely into one WTSM zone; there were often small slivers that fell into adjacent zones. This is a limitation of the way boundaries are represented in the GIS. The reason a population growth rate was chosen is that the 2006 WTSM inputs were derived from Census data whereas the population estimates and projections are derived on a different basis, and are therefore not directly comparable.

This process didn't work for WTSM zone 149, which contains the Riverstone Terraces AU in Upper Hutt which has been growing rapidly. The reason is that the rest of the WTSM zone is rural and has virtually no population. This problem was picked up through the TA level checking process which compared the growth rate for the WTSM inputs between 2006 & 11 with the growth rate of the Stats update population projections over the same period. The medium series was mainly used as for most TAs this tracks the population estimates between 2006 & 10.⁹ The growth rate in Carterton District was below that expected from the population projections and the growth rate in Masterton District was above that expected from the population projections. The problem found in zone 149 may also exist elsewhere in the region in some WTSM zones, but not show up at the TA level. There was insufficient budget to conduct further checking.

The persons in the WTSM land use are also segmented by age and employment status. The population estimates and projections are segmented by age, but not employment status. Employment status is available from the Household Labour Force Survey (HLFS) at regional level. Employed persons as a percentage of the working age population hardly changed between the first quarter of 2006 when the Census was conducted and the first quarter of 2011. However as the HLFS is a sample survey it has relatively large errors; for example in the first quarter of 2011 for the Wellington region the 95% confidence interval for employed persons (who made up 93.1% of the labour force) ranged from 89.4% to 96.7% of the labour force. Although the split between the employed categories (Adult Full/Part Time Employed) and the Other category may have changed

⁹ For more details, see the table which compares the growth rate in the population estimates from 06 to 10 with the comparable population projection series.

they were not adjusted as the confidence interval from the HLFS was too large for there to be a basis upon which to do it.

Households

No subnational household estimates are produced by Statistics NZ¹⁰; the only household estimates produced by Statistics NZ are at a national level, these were compared against the national population estimates to derive national household occupancy. It was found that household occupancy has dropped 0.8% since 2006. As this change is very small and the actual change in Wellington is unknown it was decided to use the household occupancies from the 2006 land use inputs. Therefore the household numbers have been derived by applying the 2006 household occupancy rates to the 2011 person numbers

A review of Household Labour Force Survey tables on Infoshare revealed that there are no tables that are relevant to deciding whether to change the split between household categories. Therefore the 2006 splits between household categories in each zone were used. For example if the category *1 Adult Employed* made up 20% of all households in the WTSM inputs for zone 1 in 2006, then the same percentage was applied in 2011 to the total households for that zone.

Usage of household data in trip generation model

Much of the segmentation of households appears to be unused in the trip generation model; the only use is in the Home Based Other productions where the trip generation rate is lower for households with 2+ people. The household segmentation may be used in the car ownership model, but no documentation has been supplied on it. Car ownership is a factor in trip productions for some types of trips.

Employment

The 2006 Employment data was derived from 2006 Census workplace data. This is unfortunate from the perspective of this update as the other source of spatial employment data is Business Demography (BD) statistics which are updated yearly. With the 2011 Census having been cancelled it would have been desirable if the 2006 employment data was based on the BD statistics.

Another issue is the reconciliation between the numbers of employed persons in the model inputs and the amount of employment. In 2006 over the model area there were 222,965 employed persons and 255,146 "jobs" (called employment in the model inputs). As both datasets were derived from the Census they should be consistent, although this doesn't mean they should be the same. The documentation supplied to the author doesn't document the reasons for the difference, although one possibility is people working more than one job.

The 2011 BD numbers will be released in October.¹¹ Business Demography statistics for 2006 to 2010 were custom ordered by WTSM zone & WTSM aggregations. These have been used to grow/decline the individual cells in the 2006 data. Originally it had been intended to grow the resultant numbers by the projected growth rate for Wellington Region's Economy in 2010-11. However inspection of the data revealed that an individual zone & industry level the BD was quite lumpy and had lots of small numbers (which get rounded by Stats NZ). In many cases the numbers were quite different from the 2006 model inputs. Given these issues and the lack of information on the growth/decline of individual industries in the Wellington Region between 2010 & 11 it was

¹⁰ E-mail to Russell Jones by Richard Speirs of Statistics NZ on 26/4/11

¹¹ E-mail to Russell Jones by Nalin Patel of Statistics NZ on 24/6/11

decided not to apply a growth rate between 10 & 11 and apply the constraints mentioned in the following paragraphs.

For each industry and zone the growth rate in the BD data from 2006 to 10 was calculated and this was applied to scale the 2006 Census employment used in WTSM. Checks were conducted for high growth or decline in the BD data in combination with the BD data being very different from the 2006 Census WTSM data. A spreadsheet was used to calculate where the BD growth or decline from 06 to 10 exceeded 30% and the 06 Census employment exceeded the 06 BD employment by 35%. In these cases the data was inspected and a 2011 employment number was calculated manually. The object of these changes was to avoid big percentage changes in the BD data causing a large numerical growth or decline in the data used in the model.

In WTSM zones where the 2006 BD employment for that industry was zero, calculation of a growth rate from 06 to 10 gives a divide by zero error. These zones were inspected and the 2011 employment was set manually. In many cases the 2006 employment was left unchanged.

For some industries, there were zones where there was little or no employment in the BD data, but significant numbers in the 2006 WTSM inputs; in this case the 2006 WTSM inputs were used, sometimes with small changes.

Table 17 - Comparison of employment changes by industry

Industry	Bus Demog change 06 to 10	Change 06 model inputs to 11
Manufacturing	-11.0%	-6.2%
Retail	-3.5%	-2.0%
Transport & Communications	-0.6%	5.3%
Services	6.8%	7.4%
Other	-11.0%	-9.5%
HCV : Manufac turing	-20.7%	-17.8%
HCV:Agr, Min, and Construction	0.6%	1.7%

Table 1 shows a comparison of rates of growth/decline by industry across the modelled area between the Business Demography data and the 2006 WTSM model inputs compared to the 2011 model inputs. For most industries they're quite similar; the exceptions being *Manufacturing* and *Transport & Communications*. No further tweaking was made to the individual zone numbers at this stage, as it is felt possible changes should be discussed with the client.

School & Tertiary Rolls

The school roll numbers have been supplied by the Ministry of Education and are actual school rolls segmented by age (5-10 years, 11-16 years & 17+ years) as at July 2010. Latitude and longitudes for the schools were supplied by the Ministry of Education and these were used to geocode them to WTSM zones.

The tertiary roll numbers are only intramural (covers courses where students must be physically present in scheduled teaching sessions in order to meet the course requirements. These courses may, however, include periods of supervised research and clinical or field experience which may take place outside the campus). There are three other categories; two of which are extramural and

one intramural where the students are overseas that were not included as the students don't travel to the institution's campus.¹² There are issues with the data that Ministry of Education are aware of; for example, the writer found that the Open Polytechnic has 2362 intramural students in the data supplied, but when phoned the Open Polytechnic stated that they have no intramural students. This error has been corrected, but others may exist.

Use of Kapiti data supplied by James Newell

James Newell of MERA has recently done population, household & employment projections for Kapiti Coast District Council. The original intention was to use them to help produce the 2011 land use numbers, but differences were found at a zonal level between the 2006 WTSM numbers and the 2006 Kapiti numbers that JN supplied.¹³

Disclaimer

The information contained in this document is given in good faith. To the maximum extent permitted by law, no liability is accepted by Russell Jones or related parties for any loss or damage arising as a result of any person acting in reliance on information contained in this document.

¹² Refer e-mail from Russell Jones to Sathi Sathiyandra of Ministry of Education on 22/6/11.

¹³ Refer to the spreadsheet: *Comparison between JN Kapiti & DY WTSM inp*



MEMO

TO Fraser Fleming, Andy Wilson
COPIED TO Nick Sargent
FROM Andrew Ford
DATE 20 December 2011
FILE NUMBER PS/04/01/01

Demographic Analysis

1. Introduction

Greater Wellington Regional Council (GWRC) were asked by Opus International Consultants (Opus) to undertake some initial analysis of the demographic inputs for and resulting trip generation outputs from the 2011 WTSM Model Update.

This note summarises the analysis of this data for both the updated 2011 and previous (2006) WTSM base year models.

2. Demographic Data

The following demographic data was obtained and analysed for both 2006 and 2011:

- Population – segmented by age and employment status;
- Number of Households – segmented by number of adult occupants and employment status;
- Persons in Employment – segmented by employment type;
- Persons in Education – segmented by establishment (primary, secondary, tertiary); and
- Employment – HCV use – segmented by employment type.

This data, along with household trip rates (which remain identical between 2006 and 2011), is used to generate trip end productions and attractions for the WTSM model.

It should be noted that the quality of the 2011 population data is not as good as that from the 2006 Census data and the 2011 employment data comes from a different source (business demography) to

that used in the 2006 Census. Therefore differences between the 2006 and 2011 forecasts are due to a combination of both changes in demographics through time and changes to the methodology.

2.1 TLA Level

The following points can be drawn from analysis undertaken at a TLA level:

- Population increases by 5% between 2006 and 2011 across the whole region. Individual growth rates vary by TLA; Wellington City (7%) has the highest growth rate, Hutt Valley (2%) the lowest;
- The rate of increase in the number of households per TLA between 2006 and 2011 is identical to the rate of increase in population over the same period. This is because for the preparation of the 2011 land use data household occupancy is assumed to remain constant between 2006 and 2011;
- Employment (by job location) increases by 3% between 2006 and 2011. Wellington (4.5%) has the highest growth rate, whereas Upper Hutt(-1.5%) has the lowest;
- Overall the number of students in full-time education increases by 6% between 2006 and 2011. The current dataset shows some very large variations in growth rates between TLA's – this is being investigated;
- The change in employment (by residential address) mirrors the pattern seen for changes in both population and household. The revised 2011 land use data assumes that the employment rate remains constant (at a zonal level) between 2006 and 2011 – therefore any increase in employment is directly related to the increase in population. This highlights a potential mis-match between employment at a job location level (growing by 3%) and employment at a residential level (growing by 5%).

2.2 Zonal Level

At a zonal level the changes in demographics between 2006 and 2011 can be summarised as follows:

- Around 19 zones experience an increase in population greater than 15%. Whilst these zones are generally spread out across the region, a cluster of zones (46 to 53) experience a 29% increase in population. These zones are found at the lower end of Wellington CBD along the proposed “PT Spine”;
- A handful of zones exhibit a small decrease in population between 2006 and 2011 – only 2 zones experience a decrease greater than 15% in magnitude;
- As previously mentioned, household size remains constant between 2006 and 2011. There are around 20 zones where household occupancy is over 3 (the average across the region is 2.7) – conversely there are 5 zones where household occupancy is under 2. Whilst these figures are at the upper and lower end of what might be considered reasonable, they are neither too high nor too low to be considered erroneous;

- Employment (by job location) shows a large degree of variation between 2006 and 2011. There are 23 zones that experience a decrease in employment greater than 15% - conversely 50 zones show an increase in jobs of greater than 15% between 2006 and 2011. Russell Jones, who prepared the 2011 land use data, states that “employment can jump around in a zone, even in the absence of an area being zoned for growth” – placed in this context the observed variation in employment at a zonal level is not unreasonable;
- HCV movements (associated with employment) show a similar trend to employment (by job location), with 31 zones showing a decrease and 66 showing an increase in trips between 2006 and 2011; and
- Employment (by residential address) shows an identical trend to population, because as previously mentioned, employment rates and household occupancies are identical in 2006 and 2011.

3. Trip Productions and Attractions

The demographic data reported above has been used together with trip rates in order to generate trip productions and attractions by purpose across a 24 hour period. The data is segmented by the following purposes for both productions and attractions:

- Employers Business;
- Home Based Work;
- Home Based Education;
- Home Based Other;
- Home Based Shopping; and
- Non Home Based Other.

3.1 TLA

Analysis of the data at a TLA level shows the following:

- Changes in productions between 2006 and 2011 are similar across all purposes. On average trip productions increase by around 5% - Wellington, Kapiti and Upper Hutt show the greatest increase (6% to 10%) whilst Porirua and Lower Hutt show the lowest increase (around 2%);
- Wellington contains 50% of all productions and attractions (and around 50% of the population) – hence Wellington is the main driver for change across the whole region and can mask subtle effects and changes that might be occurring in other TLAs;
- Trip attractions show a very similar pattern to trip productions – this is unsurprising as both figures cover a 24 hr period. We would therefore expect the total number of productions and

attractions within the study area to balance other over 24 hours – this is the case, as both productions and attractions show a 4.9% increase between 2006 and 2011;

- At a TLA level, Wellington shows a slightly greater increase in productions (6.1%) than attractions (4.75%) over a 24 hr period. Conversely, Kapiti and Upper Hutt have a greater increase in attractions than productions. In both instances, however, the difference between productions and attractions is fairly small;

3.2 Zonal Level

Analysis of the data at a zonal level shows the following:

- Employer's business productions show a large degree of variation between 2006 and 2011. The overall trend, as highlighted in the TLA section, is for growth of around 5%. Five zones have a decrease greater than 15% and 46 zones show an increase greater than 15%. The zones showing a sizeable increase in trips are spread evenly throughout the modelled area;
- Home-based work productions show a much smaller level of variability – only 18 zones have an increase in trips greater than 15% between 2006 and 2011. Unsurprisingly there is a good correlation between home based work trip productions and the population demographic data, as the former is largely generated by the latter;
- Productions for other trips (an aggregation of HbEd, HbSH, HBO and NHBO) show a small degree of variability at a zonal level, with 27 zones showing an increase greater than 15%;
- The pattern of employer's business productions and attractions is identical, as in any 24hr period it is assumed that all employer's business trips will have two legs (a 'to' leg and a 'from' leg), both of which are equal and opposite.
- Home based work attractions show a greater level of variability than home based work productions – 17 zones experience a decrease in trips greater than 15% whilst 63 zones have an increase greater than 15%. This trend is not surprising – when referring back to the demographic data, the change in population (and employment by residential address) at a zonal level (which drives HBW productions) is less pronounced than the change in employment (job location) at a zonal level (which drives HBW attractions). Overall the number of HBW productions and HBW attractions are identical across the 24 hr modelled time period;
- 'Other' attractions (comprising HbEd, HbSH, HBO and NHBO) vary to a greater extent than 'other' productions – 52 zones have an increase in trips of greater than 15%, with 17 experiencing a comparable decrease;
- The difference between trips in 2006 and 2011 at a zonal level is more pronounced for productions than attractions. A logical explanation for this observed trend is that the 2011 population data (which is linked to the household and employment (by residential address) data) is derived directly from the 2006 population data and drives the production end of most trips. Whilst this data will in part be used to generate trips attractions, employment (by job location) will have a much greater impact on trip attractions. Unlike population and employment (by

residential address), employment (by job location) is derived from a different source (business demography) and is not directly linked to any 2006 data. As mentioned earlier, not only do the growth rates differ between these two sources but variability between 2006 and 2011 is greater when employment is analysed using the job location indicator as opposed to the residential address indicator; and

- Further investigations are required, perhaps focussing on certain zones that see a particularly large change in employment, to determine whether these changes are realistic or whether they are attributable to differences in the methodology used to compile employment (by job location) data in 2006 and 2011.

