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Report to:

Grow Wellington and GWRC

THE ECONOMIC BENEFITS OF EARLY UFB ROLL-OUT IN WELLINGTON

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The economic benefits of early UFB roll-out in Wellington

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1 Summary

There is an important role for local government to play in intervening in the broadband market and supporting the Government's Ultra Fast Broadband Initiative (UFBI). BERL has been commissioned to provide an economic case that supports the Wellington Urban Area's bid to be included in the first stage roll-out of UFB by providing an economic case for the Wellington Urban Area.[1]

From an economic perspective, there are three key factors that support the Wellington Urban Area's case to be a prioritised player in the Government's UFBI. These are based on the demographic, industry, and geographic shape of the region.

Demographics

- The Wellington Urban Area has a large population (374,000, 9% of total) but, more important it is the unique characteristics of this population. Compared to the rest of New Zealand, the area's population tends to be **younger,** more **highly educated** and more **highly paid**, and more **diverse in terms of ethnicity and nationality**. These characteristics mean Wellingtonians are likely to support high levels of demand for network access, thereby supporting the demand for, and uptake of, UFB.

Industry

- The Wellington Urban Area employs a large number of people (198,000, 11% of total). Not only this, a relatively larger proportion (25%) of these people are employed in industries that will take up and derive greater benefit from UFB (18 % of aligned industries nationally).

Geography

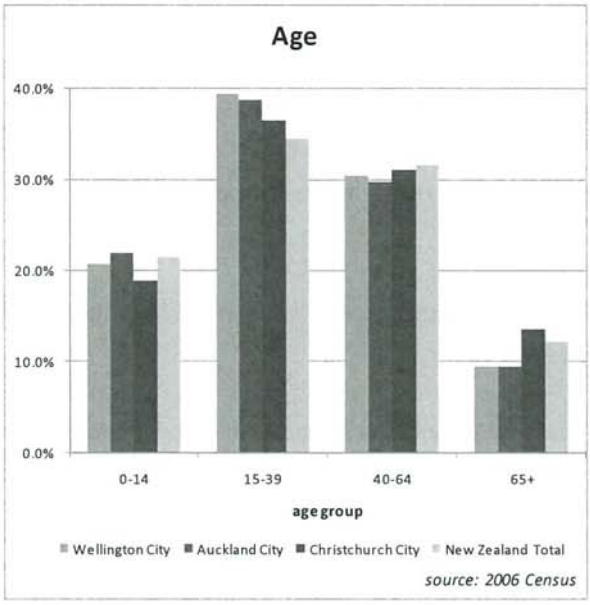
- Wellington Urban Area's **density, urban form, existing assets** and **prioritised local government planning** mean that implementing UFB will be cost effective and deliverable in a timely fashion.

Below we summarise some of the key points that make up these three key factors.

[1] The Wellington Urban Area, in this analysis, covers the four local authority areas of Wellington City, Porirua City, Lower Hutt City and Upper Hutt City.

The people: young, highly skilled and globally connected

Research suggests that UFB is in greater demand in areas where there is a large proportion of younger, higher skilled, and globally connected people. Most of the Wellington Region's employment (almost 9 out of 10 workers) is located in Wellington's four cities. Almost 70 percent of Wellington City's population in 2006 was working aged (15-64 years old). This was the highest proportion in the country, and was above the national average of just under two thirds (66.2 percent).



Wellington City had the highest proportions of people in the younger (15-39 year olds) age group. Wellington City also had a higher proportion of young people (0-14 years old) than Christchurch City.

Wellington City has a relatively high proportion of skilled workers, reflecting the concentration of government, business services, education, creative, and high value manufacturing industries in the area. In absolute terms, almost 101,000 people worked as managers, professionals or technicians in Wellington City. The equivalent number was just over 76,000 in Christchurch City.

In terms of concentration, more than one third (36 percent) of Wellington City's population were managers, professionals or technicians (which are largely high-skilled occupations), compared to just under one third (31 percent) in Auckland City.