4. Conclusions

Analysis of the 2006 and 2011 demographic data shows that the observed changes appear largely plausible. Comparisons between the 2006 and 2011 trip generation data, produced from a combination of trip rates (which are the same in 2006 and 2011) and demographic data, again show that the observed changes are reasonable:

The following points have been flagged as areas of concern where differences that cannot readily be explained exist between the 2006 and 2011 data:

- There appears to be an error with the education data for 2011 – this has been narrowed down to an issue with the allocation of tertiary institutions to WTSM zone and is being rectified;
- It has been assumed that household occupancy rates remain constant between 2006 and 2011 – with no knowledge of the number of housing consents that have been granted in this period this assumption is currently considered valid;
- The proportion of the total population lying within each age band (e.g infants, 5-10 yr old, 10 – 16, Young adult, adult, older adult) remains constant between 2006 and 2011. In the absence of other data this is a realistic assumptions, although it is possible that inward (or outward) migration could affect these ratios;
- The number of children enrolled at primary education establishments has decreased by 7% between 2006 and 2011 whilst numbers in secondary education have increased by around 8% (according to Ministry of Education data). This contradicts the population data which shows the proportion of children categorised as ‘primary’ or ‘secondary’ age increasing by around 5% during the same period;
- Whilst the overall totals are identical, the differences between the 2006 and 2011 totals (at a zonal level) are greater for attractions than productions. From this we can infer that there may be a noticeable change in the distribution of trips between the 2006 and 2011 models;
- Whilst employment (by residential address) is related to population, employment (by job location) is obtained from a different source. As mentioned above, employment (by residential address) exhibits less variation between 2006 and 2011 compared with employment (by job location).

5. Analysis of Rebasing Exercise

Comments on the 'WTSM 2011 Rebasing Report' were provided to GWRC and Opus by Russell Jones, Prism Consulting. A number of further sense checks were suggested, in order to confirm that the future projections following the rebasing process appear reasonable.

The checks are as follows:

1. Look at the relationship between working persons (adults in full time employment) and employment (job location) in 2041 in both the previous WTSM forecasts (referred to henceforth as 'previous') and the rebased forecasts (referred to henceforth as 'rebased');
2. A general check at a zonal level of the previous and rebased future forecasts, in order to determine whether the changes are reasonable: and
3. Compare the spatially different scenarios (Western Drift & Eastern Drift) against the medium and high rebased scenarios to confirm that growth is being focussed on the correct areas.

5.1 Employment Checks

The number of adults categorised as follows was obtained from the population data:

- Young adults – in full time employment;
- Adults – full time employment;
- Older adults – full time employment;

Along with the above information, total population and employment (by job location) was also gathered for the previous and re-based projections in 2011 and 2041.

Table 1 Difference between previous and rebased 2011 land use projections

Diff - 2011 WTSM and 2011 Rebased

	Young Adult Full-Time Employed	Adult Full-Time Employed	Older Adult Full-Time Employed	Overall Population Total	Employment (Job Location)
Wellington City	0%	-1%	-62%	2%	-6%
Porirua City	-12%	0%	-67%	1%	-7%
Kapiti Coast District	-15%	-2%	-48%	-1%	-6%
Upper Hutt City	-11%	0%	-68%	2%	-11%
Lower Hutt City	-8%	-1%	-64%	0%	-9%
South Wairarapa District	-16%	0%	-69%	1%	-13%

Masterton District	-15%	-4%	-69%	0%	-10%
Carterton District	-14%	-3%	-48%	-1%	13%
Total	-6%	-1%	-63%	1%	-7%

Table 1 above shows that the overall population remains broadly constant between the previous and rebased projections. The number of young adults in employment decrease by 6%, whilst adults in employment decrease by 1%. These aggregate figures mask larger changes that can be seen at a zonal level – young adult employment, for example, decreases by around 10 to 15% in every TLA apart from Wellington. Because Wellington is the largest TLA, containing 50% of the regions population and an even greater percentage of jobs in the region, the Wellington trend might mask more subtle trends and changes elsewhere in the region. The number of full time adults in employment, however, remains constant between the previous and rebased scenarios when viewed at both an aggregate and individual TLA level. **The number of older adults in employment decreases by over 60% - this appears wrong and needs to be investigated.**

Employment numbers by job location decrease by around 7% as a result of the rebasing process.

**Table 2 Difference between 2041 WTSM and 2041 Rebased
Diff - 2041 WTSM and 2041 Rebased**

	Young Adult Full-Time Employed	Adult Full-Time Employed	Older Adult Full-Time Employed	Population Total	Employed
Wellington City	1%	1%	1%	1%	-6%
Porirua City	2%	2%	3%	0%	-6%
Kapiti Coast District	-2%	-1%	-2%	-1%	-6%
Upper Hutt City	2%	2%	1%	2%	-12%
Lower Hutt City	0%	0%	0%	0%	-9%
South Wairarapa District	1%	1%	1%	1%	-12%
Masterton District	0%	0%	1%	0%	-10%
Carterton District	-1%	-2%	-2%	-2%	12%
Total	1%	1%	1%	1%	-7%

When comparing the previous and rebased projections in 2041, the difference between the working adult population and overall population is very small, at both an aggregate and TLA level.

The difference for employment (by job location), however, is more noticeable with the rebased 2041 employment projection lagging 7% behind the previous 2041 employment projection, demonstrating that the trend seen in the base year is carried through to the future year projections.

5.2 Rebasing Check

In order to verify the rebasing process, differences between the previous and rebased projected land use were analysed at both a model-wide and zonal level for all indicators, namely population (by age group), households, employment (by job location and industry) and school roll numbers. This analysis focussed on the medium scenarios in 2011, 2021 and 2041, using the assumptions that the 'low' and 'high' scenarios use the same method. A cursory check determined that this assumption was indeed valid.

The differences between the previous and rebased medium scenarios are listed below.

5.2.1 2011 – Rebased vs Previous

- Child population – increases by 10%;
- Young adults / adults in employment – remains broadly the same, maybe slightly lower;
- Other young adults / adults – slight increase;
- Older adults in employment – decreases by 60%;
- Overall population – increases by 3%;
- Household numbers – broadly similar;
- Employment (by job location) – decreases by 6%;
- Children enrolled at primary schools – decreases by 6%;
- Pupils at secondary schools – increases by 14%.

The figures quoted above are aggregate, model wide stats. At a zonal level changes are more pronounced, with changes in population / employment numbers of +/- 30% seen in many zones.

5.2.2 2021 – Previous vs Rebased

- 3% increase in population across all categories;
- Households – no change;
- Employment (by job location) - decreases by 6%;
- Primary roll – down 4%; and
- Secondary roll – up 16%.

Unlike the 2011 comparisons, there is a much closer correlation between the previous and rebased 2021 land use projections. Whilst the aggregate numbers presented above may mask changes at a zonal level, such changes are relatively minor and appear to be a result of known changes to land

use zoning e.g Zones 46 to 53, along the route of the proposed PT spine improvements, show an expected increase in employment of around 30% in the rebased scenario when compared against the previous 2021 forecast.

5.2.3 2041 – Previous vs Rebased

- 1% increase in population across all categories;
- Households – 1 to 2% decrease;
- Employment (by job location) - decrease of 8%;
- Primary roll – down 8%; and
- Secondary roll – up 12%;

The 2041 trend is very similar to that seen in 2021.

5.2.4 Overall

It appears that the re-basing process is working well, with both the 2021 and 2041 rebased forecasts correlating well with the 2021 and 2041 forecasts. As mentioned above, there are changes at a zonal level but these appear to be a result of specific changes to the land use assumptions in 2011.

The only major difference between the previous and rebased projections is that whilst the population in 2021 and 2041 remains broadly similar between the two scenarios, employment (by job location) is around 6% lower for the rebased projections. This is due to differences between the previous and rebased base year employment (by job location) data being carried forward to the future year projections.

One pronounced difference between the previous and rebased 2011 land use data is in relation to the number of ‘older adults’, who seem to decrease by 50% in the rebased projections. This difference, however, is only present in 2011 and disappears in the future forecasts. Whilst the numbers in question are relatively small (when expressed as a percentage of the overall population), it would be valuable to find an explanation for this apparent trend.

5.3 Scenario Check

Both the Western Drift and Eastern Drift scenarios have been compared against the appropriate medium and high rebased scenarios in 2041, to determine whether these spatially different scenarios do result in additional growth being focussed in the designated areas.

5.3.1 Western Drift

Compared with medium scenario:

- Porirua / Kapiti – 10 to 15% higher growth than in ‘medium’ scenario

- Wellington and rest of region – identical to medium scenario.

Compared with high scenario:

- Wellington and rest of region – 10% or so lower than in ‘high’ scenario; and
- Porirua / Kapiti – identical to high scenario.

5.3.2 Eastern Drift

Compared with medium scenario:

- Hutt Valley / Wairarapa – 10 to 15% higher growth than in ‘medium’ scenario; and
- Wellington and rest of region – identical to medium scenarios.

Compared with high scenario:

- Wellington and rest of region – 10 to 15% higher growth than in ‘medium’ scenario; and
- Hutt Valley / Wairarapa – identical to high scenario.

5.3.3 Overall

This brief analysis shows that both the Western and Eastern drift scenarios result in higher levels of growth being focussed in the correct areas. Analysis of both the 2021 and 2031 forecasts shows the presence of the same trend.

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Strategic Planning

Appendix C – Base and Future Year Forecasts

Total Population	2006 WTSM					2011 WTSM			
	2006	2011 Low Growth	2021 Low Growth	2031 Low Growth	2041 Low Growth	2011 Base (Prism)	2021 Rebased Low	2031 Rebased Low	2041 Rebased Low
Wellington City	179,095	184,388	193,609	201,335	204,489	191,236	200,614	208,483	211,750
Porirua City	49,513	49,582	48,224	45,997	41,539	51,443	49,720	47,342	42,777
Lower Hutt City	97,911	97,812	95,300	91,324	83,722	99,678	97,019	92,885	85,153
Upper Hutt City	38,573	38,608	37,475	35,717	32,036	40,188	39,033	37,214	33,379
Kapiti Coast District	46,260	48,148	51,066	53,618	54,694	49,085	51,745	54,293	55,383
Masterton District	23,168	23,110	22,494	21,275	18,564	23,588	22,956	21,709	18,942
Carterton District	6,898	6,881	6,803	6,529	5,778	6,969	6,878	6,588	5,830
South Wairarapa District	8,603	8,617	8,402	8,150	7,042	8,873	8,652	8,390	7,250
Total	450,021	457,146	463,373	463,945	447,864	471,060	476,616	476,904	460,463

Total Households	2006 WTSM					2011 WTSM			
	2006	2011 Low Growth	2021 Low Growth	2031 Low Growth	2041 Low Growth	2011 Base (Prism)	2021 Rebased Low	2031 Rebased Low	2041 Rebased Low
Wellington City	67,408	70,636	76,877	83,037	85,600	71,944	78,180	84,328	86,931
Porirua City	15,633	15,968	16,351	16,334	15,034	16,268	16,550	16,498	15,188
Lower Hutt City	35,326	35,976	36,701	36,792	34,318	35,936	36,622	36,674	34,208
Upper Hutt City	14,121	14,708	15,451	15,885	14,726	14,673	15,424	15,858	14,701
Kapiti Coast District	19,105	20,255	22,283	23,821	24,644	20,283	22,164	23,669	24,487
Masterton District	9,072	9,418	9,820	10,040	9,044	9,230	9,622	9,830	8,854
Carterton District	2,686	2,797	3,099	3,490	3,228	2,720	3,002	3,366	3,114
South Wairarapa District	3,505	3,772	4,378	5,379	4,983	3,612	4,186	5,127	4,749
Total	166,855	173,530	184,960	194,778	191,576	174,665	185,749	195,350	192,232

Total Employed	2006 WTSM					2011 WTSM			
	2006	2011 Low Growth	2021 Low Growth	2031 Low Growth	2041 Low Growth	2011 Base (Prism)	2021 Rebased Low	2031 Rebased Low	2041 Rebased Low
Wellington City	128,313	140,333	143,689	142,163	144,390	133,976	137,146	135,663	137,789
Porirua City	16,306	17,931	18,426	18,462	16,766	17,049	17,528	17,569	15,964
Lower Hutt City	44,068	47,952	48,456	47,910	43,922	44,135	44,631	44,167	40,490
Upper Hutt City	12,099	13,243	13,535	13,568	12,169	11,923	12,167	12,182	10,927
Kapiti Coast District	14,539	15,887	16,226	16,161	16,485	15,206	15,522	15,456	15,767
Masterton District	11,113	12,050	12,179	11,885	10,370	11,036	11,156	10,888	9,500
Carterton District	3,261	3,474	3,432	3,258	2,884	3,518	3,475	3,297	2,918
South Wairarapa District	3,865	4,130	4,114	3,935	3,400	3,654	3,645	3,493	3,018
Total	233,565	255,001	260,057	257,343	250,388	240,498	245,270	242,716	236,373

Total Population	2006 WTSM					2011 WTSM			
	2006	2011 Med Growth	2021 Med Growth	2031 Med Growth	2041 Med Growth	2011 Base (Prism)	2021 Rebased Medium	2031 Rebased Medium	2041 Rebased Medium
Wellington City	179,095	188,361	205,758	221,929	234,668	191,236	208,662	224,890	237,800
Porirua City	49,513	50,837	52,114	52,752	51,644	51,443	52,330	52,910	51,815
Lower Hutt City	97,911	99,752	101,097	101,196	98,569	99,678	100,929	100,934	98,314
Upper Hutt City	38,573	39,447	39,936	39,796	38,318	40,188	40,650	40,489	38,985
Kapiti Coast District	46,260	49,336	54,613	59,541	63,465	49,085	54,022	58,854	62,732
Masterton District	23,168	23,519	23,561	23,097	21,447	23,588	23,621	23,150	21,496
Carterton District	6,898	7,046	7,152	7,115	6,818	6,969	7,058	7,004	6,711
South Wairarapa District	8,603	8,788	8,827	8,627	8,040	8,873	8,913	8,711	8,118
Total	450,021	467,086	493,057	514,053	522,968	471,060	496,185	516,943	525,972

Total Households	2006 WTSM					2011 WTSM			
	2006	2011 Med Growth	2021 Med Growth	2031 Med Growth	2041 Med Growth	2011 Base (Prism)	2021 Rebased Medium	2031 Rebased Medium	2041 Rebased Medium
Wellington City	67,408	72,074	81,441	90,968	97,629	71,944	81,149	90,513	97,140
Porirua City	15,633	16,368	17,595	18,629	18,582	16,268	17,339	18,325	18,280
Lower Hutt City	35,326	36,667	38,786	40,537	40,173	35,936	37,980	39,654	39,299
Upper Hutt City	14,121	15,031	16,402	17,541	17,457	14,673	15,998	17,104	17,022
Kapiti Coast District	19,105	20,760	23,751	26,334	28,467	20,283	23,056	25,539	27,608
Masterton District	9,072	9,574	10,305	10,858	10,408	9,230	9,928	10,454	10,021
Carterton District	2,686	2,880	3,244	3,761	3,767	2,720	3,051	3,518	3,523
South Wairarapa District	3,505	3,833	4,613	5,577	5,572	3,612	4,338	5,236	5,231
Total	166,855	177,187	196,137	214,205	222,055	174,665	192,840	210,343	218,124

Total Employed	2006 WTSM					2011 WTSM			
	2006	2011 Medium Growth	2021 Med Growth	2031 Med Growth	2041 Med Growth	2011 Base (Prism)	2021 Rebased Medium	2031 Rebased Medium	2041 Rebased Medium
Wellington City	128,313	142,613	152,637	160,282	169,483	133,976	143,304	150,416	159,051
Porirua City	16,306	18,241	19,606	20,666	20,302	17,049	18,333	19,330	18,997
Lower Hutt City	44,068	48,721	51,768	54,108	52,703	44,135	46,918	49,057	47,784
Upper Hutt City	12,099	13,464	14,405	15,138	14,576	11,923	12,749	13,392	12,895
Kapiti Coast District	14,539	16,147	17,254	18,113	19,307	15,206	16,242	17,047	18,170
Masterton District	11,113	12,233	12,974	13,529	12,563	11,036	11,704	12,205	11,333
Carterton District	3,261	3,518	3,665	3,768	3,610	3,518	3,663	3,766	3,608
South Wairarapa District	3,865	4,184	4,378	4,517	4,210	3,654	3,828	3,953	3,684
Total	233,565	259,120	276,686	290,122	296,754	240,498	256,741	269,166	275,522

Total Population	2006 WTSM					2011 WTSM			
	2006	2011 High Growth	2021 High Growth	2031 High Growth	2041 High Growth	2011 Base (Prism)	2021 Rebased High	2031 Rebased High	2041 Rebased High
Wellington City	179,095	192,441	217,991	242,813	263,718	191,236	216,323	240,748	261,476
Porirua City	49,513	52,182	56,217	59,665	61,710	51,443	54,882	58,179	60,181
Lower Hutt City	97,911	101,626	106,974	111,216	112,770	99,678	104,843	108,919	110,441
Upper Hutt City	38,573	40,370	42,511	44,152	44,544	40,188	42,300	43,911	44,301
Kapiti Coast District	46,260	50,536	58,085	65,376	71,248	49,085	56,061	63,055	68,718
Masterton District	23,168	23,841	24,690	25,033	24,113	23,588	24,419	24,753	23,843
Carterton District	6,898	7,141	7,533	7,826	7,873	6,969	7,337	7,605	7,651
South Wairarapa District	8,603	8,959	9,294	9,430	9,193	8,873	9,204	9,338	9,103
Total	450,021	477,096	523,294	565,510	595,169	471,060	515,369	556,507	585,714

Total Households	2006 WTSM					2011 WTSM			
	2006	2011 High Growth	2021 High Growth	2031 High Growth	2041 High Growth	2011 Base (Prism)	2021 Rebased High	2031 Rebased High	2041 Rebased High
Wellington City	67,408	73,549	86,052	99,179	109,329	71,944	83,997	96,662	106,555
Porirua City	15,633	16,840	18,956	20,951	22,076	16,268	18,112	19,981	21,053
Lower Hutt City	35,326	37,321	40,918	44,259	45,660	35,936	39,373	42,551	43,898
Upper Hutt City	14,121	15,397	17,404	19,333	20,160	14,673	16,580	18,408	19,195
Kapiti Coast District	19,105	21,243	25,208	28,773	31,802	20,283	23,903	27,261	30,131
Masterton District	9,072	9,707	10,765	11,709	11,643	9,230	10,229	11,120	11,057
Carterton District	2,686	2,918	3,437	4,091	4,302	2,720	3,192	3,779	3,974
South Wairarapa District	3,505	3,916	4,866	6,070	6,344	3,612	4,477	5,576	5,827
Total	166,855	180,891	207,606	234,365	251,316	174,665	199,863	225,338	241,690

Total Employed	2006 WTSM					2011 WTSM			
	2006	2011 High Growth	2021 High Growth	2031 High Growth	2041 High Growth	2011 Base (Prism)	2021 Rebased High	2031 Rebased High	2041 Rebased High
Wellington City	128,313	145,911	161,331	175,186	190,270	133,976	147,994	160,590	174,417
Porirua City	16,306	18,689	20,786	22,680	23,505	17,049	18,973	20,709	21,467
Lower Hutt City	44,068	49,828	54,699	59,142	59,969	44,135	48,473	52,430	53,163
Upper Hutt City	12,099	13,783	15,244	16,569	16,717	11,923	13,181	14,323	14,451
Kapiti Coast District	14,539	16,523	18,244	19,806	21,585	15,206	16,783	18,213	19,849
Masterton District	11,113	12,497	13,677	14,744	14,202	11,036	12,075	13,016	12,538
Carterton District	3,261	3,581	3,835	4,066	4,090	3,518	3,765	3,991	4,015
South Wairarapa District	3,865	4,261	4,585	4,879	4,757	3,654	3,937	4,193	4,088
Total	233,565	265,072	292,401	317,073	335,094	240,498	265,181	287,466	303,987

The household occupancy and number of employees per 1000 population has also been computed for the low, medium and high growth scenarios.

Household Occupancy	2006 WTSM					2011 WTSM			
	2006	2011 Low Growth	2021 Low Growth	2031 Low Growth	2041 Low Growth	2011 Base (Prism)	2021 Rebased Low	2031 Rebased Low	2041 Rebased Low
Wellington City	2.66	2.61	2.52	2.42	2.39	2.66	2.57	2.47	2.44
Porirua City	3.17	3.11	2.95	2.82	2.76	3.16	3.00	2.87	2.82
Lower Hutt City	2.77	2.72	2.60	2.48	2.44	2.77	2.65	2.53	2.49
Upper Hutt City	2.73	2.62	2.43	2.25	2.18	2.74	2.53	2.35	2.27
Kapiti Coast District	2.42	2.38	2.29	2.25	2.22	2.42	2.33	2.29	2.26
Masterton District	2.55	2.45	2.29	2.12	2.05	2.56	2.39	2.21	2.14
Carterton District	2.57	2.46	2.20	1.87	1.79	2.56	2.29	1.96	1.87
South Wairarapa District	2.45	2.28	1.92	1.52	1.41	2.46	2.07	1.64	1.53
Total	2.70	2.63	2.51	2.38	2.34	2.70	2.57	2.44	2.40

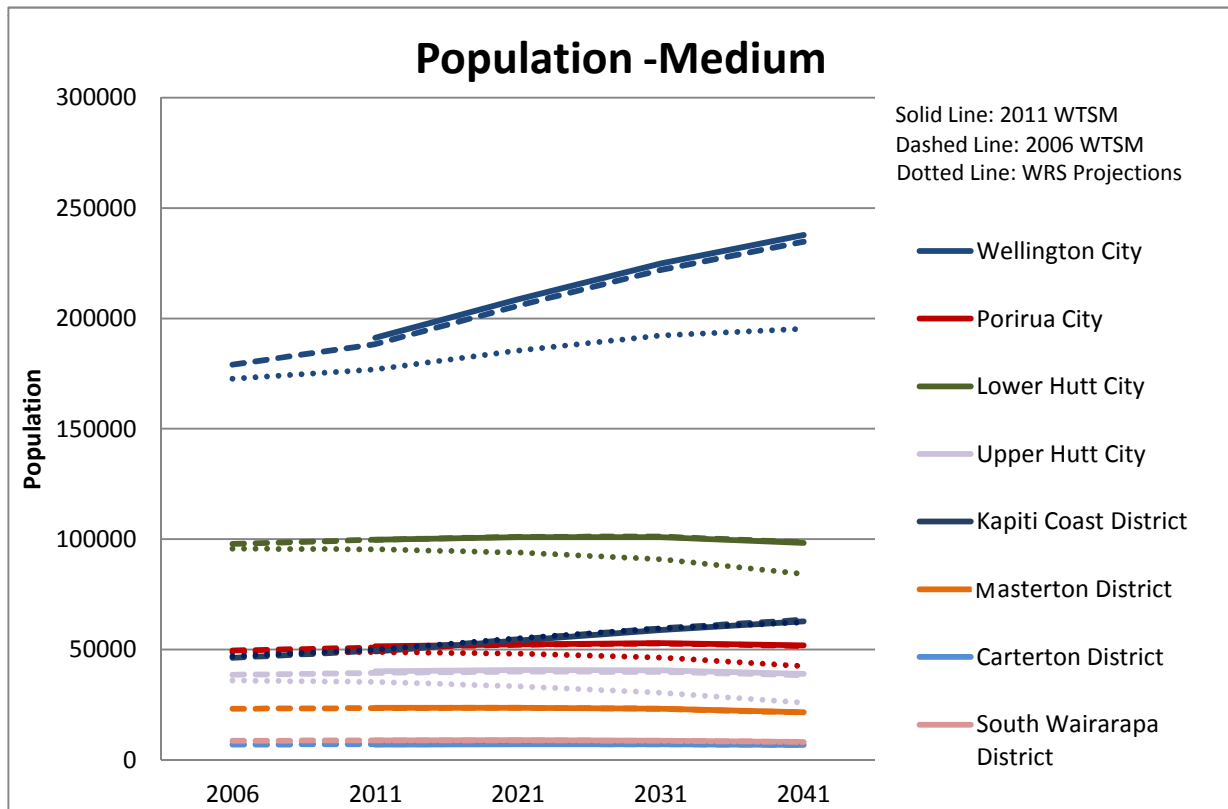
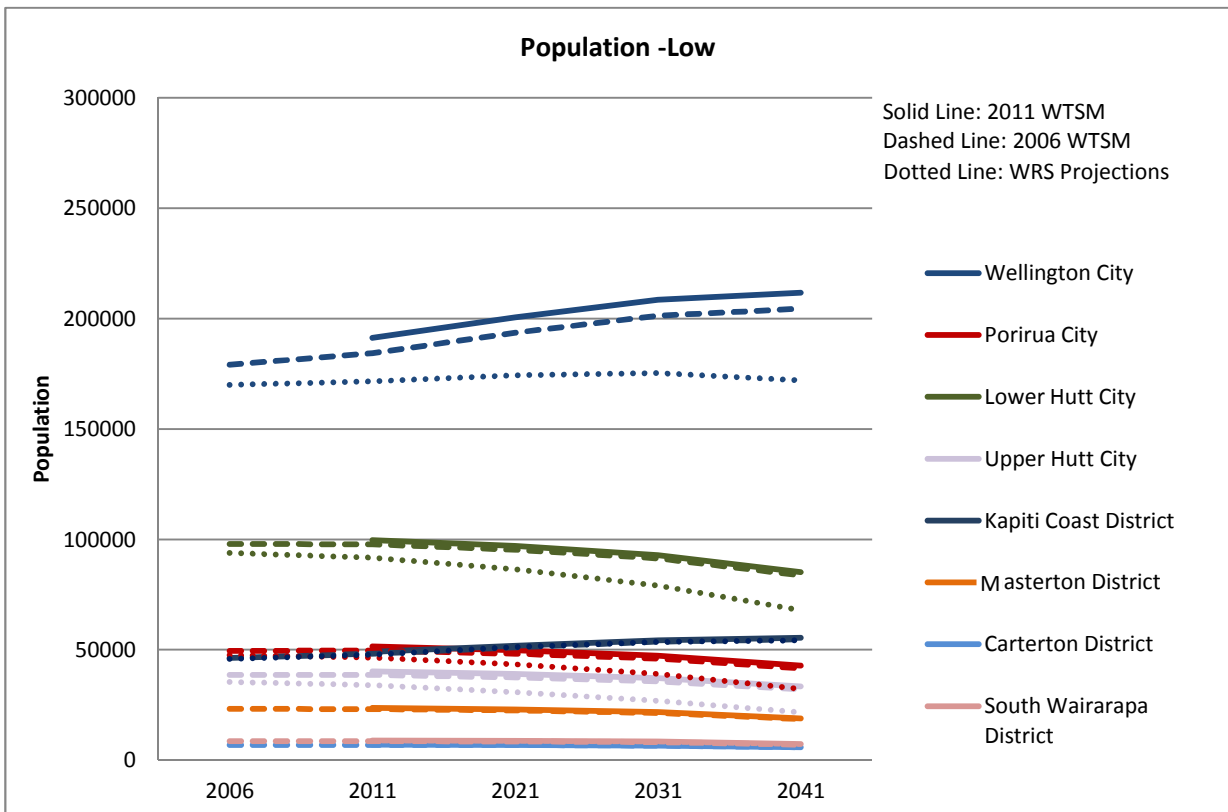
Employees/1000 Population	2006 WTSM					2011 WTSM			
	2006	2011 Low Growth	2021 Low Growth	2031 Low Growth	2041 Low Growth	2011 Base (Prism)	2021 Rebased Low	2031 Rebased Low	2041 Rebased Low
Wellington City	716	761	742	706	706	701	684	651	651
Porirua City	329	362	382	401	404	331	353	371	373
Lower Hutt City	450	490	508	525	525	443	460	475	475
Upper Hutt City	314	343	361	380	380	297	312	327	327
Kapiti Coast District	314	330	318	301	301	310	300	285	285
Masterton District	480	521	541	559	559	468	486	502	502
Carterton District	473	505	505	499	499	505	505	500	500
South Wairarapa District	449	479	490	483	483	412	421	416	416
Total	519	558	561	555	559	512	515	509	513

Household Occupancy	2006 WTSM					2011 WTSM			
	2006	2011 Medium Growth	2021 Medium Growth	2031 Medium Growth	2041 Medium Growth	2011 Base (Prism)	2021 Rebased Medium	2031 Rebased Medium	2041 Rebased Medium
Wellington City	2.66	2.61	2.53	2.44	2.40	2.66	2.57	2.48	2.45
Porirua City	3.17	3.11	2.96	2.83	2.78	3.16	3.02	2.89	2.83
Lower Hutt City	2.77	2.72	2.61	2.50	2.45	2.77	2.66	2.55	2.50
Upper Hutt City	2.73	2.62	2.43	2.27	2.20	2.74	2.54	2.37	2.29
Kapiti Coast District	2.42	2.38	2.30	2.26	2.23	2.42	2.34	2.30	2.27
Masterton District	2.55	2.46	2.29	2.13	2.06	2.56	2.38	2.21	2.15
Carterton District	2.57	2.45	2.20	1.89	1.81	2.56	2.31	1.99	1.90
South Wairarapa District	2.45	2.29	1.91	1.55	1.44	2.46	2.05	1.66	1.55
Total	2.70	2.64	2.51	2.40	2.36	2.70	2.57	2.46	2.41