With a large, highly skilled working age population, Wellington City is the highest earning area in New Zealand and with the greatest proportion of

people (nearly one person in eight) in the higher income brackets ($70,000+ p.a.), with one in three people earning above the average wage compared to one in four nationally. At the higher end, 5.8 percent of Wellington City employees had incomes of at least $100,000. This compared to 4.4 percent in Auckland City, 2.8 percent in Christchurch City, and 3.3 percent nationally.

Wellington City is ethnically diverse, attracting both short-term migrants (generally for study) and long term-migrants who are well immersed within the local labour market. Over one quarter (27.6 percent) of Wellington City's residents were born overseas, which is above the national average.

Notably, Wellington City has the highest proportion of immigrants from the UK, Ireland, European Union and North America.

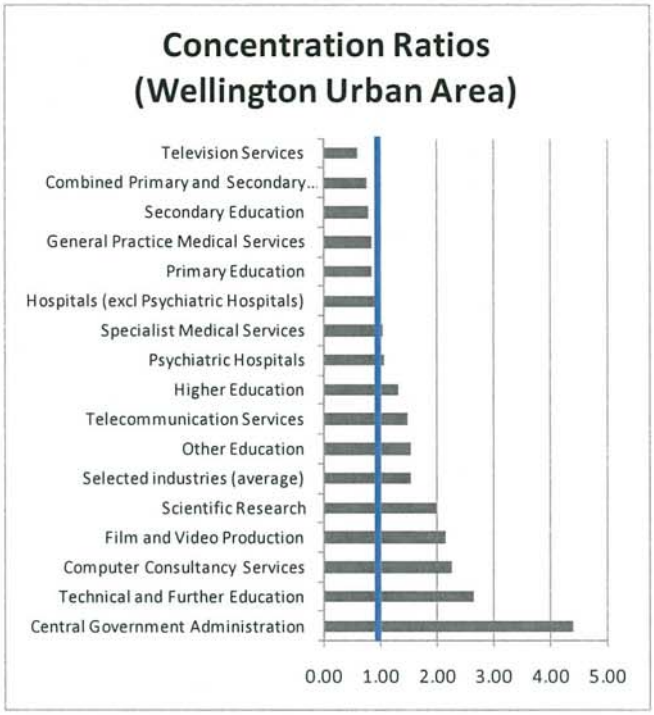
Immigrants from the UK, Europe and America have above average incomes (amongst migrants but also generally) and tend to stay in New Zealand for longer than other migrant groups. They are therefore likely to have a high propensity to demand broadband services and this demand will be sustained so the investment in broadband will pay off over a longer period.

The industry: the size and the mix to leverage the UFBI gain

Research suggests that the greatest uptake or demand for, and productivity gains from, UFB is from creative industries, government, education, and health sectors. These are the industries that are most likely to benefit from an upgrade and expansion of UFB, and are also the strategic focus of Grow Wellington, the Wellington Region's economic development agency.

One quarter of all full time equivalent (FTE) workers in Wellington's Urban Area work in the industries that are most likely to maximise the leverage from an early roll-out of UFB. This compares to only 15 percent of activity nationally. In absolute terms, over 49,000 FTE workers and almost 4,700 businesses operate in the identified driver industries. The Wellington Urban Area accounts for around 18 percent of all employment nationally in those industries.

This is reflected in the relative activity in these sectors. The research, government, education, health and digital production industries are highly concentrated in the Wellington Urban Area economy. Hence, people in the Wellington Urban Area are1.5 times more likely to be employed in industries that would benefit from UFB.



This concentration ratio is even higher in industries such as central government administration (4.4 times); technical and further education (2.6 times); computer consultancy (2.3 times) and film and video production (2.1 times).

Finally, these key industries are growing faster in the Wellington Urban Area than they are nationally. In the latest year (2009), these industries increased employment by 8.3 percent compared to 6.9 percent nationally. Over the last five years, employment growth in the Wellington Urban Area