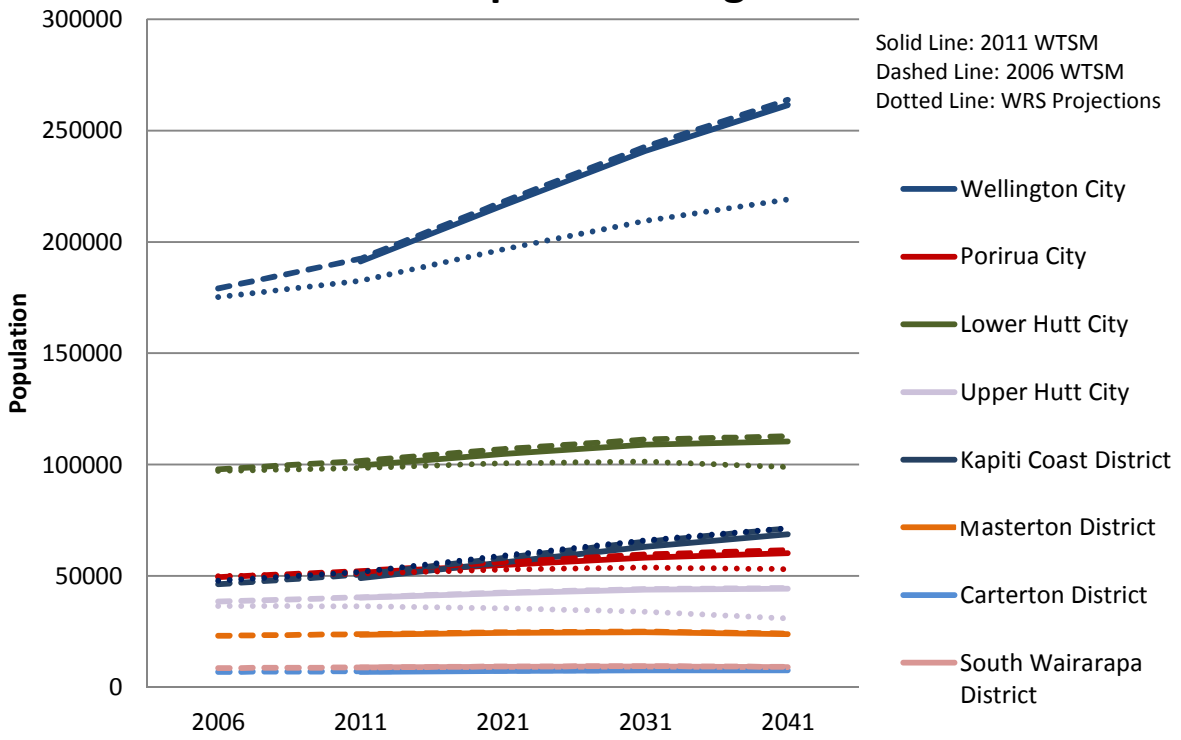
Employees/1000 Population	2006 WTSM					2011 WTSM			
	2006	2011 Medium Growth	2021 Medium Growth	2031 Medium Growth	2041 Medium Growth	2011 Base (Prism)	2021 Rebased Medium	2031 Rebased Medium	2041 Rebased Medium
Wellington City	716	757	742	722	722	701	687	669	669
Porirua City	329	359	376	392	393	331	350	365	367
Lower Hutt City	450	488	512	535	535	443	465	486	486
Upper Hutt City	314	341	361	380	380	297	314	331	331
Kapiti Coast District	314	327	316	304	304	310	301	290	290
Masterton District	480	520	551	586	586	468	495	527	527
Carterton District	473	499	512	530	530	505	519	538	538
South Wairarapa District	449	476	496	524	524	412	429	454	454
Total	519	555	561	564	567	512	517	521	524

Household Occupancy	2006 WTSM					2011 WTSM			
	2006	2011 High Growth	2021 High Growth	2031 High Growth	2041 High Growth	2011 Base (Prism)	2021 Rebased High	2031 Rebased High	2041 Rebased High
Wellington City	2.66	2.62	2.53	2.45	2.41	2.66	2.58	2.49	2.45
Porirua City	3.17	3.10	2.97	2.85	2.80	3.16	3.03	2.91	2.86
Lower Hutt City	2.77	2.72	2.61	2.51	2.47	2.77	2.66	2.56	2.52
Upper Hutt City	2.73	2.62	2.44	2.28	2.21	2.74	2.55	2.39	2.31
Kapiti Coast District	2.42	2.38	2.30	2.27	2.24	2.42	2.35	2.31	2.28
Masterton District	2.55	2.46	2.29	2.14	2.07	2.56	2.39	2.23	2.16
Carterton District	2.57	2.45	2.19	1.91	1.83	2.56	2.30	2.01	1.93
South Wairarapa District	2.45	2.29	1.91	1.55	1.45	2.46	2.06	1.67	1.56
Total	2.70	2.64	2.52	2.41	2.37	2.70	2.58	2.47	2.42

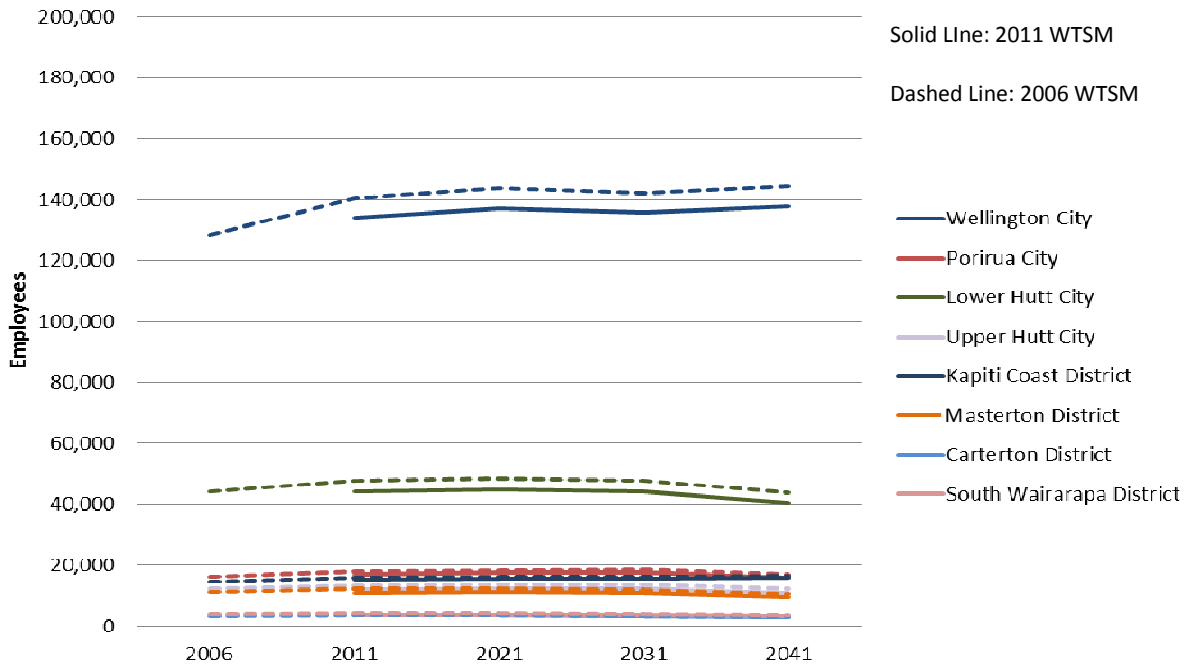
Employees/1000 Population	2006 WTSM					2011 WTSM			
	2006	2011 High Growth	2021 High Growth	2031 High Growth	2041 High Growth	2011 Base (Prism)	2021 Rebased High	2031 Rebased High	2041 Rebased High
Wellington City	716	758	740	721	721	701	684	667	667
Porirua City	329	358	370	380	381	331	346	356	357
Lower Hutt City	450	490	511	532	532	443	462	481	481
Upper Hutt City	314	341	359	375	375	297	312	326	326
Kapiti Coast District	314	327	314	303	303	310	299	289	289
Masterton District	480	524	554	589	589	468	495	526	526
Carterton District	473	502	509	520	520	505	513	525	525
South Wairarapa District	449	476	493	517	517	412	428	449	449
Total	519	556	559	561	563	512	515	517	519



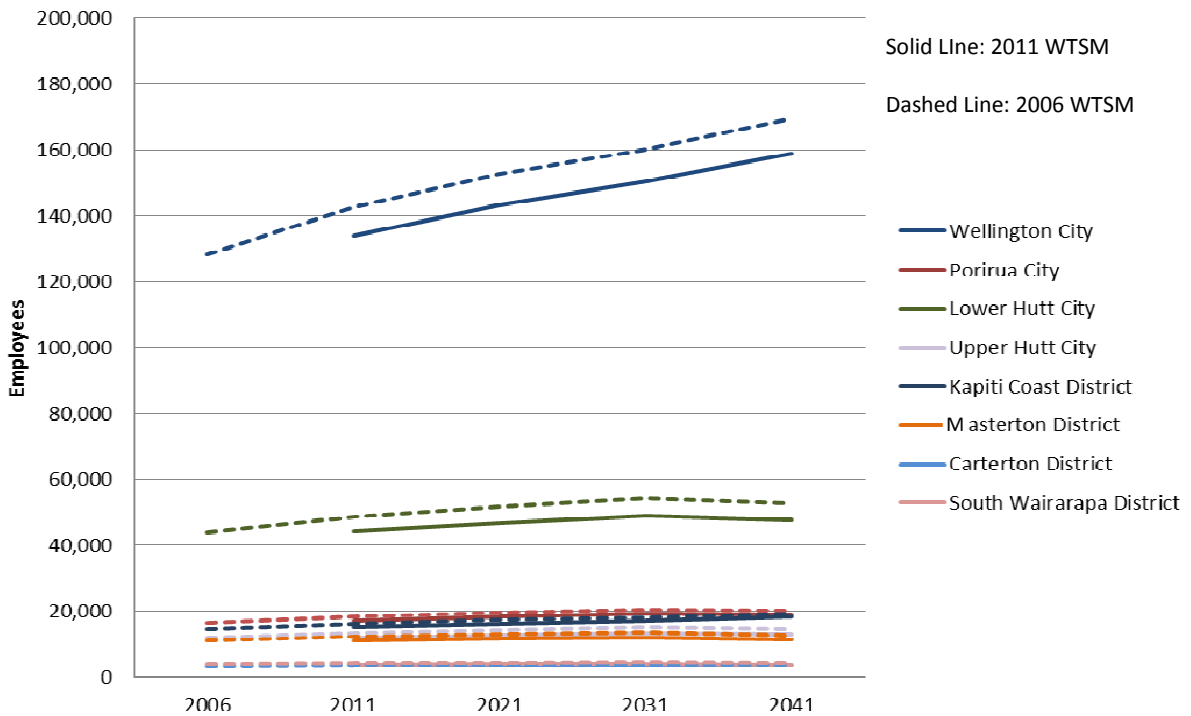
Population -High



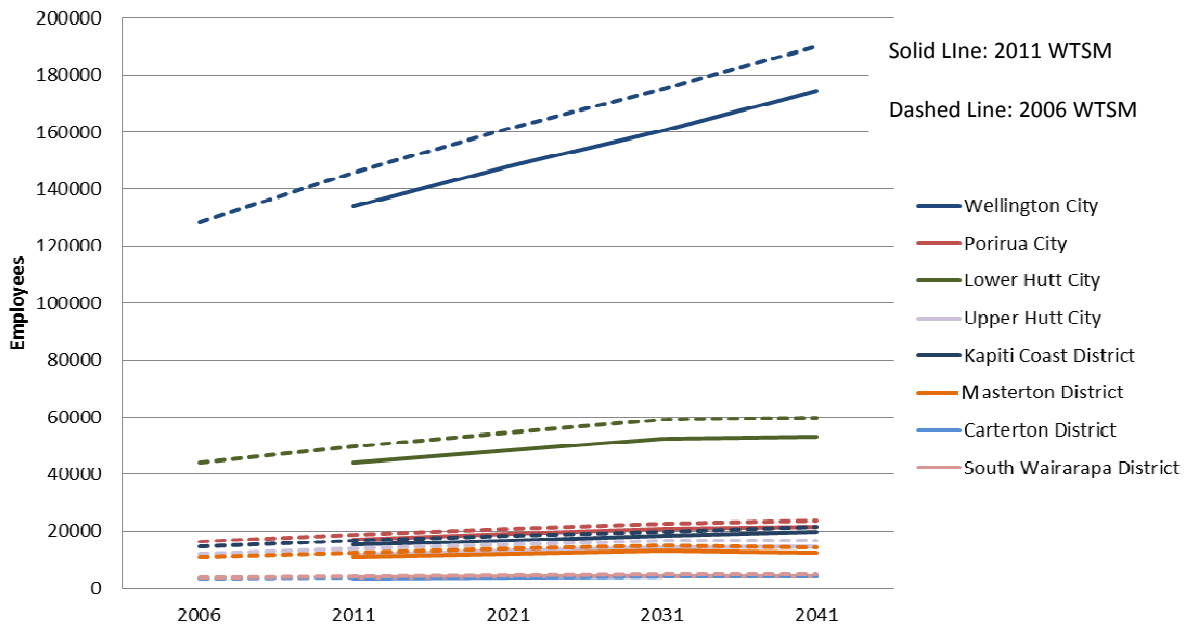
Employment -Low



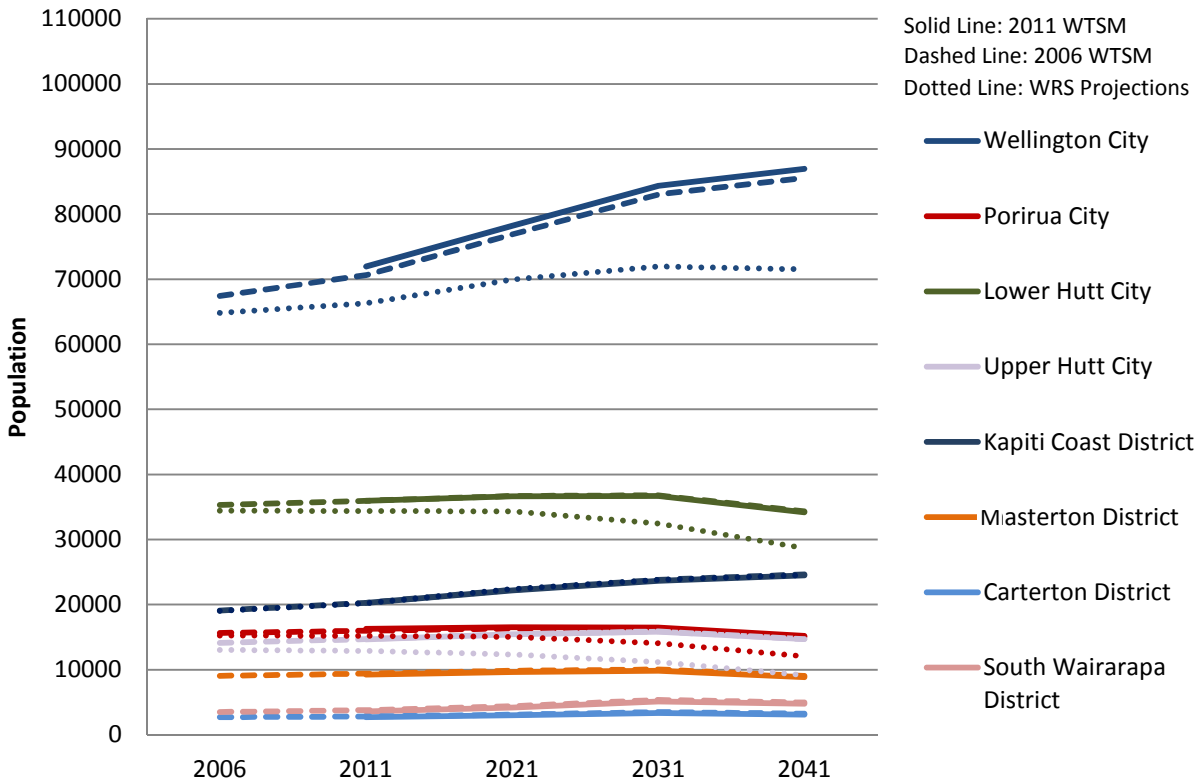
Employment -Medium



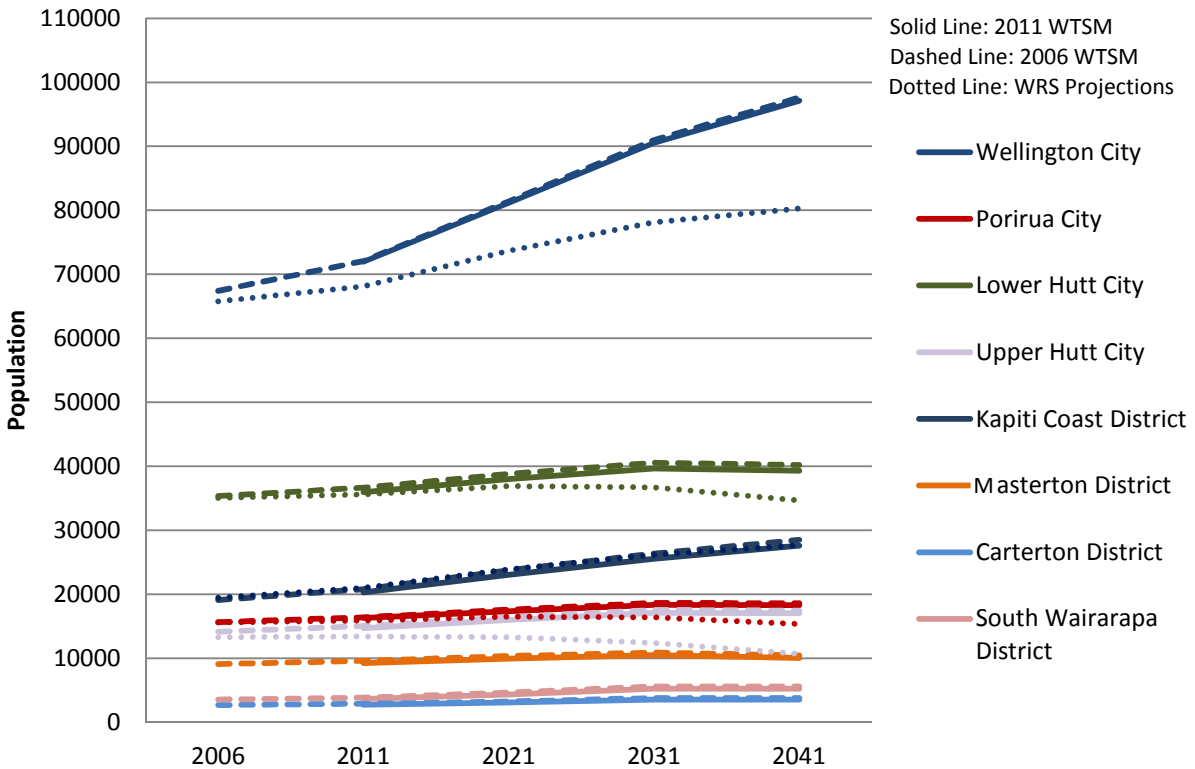
Employment -High



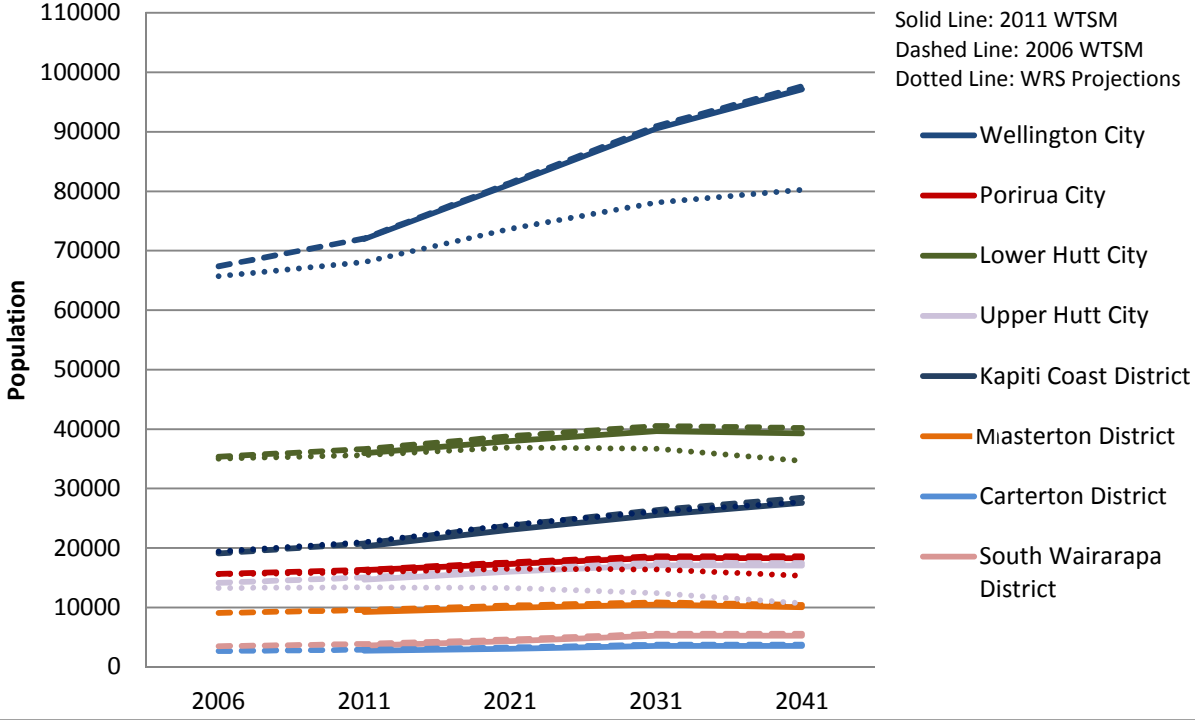
Households -Low



Households -Medium



Households -High



Appendix D – 2021, 2031, 2041 Forecast Development

Appendix E – Wellington Expansion Scenario

Total Population	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Wtgn Expansion	Rebased Medium	Rebased High	Wtgn Expansion	Rebased Medium	Rebased High	Wtgn Expansion
Wellington City	191,236	208,662	216,323	216,323	224,890	240,748	240,748	237,800	261,476	261,476
Porirua City	51,443	52,330	54,882	52,330	52,910	58,179	52,910	51,815	60,181	51,815
Lower Hutt City	99,678	100,929	104,843	100,929	100,934	108,919	100,934	98,314	110,441	98,314
Upper Hutt City	40,188	40,650	42,300	40,650	40,489	43,911	40,489	38,985	44,301	38,985
Kapiti Coast District	49,085	54,022	56,061	54,022	58,854	63,055	58,854	62,732	68,718	62,732
Masterton District	23,588	23,621	24,419	23,621	23,150	24,753	23,150	21,496	23,843	21,496
Carterton District	6,969	7,058	7,337	7,058	7,004	7,605	7,004	6,711	7,651	6,711
South Wairarapa District	8,873	8,913	9,204	8,913	8,711	9,338	8,711	8,118	9,103	8,118
Total	471,060	496,185	515,369	503,846	516,943	556,507	532,800	525,972	585,714	549,648

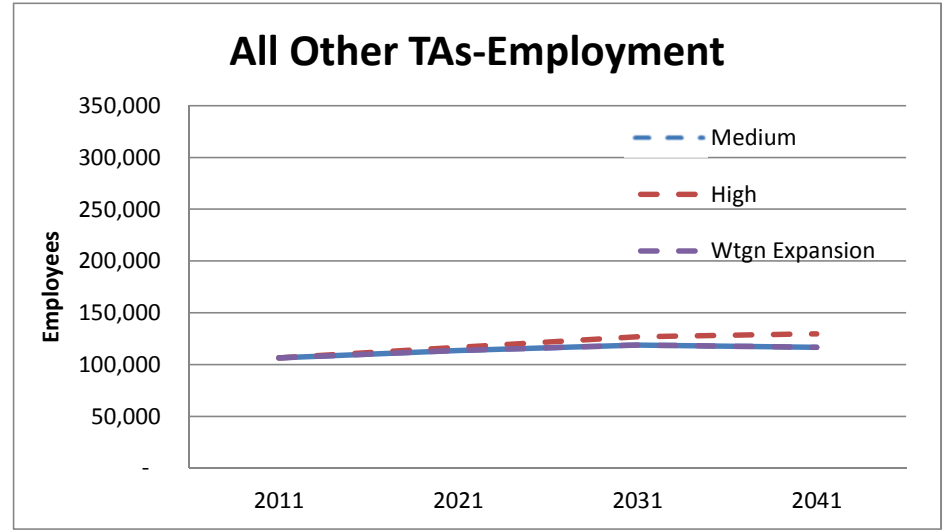
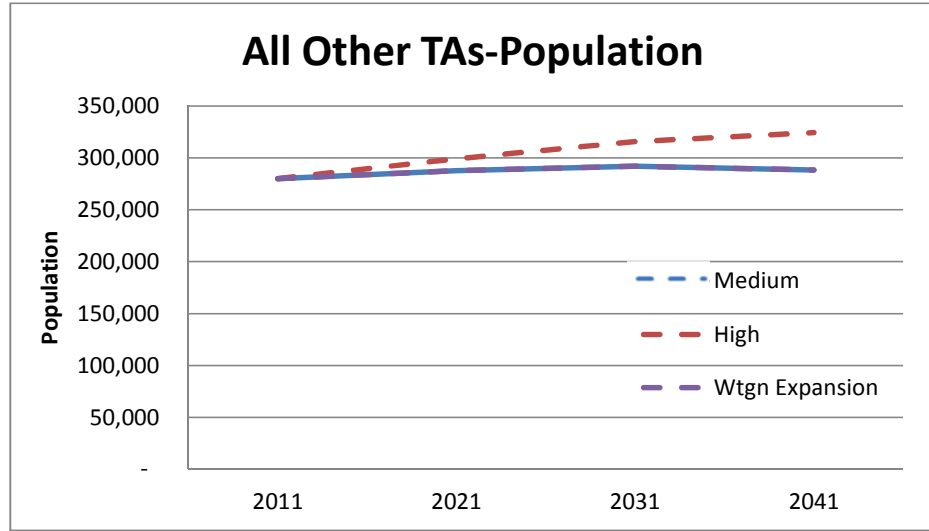
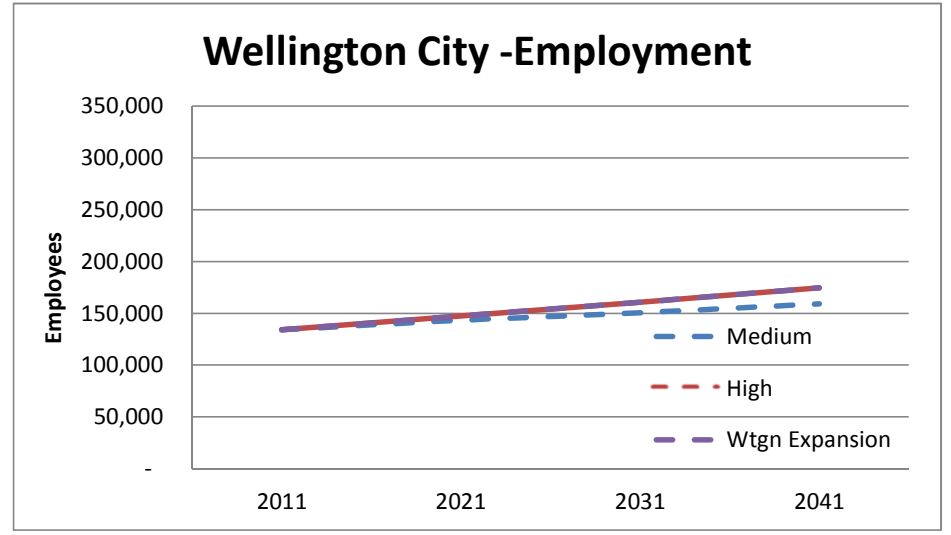
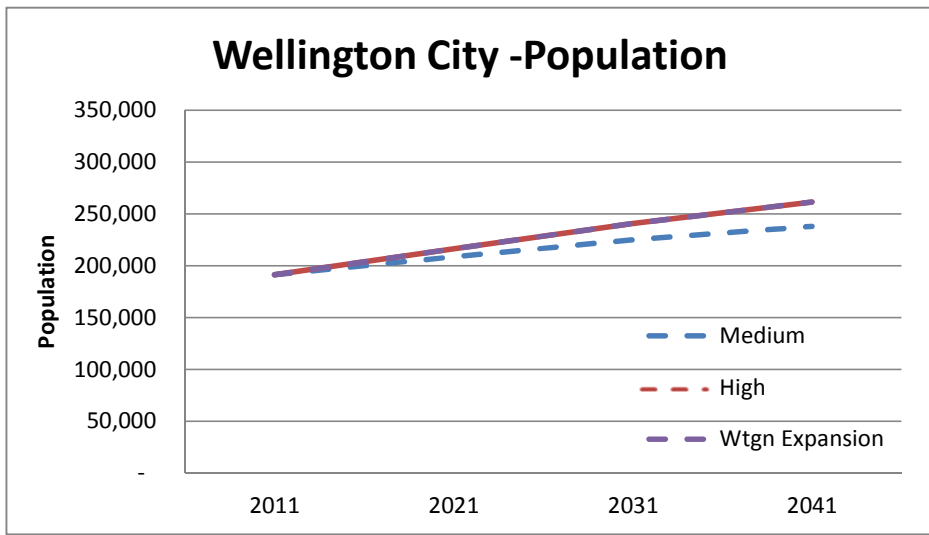
Total Households	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Wtgn Expansion	Rebased Medium	Rebased High	Wtgn Expansion	Rebased Medium	Rebased High	Wtgn Expansion
Wellington City	71,944	81,149	83,997	83,997	90,513	96,662	96,662	97,140	106,555	106,555
Porirua City	16,268	17,339	18,112	17,339	18,325	19,981	18,325	18,280	21,053	18,280
Lower Hutt City	35,936	37,980	39,373	37,980	39,654	42,551	39,654	39,299	43,898	39,299
Upper Hutt City	14,673	15,998	16,580	15,998	17,104	18,408	17,104	17,022	19,195	17,022
Kapiti Coast District	20,283	23,056	23,903	23,056	25,539	27,261	25,539	27,608	30,131	27,608
Masterton District	9,230	9,928	10,229	9,928	10,454	11,120	10,454	10,021	11,057	10,021
Carterton District	2,720	3,051	3,192	3,051	3,518	3,779	3,518	3,523	3,974	3,523
South Wairarapa District	3,612	4,338	4,477	4,338	5,236	5,576	5,236	5,231	5,827	5,231
Total	174,665	192,840	199,863	195,688	210,343	225,338	216,493	218,124	241,690	227,539

Total Employed	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Wtgn Expansion	Rebased Medium	Rebased High	Wtgn Expansion	Rebased Medium	Rebased High	Wtgn Expansion
Wellington City	133,976	143,304	147,392	147,392	150,416	160,590	160,590	159,051	174,417	174,417
Porirua City	17,049	18,333	18,557	18,333	19,330	20,709	19,330	18,997	21,467	18,997
Lower Hutt City	44,135	46,918	48,473	46,918	49,057	52,430	49,057	47,784	53,163	47,784
Upper Hutt City	11,923	12,749	13,181	12,749	13,392	14,323	13,392	12,895	14,451	12,895
Kapiti Coast District	15,206	16,242	16,783	16,242	17,047	18,213	17,047	18,170	19,849	18,170
Masterton District	11,036	11,704	12,075	11,704	12,205	13,016	12,205	11,333	12,538	11,333
Carterton District	3,518	3,663	3,765	3,663	3,766	3,991	3,766	3,608	4,015	3,608
South Wairarapa District	3,654	3,828	3,937	3,828	3,953	4,193	3,953	3,684	4,088	3,684
Total	240,498	256,741	264,163	260,829	269,166	287,466	279,340	275,522	303,987	290,888

Household Occupancy	2011 WTSM									
	2011	2021 Rebased High	2021 Rebased High	Wtgn Expansion	2031 Rebased Med	2031 Rebased High	Wtgn Expansion	2041 Rebased Med	2041 Rebased High	Wtgn Expansion
	Wellington City	2.66	2.57	2.58	2.58	2.48	2.49	2.49	2.45	2.45
Porirua City	3.16	3.02	3.03	3.02	2.89	2.91	2.89	2.83	2.86	2.83
Lower Hutt City	2.77	2.66	2.66	2.66	2.55	2.56	2.55	2.50	2.52	2.50
Upper Hutt City	2.74	2.54	2.55	2.54	2.37	2.39	2.37	2.29	2.31	2.29
Kapiti Coast District	2.42	2.34	2.35	2.34	2.30	2.31	2.30	2.27	2.28	2.27
Masterton District	2.56	2.38	2.39	2.38	2.21	2.23	2.21	2.15	2.16	2.15
Carterton District	2.56	2.31	2.30	2.31	1.99	2.01	1.99	1.90	1.93	1.90
South Wairarapa District	2.46	2.05	2.06	2.05	1.66	1.67	1.66	1.55	1.56	1.55
Total	2.70	2.57	2.58	2.57	2.46	2.47	2.46	2.41	2.42	2.42

Employees/1000 Population	2011 WTSM									
	2011	2021 Rebased High	2021 Rebased High	Wtgn Expansion	2031 Rebased Med	2031 Rebased High	Wtgn Expansion	2041 Rebased Med	2041 Rebased High	Wtgn Expansion
	Wellington City	701	687	681	681	669	667	667	669	667
Porirua City	331	350	338	350	365	356	365	367	357	367
Lower Hutt City	443	465	462	465	486	481	486	486	481	486
Upper Hutt City	297	314	312	314	331	326	331	331	326	331
Kapiti Coast District	310	301	299	301	290	289	290	290	289	290
Masterton District	468	495	495	495	527	526	527	527	526	527
Carterton District	505	519	513	519	538	525	538	538	525	538
South Wairarapa District	412	429	428	429	454	449	454	454	449	454
Total	511	517	513	518	521	517	524	524	519	529

Wellington City Expansion
By TA



Wellington City -Population			
	Medium	High	Wtgn Expansion
2011	191,236	191,236	191,236
2021	208,662	216,323	216,323
2031	224,890	240,748	240,748
2041	237,800	261,476	261,476

Wellington City -Employment			
	Medium	High	Wtgn Expansion
2011	133,976	133,976	133,976
2021	143,304	147,392	147,392
2031	150,416	160,590	160,590
2041	159,051	174,417	174,417

All Other TAs -Population			
	Medium	High	Wtgn Expansion
2011	279,823	279,823	279,823
2021	287,523	299,046	287,523
2031	292,052	315,759	292,052
2041	288,172	324,239	288,172

All Other TAs -Employment			
	Medium	High	Wtgn Expansion
2011	106,522	106,522	106,522
2021	113,437	116,771	113,437
2031	118,750	126,876	118,750
2041	116,471	129,570	116,471

Total -Population			
	Medium	High	Wtgn Expansion
2011	471,060	471,060	471,060
2021	496,185	515,369	503,846
2031	516,943	556,507	532,800
2041	525,972	585,714	549,648

Total -Employment			
	Medium	High	Wtgn Expansion
2011	240,498	240,498	240,498
2021	256,741	264,163	260,829
2031	269,166	287,466	279,340
2041	275,522	303,987	290,888

Appendix F – Western Expansion Scenario

Total Population	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Western Expansion	Rebased Medium	Rebased High	Western Expansion	Rebased Medium	Rebased High	Western Expansion
Wellington City	191,236	208,662	216,323	208,662	224,890	240,748	224,890	237,800	261,476	237,800
Porirua City	51,443	52,330	54,882	54,882	52,910	58,179	58,179	51,815	60,181	60,181
Lower Hutt City	99,678	100,929	104,843	100,929	100,934	108,919	100,934	98,314	110,441	98,314
Upper Hutt City	40,188	40,650	42,300	40,650	40,489	43,911	40,489	38,985	44,301	38,985
Kapiti Coast District	49,085	54,022	56,061	56,061	58,854	63,055	63,055	62,732	68,718	68,718
Masterton District	23,588	23,621	24,419	23,621	23,150	24,753	23,150	21,496	23,843	21,496
Carterton District	6,969	7,058	7,337	7,058	7,004	7,605	7,004	6,711	7,651	6,711
South Wairarapa District	8,873	8,913	9,204	8,913	8,711	9,338	8,711	8,118	9,103	8,118
Total	471,060	496,185	515,369	500,776	516,943	556,507	526,412	525,972	585,714	540,324

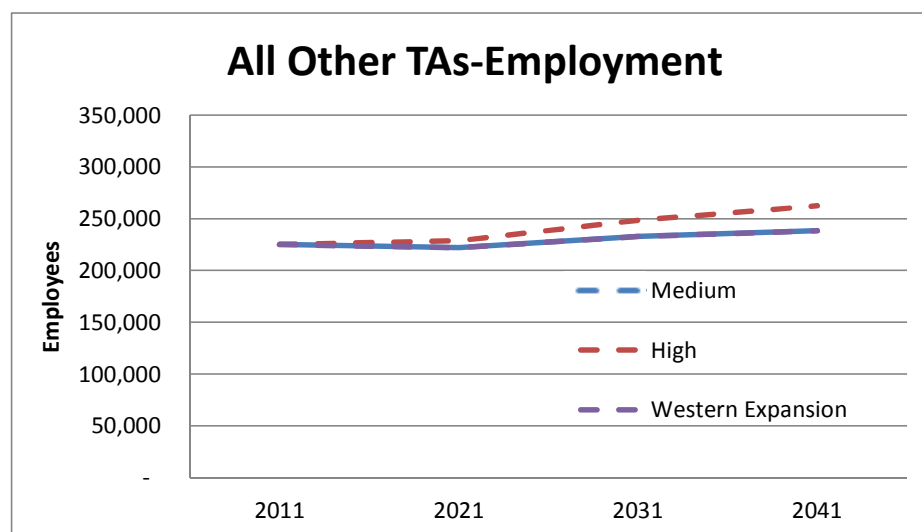
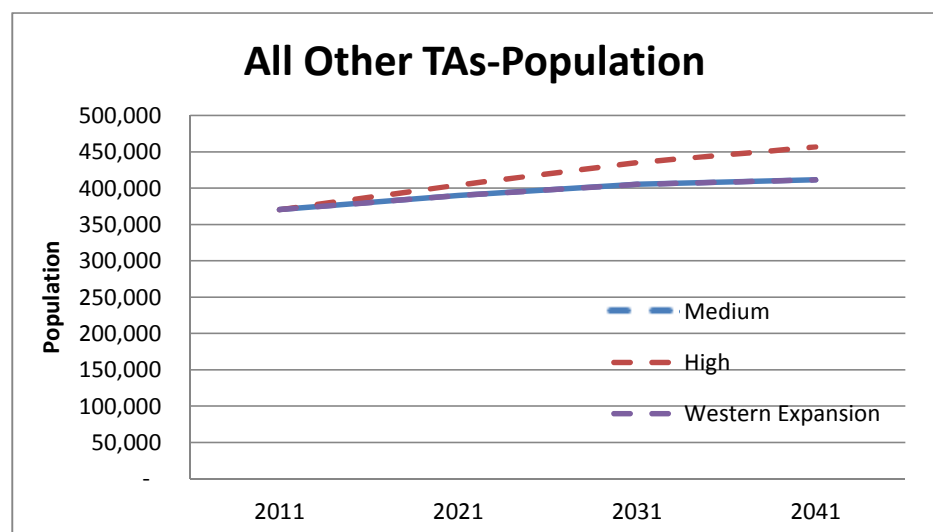
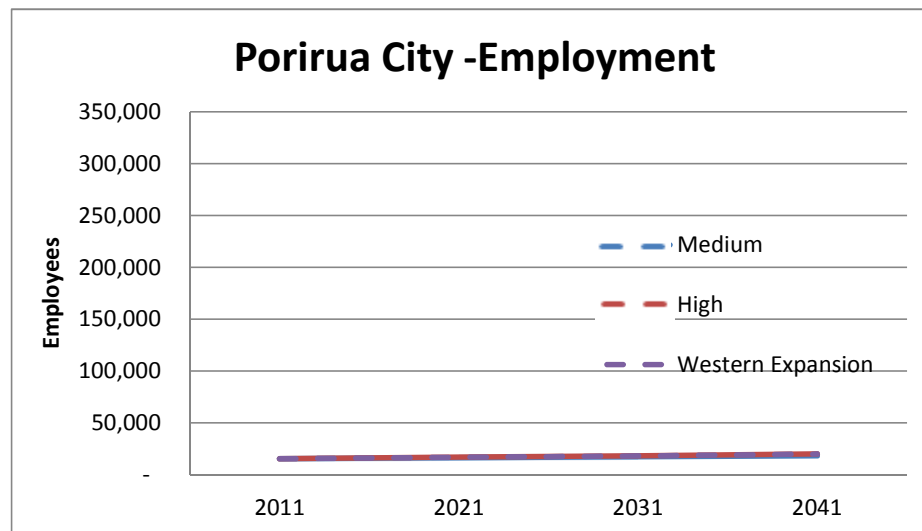
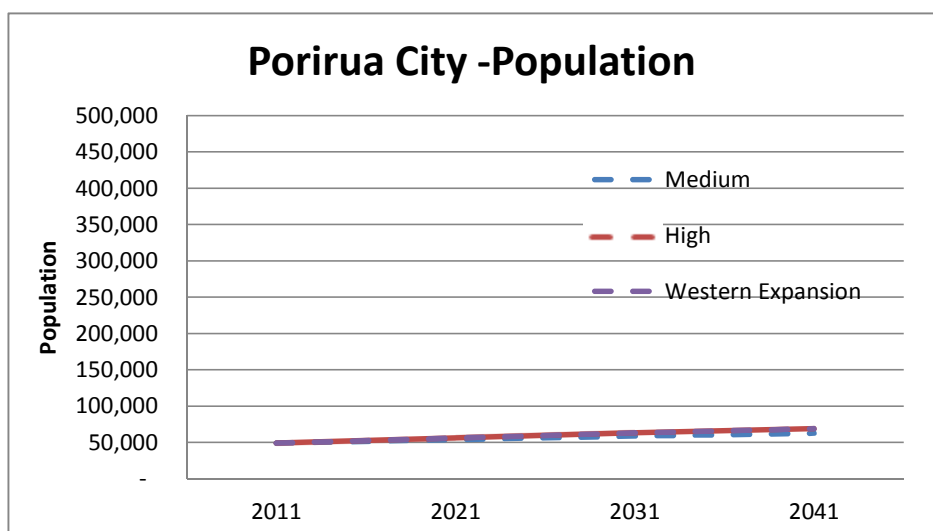
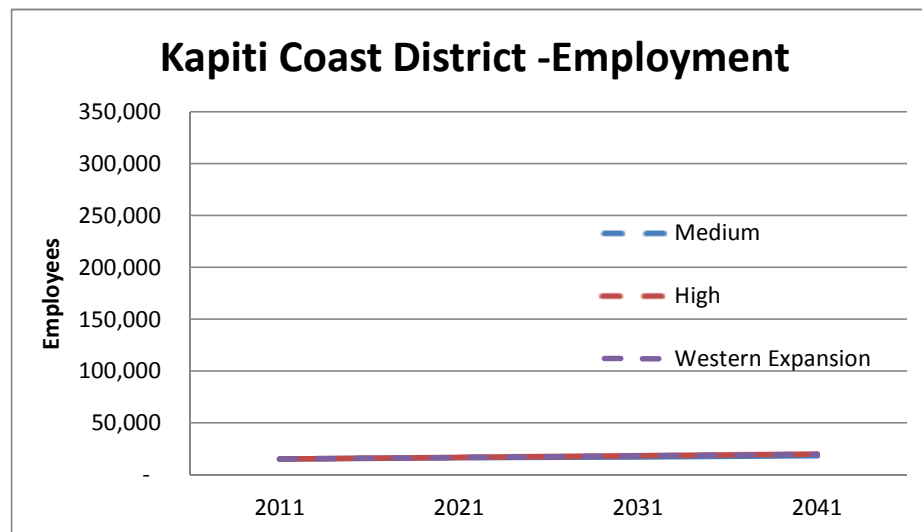
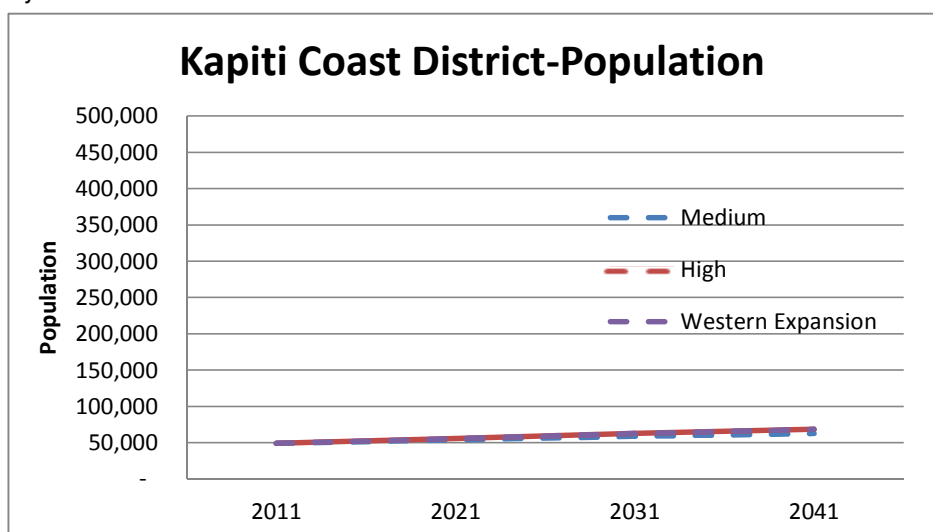
Total Households	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Western Expansion	Rebased Medium	Rebased High	Western Expansion	Rebased Medium	Rebased High	Western Expansion
Wellington City	71,944	81,149	83,997	81,149	90,513	96,662	90,513	97,140	106,555	97,140
Porirua City	16,268	17,339	18,112	18,112	18,325	19,981	19,981	18,280	21,053	21,053
Lower Hutt City	35,936	37,980	39,373	37,980	39,654	42,551	39,654	39,299	43,898	39,299
Upper Hutt City	14,673	15,998	16,580	15,998	17,104	18,408	17,104	17,022	19,195	17,022
Kapiti Coast District	20,283	23,056	23,903	23,903	25,539	27,261	27,261	27,608	30,131	30,131
Masterton District	9,230	9,928	10,229	9,928	10,454	11,120	10,454	10,021	11,057	10,021
Carterton District	2,720	3,051	3,192	3,051	3,518	3,779	3,518	3,523	3,974	3,523
South Wairarapa District	3,612	4,338	4,477	4,338	5,236	5,576	5,236	5,231	5,827	5,231
Total	174,665	192,840	199,863	194,460	210,343	225,338	213,722	218,124	241,690	223,420

Total Employed	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Western Expansion	Rebased Medium	Rebased High	Western Expansion	Rebased Medium	Rebased High	Western Expansion
Wellington City	133,976	143,304	147,392	143,304	150,416	160,590	150,416	159,051	174,417	159,051
Porirua City	17,049	18,333	18,557	18,557	19,330	20,709	20,709	18,997	21,467	21,467
Lower Hutt City	44,135	46,918	48,473	46,918	49,057	52,430	49,057	47,784	53,163	47,784
Upper Hutt City	11,923	12,749	13,181	12,749	13,392	14,323	13,392	12,895	14,451	12,895
Kapiti Coast District	15,206	16,242	16,783	16,783	17,047	18,213	18,213	18,170	19,849	19,849
Masterton District	11,036	11,704	12,075	11,704	12,205	13,016	12,205	11,333	12,538	11,333
Carterton District	3,518	3,663	3,765	3,663	3,766	3,991	3,766	3,608	4,015	3,608
South Wairarapa District	3,654	3,828	3,937	3,828	3,953	4,193	3,953	3,684	4,088	3,684
Total	240,498	256,741	264,163	257,506	269,166	287,466	271,712	275,522	303,987	279,672

Household Occupancy	2011 WTSM									
	2011	2021 Rebased High	2021 Rebased High	Western Expansion	2031 Rebased Med	2031 Rebased High	Western Expansion	2041 Rebased Med	2041 Rebased High	Western Expansion
	Wellington City	2.66	2.57	2.58	2.57	2.48	2.49	2.48	2.45	2.45
Porirua City	3.16	3.02	3.03	3.03	2.89	2.91	2.91	2.83	2.86	2.86
Lower Hutt City	2.77	2.66	2.66	2.66	2.55	2.56	2.55	2.50	2.52	2.50
Upper Hutt City	2.74	2.54	2.55	2.54	2.37	2.39	2.37	2.29	2.31	2.29
Kapiti Coast District	2.42	2.34	2.35	2.35	2.30	2.31	2.31	2.27	2.28	2.28
Masterton District	2.56	2.38	2.39	2.38	2.21	2.23	2.21	2.15	2.16	2.15
Carterton District	2.56	2.31	2.30	2.31	1.99	2.01	1.99	1.90	1.93	1.90
South Wairarapa District	2.46	2.05	2.06	2.05	1.66	1.67	1.66	1.55	1.56	1.55
Total	2.70	2.57	2.58	2.58	2.46	2.47	2.46	2.41	2.42	2.42

Employees/1000 Population	2011 WTSM									
	2011	2021 Rebased High	2021 Rebased High	Western Expansion	2031 Rebased Med	2031 Rebased High	Western Expansion	2041 Rebased Med	2041 Rebased High	Western Expansion
	Wellington City	701	687	681	687	669	667	669	669	667
Porirua City	331	350	338	338	365	356	356	367	357	357
Lower Hutt City	443	465	462	465	486	481	486	486	481	486
Upper Hutt City	297	314	312	314	331	326	331	331	326	331
Kapiti Coast District	310	301	299	299	290	289	289	290	289	289
Masterton District	468	495	495	495	527	526	527	527	526	527
Carterton District	505	519	513	519	538	525	538	538	525	538
South Wairarapa District	412	429	428	429	454	449	454	454	449	454
Total	511	517	513	514	521	517	516	524	519	518

Western Expansion
By TA



Kapiti Coast District -Population			
	Medium	High	Western Expansion
2011	49,085	49,085	49,085
2021	54,022	56,061	56,061
2031	58,854	63,055	63,055
2041	62,732	68,718	68,718

Kapiti Coast District -Employment			
	Medium	High	Western Expansion
2011	15,206	15,206	15,206
2021	16,242	16,783	16,783
2031	17,047	18,213	18,213
2041	18,170	19,849	19,849

Porirua City -Population			
	Medium	High	Western Expansion
2011	51,443	51,443	51,443
2021	52,330	54,882	54,882
2031	52,910	58,179	58,179
2041	51,815	60,181	60,181

Porirua City -Employment			
	Medium	High	Western Expansion
2011	17,049	17,049	17,049
2021	18,333	18,557	18,557
2031	19,330	20,709	20,709
2041	18,997	21,467	21,467

All Other TAs -Population			
	Medium	High	Western Expansion
2011	370,531	370,531	370,531
2021	389,833	404,425	389,833
2031	405,178	435,273	405,178
2041	411,424	456,814	411,424

All Other TAs -Employment			
	Medium	High	Western Expansion
2011	225,292	225,292	225,292
2021	222,166	228,823	222,166
2031	232,790	248,543	232,790
2041	238,355	262,670	238,355

Total -Population			
	Medium	High	Western Expansion
2011	471,060	471,060	471,060
2021	496,185	515,369	500,776
2031	516,943	556,507	526,412
2041	525,972	585,714	540,324

Total -Employment			
	Medium	High	Western Expansion
2011	257,547	257,547	257,547
2021	256,741	264,163	257,506
2031	269,166	287,466	271,712
2041	275,522	303,987	279,672

Appendix G – Eastern Expansion Scenario

Total Population	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Eastern Expansion	Rebased Medium	Rebased High	Eastern Expansion	Rebased Medium	Rebased High	Eastern Expansion
Wellington City	191,236	208,662	216,323	208,662	224,890	240,748	224,890	237,800	261,476	237,800
Porirua City	51,443	52,330	54,882	52,330	52,910	58,179	52,910	51,815	60,181	51,815
Lower Hutt City	99,678	100,929	104,843	104,843	100,934	108,919	108,919	98,314	110,441	110,441
Upper Hutt City	40,188	40,650	42,300	42,300	40,489	43,911	43,911	38,985	44,301	44,301
Kapiti Coast District	49,085	54,022	56,061	54,022	58,854	63,055	58,854	62,732	68,718	62,732
Masterton District	23,588	23,621	24,419	24,419	23,150	24,753	24,753	21,496	23,843	23,843
Carterton District	6,969	7,058	7,337	7,337	7,004	7,605	7,605	6,711	7,651	7,651
South Wairarapa District	8,873	8,913	9,204	9,204	8,711	9,338	9,338	8,118	9,103	9,103
Total	471,060	496,185	515,369	503,117	516,943	556,507	531,180	525,972	585,714	547,686

Total Households	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Eastern Expansion	Rebased Medium	Rebased High	Eastern Expansion	Rebased Medium	Rebased High	Eastern Expansion
Wellington City	71,944	81,149	83,997	81,149	90,513	96,662	90,513	97,140	106,555	97,140
Porirua City	16,268	17,339	18,112	17,339	18,325	19,981	18,325	18,280	21,053	18,280
Lower Hutt City	35,936	37,980	39,373	39,373	39,654	42,551	42,551	39,299	43,898	43,898
Upper Hutt City	14,673	15,998	16,580	16,580	17,104	18,408	18,408	17,022	19,195	19,195
Kapiti Coast District	20,283	23,056	23,903	23,056	25,539	27,261	25,539	27,608	30,131	27,608
Masterton District	9,230	9,928	10,229	10,229	10,454	11,120	11,120	10,021	11,057	11,057
Carterton District	2,720	3,051	3,192	3,192	3,518	3,779	3,779	3,523	3,974	3,974
South Wairarapa District	3,612	4,338	4,477	4,477	5,236	5,576	5,576	5,231	5,827	5,827
Total	174,665	192,840	199,863	195,396	210,343	225,338	215,810	218,124	241,690	226,979

Total Employed	2011 WTSM									
	2011	2021			2031			2041		
		Rebased Medium	Rebased High	Eastern Expansion	Rebased Medium	Rebased High	Eastern Expansion	Rebased Medium	Rebased High	Eastern Expansion
Wellington City	133,976	143,304	147,392	143,304	150,416	160,590	150,416	159,051	174,417	159,051
Porirua City	17,049	18,333	18,557	18,333	19,330	20,709	19,330	18,997	21,467	18,997
Lower Hutt City	44,135	46,918	48,473	48,473	49,057	52,430	52,430	47,784	53,163	53,163
Upper Hutt City	11,923	12,749	13,181	13,181	13,392	14,323	14,323	12,895	14,451	14,451
Kapiti Coast District	15,206	16,242	16,783	16,242	17,047	18,213	17,047	18,170	19,849	18,170
Masterton District	11,036	11,704	12,075	12,075	12,205	13,016	13,016	11,333	12,538	12,538
Carterton District	3,518	3,663	3,765	3,765	3,766	3,991	3,991	3,608	4,015	4,015
South Wairarapa District	3,654	3,828	3,937	3,937	3,953	4,193	4,193	3,684	4,088	4,088
Total	240,498	256,741	264,163	259,311	269,166	287,466	274,746	275,522	303,987	284,471

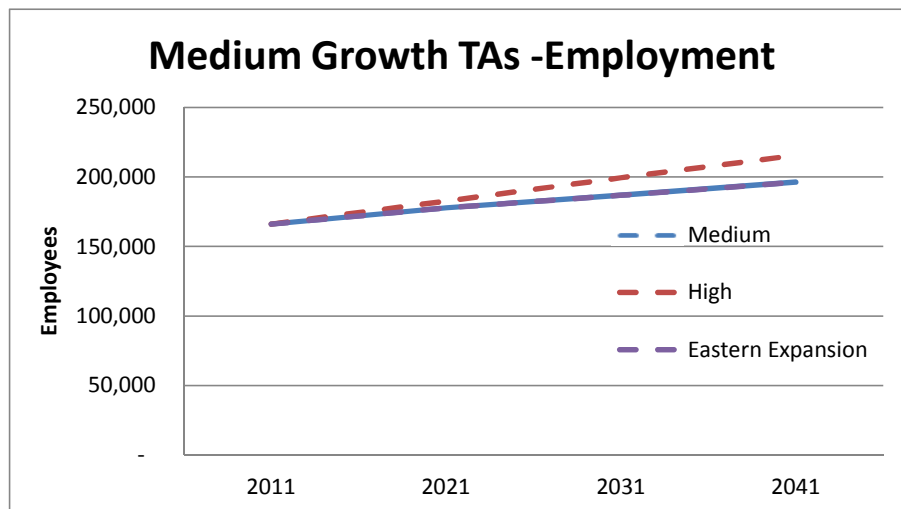
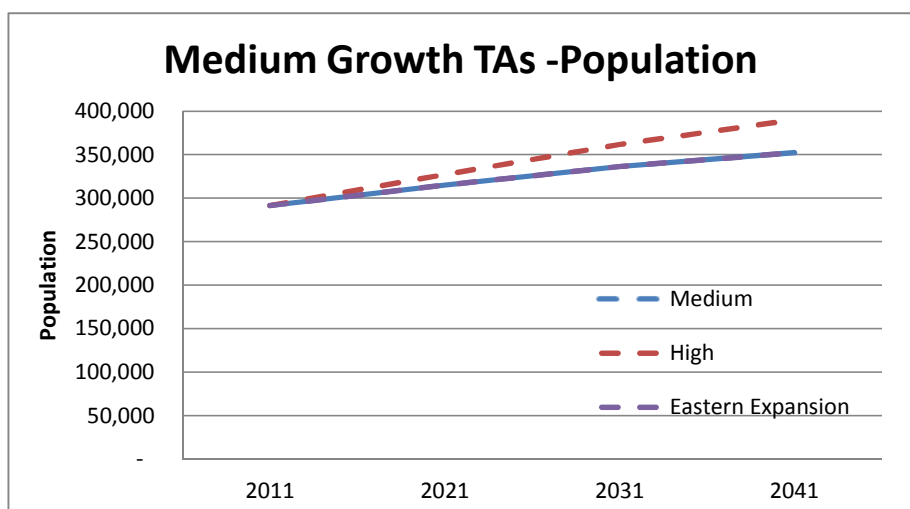
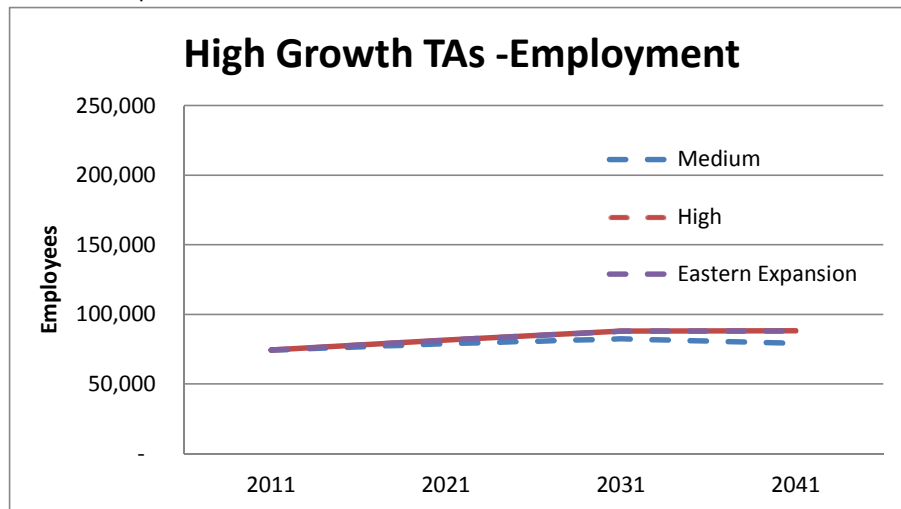
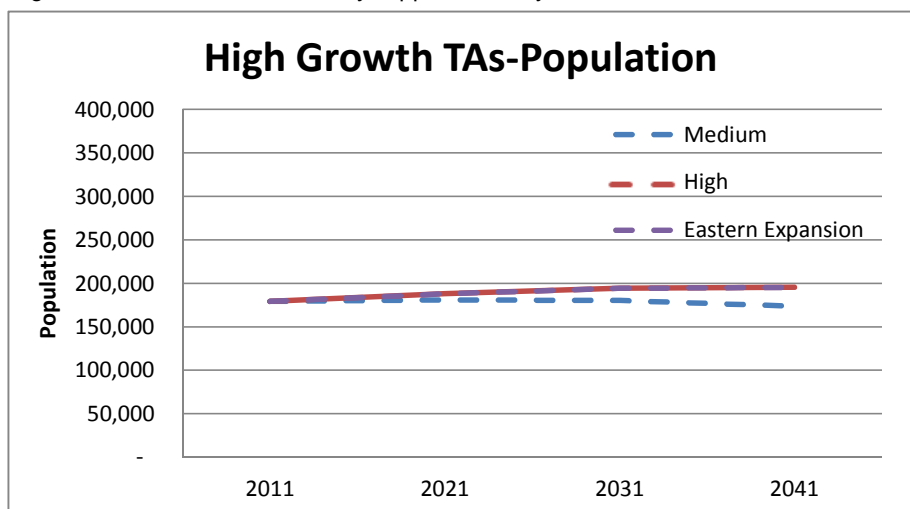
Household Occupancy	2011 WTSM									
	2011	2021 Rebased High	2021 Rebased High	Eastern Expansion	2031 Rebased Med	2031 Rebased High	Eastern Expansion	2041 Rebased Med	2041 Rebased High	Eastern Expansion
	Wellington City	2.66	2.57	2.58	2.57	2.48	2.49	2.48	2.45	2.45
Porirua City	3.16	3.02	3.03	3.02	2.89	2.91	2.89	2.83	2.86	2.83
Lower Hutt City	2.77	2.66	2.66	2.66	2.55	2.56	2.56	2.50	2.52	2.52
Upper Hutt City	2.74	2.54	2.55	2.55	2.37	2.39	2.39	2.29	2.31	2.31
Kapiti Coast District	2.42	2.34	2.35	2.34	2.30	2.31	2.30	2.27	2.28	2.27
Masterton District	2.56	2.38	2.39	2.39	2.21	2.23	2.23	2.15	2.16	2.16
Carterton District	2.56	2.31	2.30	2.30	1.99	2.01	2.01	1.90	1.93	1.93
South Wairarapa District	2.46	2.05	2.06	2.06	1.66	1.67	1.67	1.55	1.56	1.56
Total	2.70	2.57	2.58	2.57	2.46	2.47	2.46	2.41	2.42	2.41

Employees/1000 Population	2011 WTSM									
	2011	2021 Rebased High	2021 Rebased High	Eastern Expansion	2031 Rebased Med	2031 Rebased High	Eastern Expansion	2041 Rebased Med	2041 Rebased High	Eastern Expansion
	Wellington City	701	687	681	687	669	667	669	669	667
Porirua City	331	350	338	350	365	356	365	367	357	367
Lower Hutt City	443	465	462	462	486	481	481	486	481	481
Upper Hutt City	297	314	312	312	331	326	326	331	326	326
Kapiti Coast District	310	301	299	301	290	289	290	290	289	290
Masterton District	468	495	495	495	527	526	526	527	526	526
Carterton District	505	519	513	513	538	525	525	538	525	525
South Wairarapa District	412	429	428	428	454	449	449	454	449	449
Total	511	517	513	515	521	517	517	524	519	519

Eastern Expansion

Medium Growth TAs -Wellington City, Porirua City, Kapiti Coast District

High Growth TAs -Lower Hutt City, Upper Hutt City, Masterton District, Carterton District, South Wairarapa District



Lower Hutt City -Population			
	Medium	High	Eastern Expansion
2011	99,678	99,678	99,678
2021	100,929	104,843	104,843
2031	100,934	108,919	108,919
2041	98,314	110,441	110,441

Lower Hutt City -Employment			
	Medium	High	Eastern Expansion
2011	44,135	44,135	44,135
2021	46,918	48,473	48,473
2031	49,057	52,430	52,430
2041	47,784	53,163	53,163

Upper Hutt City -Population			
	Medium	High	Eastern Expansion
2011	40,188	40,188	40,188
2021	40,650	42,300	42,300
2031	40,489	43,911	43,911
2041	38,985	44,301	44,301

Upper Hutt City -Employment			
	Medium	High	Eastern Expansion
2011	11,923	11,923	11,923
2021	12,749	13,181	13,181
2031	13,392	14,323	14,323
2041	12,895	14,451	14,451

Masterton District -Population			
	Medium	High	Eastern Expansion
2011	23,588	23,588	23,588
2021	23,621	24,419	24,419
2031	23,150	24,753	24,753
2041	21,496	23,843	23,843

Masterton District -Employment			
	Medium	High	Eastern Expansion
2011	11,036	11,036	11,036
2021	11,704	12,075	12,075
2031	12,205	13,016	13,016
2041	11,333	12,538	12,538

Carterton District -Population			
	Medium	High	Eastern Expansion
2011	6,969	6,969	6,969
2021	7,058	7,337	7,337
2031	7,004	7,605	7,605
2041	6,711	7,651	7,651

Carterton District -Employment			
	Medium	High	Eastern Expansion
2011	3,518	3,518	3,518
2021	3,663	3,765	3,765
2031	3,766	3,991	3,991
2041	3,608	4,015	4,015

South Wairarapa District -Population			
	Medium	High	Eastern Expansion
2011	8,873	8,873	8,873
2021	8,913	9,204	9,204
2031	8,711	9,338	9,338
2041	8,118	9,103	9,103

South Wairarapa District -Employment			
	Medium	High	Eastern Expansion
2011	3,654	3,654	3,654
2021	3,828	3,937	3,937
2031	3,953	4,193	4,193
2041	3,684	4,088	4,088

All Other TAs -Population			
	Medium	High	Eastern Expansion
2011	291,765	291,765	291,765
2021	315,014	327,266	315,014
2031	336,655	361,981	336,655
2041	352,347	390,375	352,347

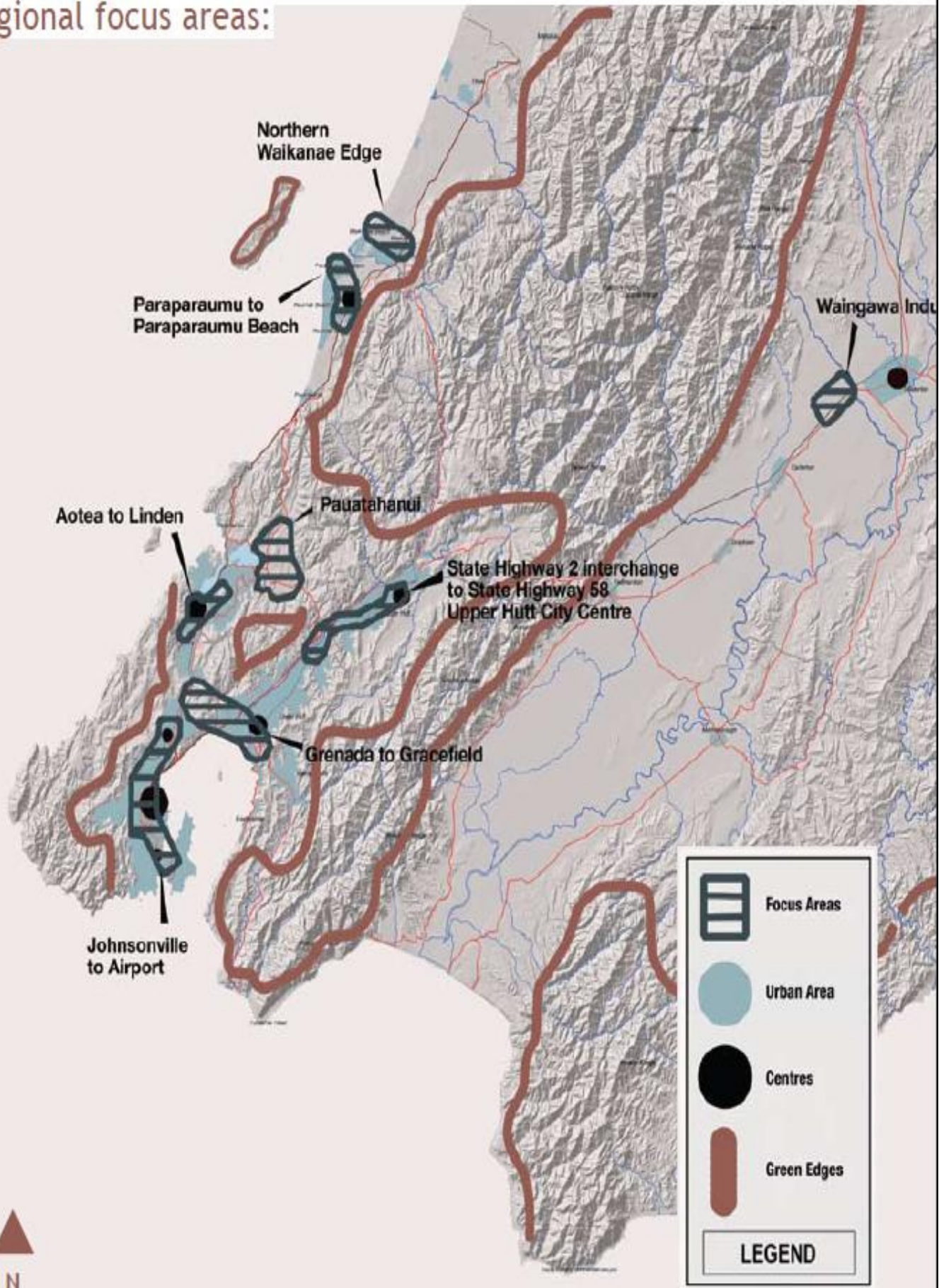
All Other TAs -Employment			
	Medium	High	Eastern Expansion
2011	166,232	166,232	166,232
2021	177,879	182,731	177,879
2031	186,793	199,513	186,793
2041	196,217	215,733	196,217

Total -Population			
	Medium	High	Eastern Expansion
2011	471,060	471,060	471,060
2021	496,185	515,369	503,117
2031	516,943	556,507	531,180
2041	525,972	585,714	547,686






Total -Employment			
	Medium	High	Eastern Expansion
2011	240,498	240,498	240,498
2021	256,741	264,163	259,311
2031	269,166	287,466	274,746
2041	275,522	303,987	284,471

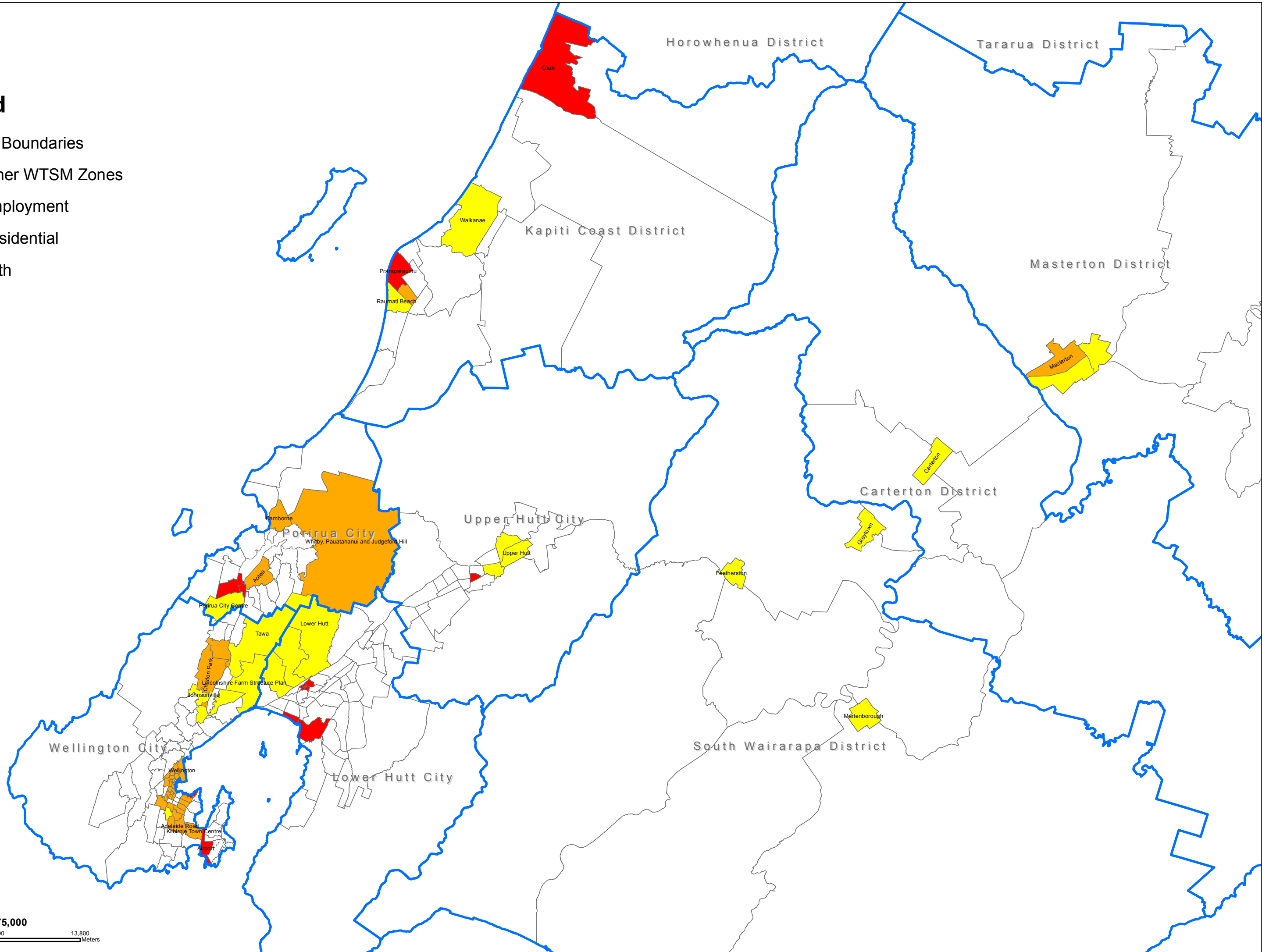
Appendix H – Alternative Scenario Development Growth Areas

Regional focus areas:



Legend

-  TA Boundaries
-  Other WTSM Zones
-  Employment
-  Residential
-  Both



1:275,000

0 3,450 6,900 13,800 Meters

Projection: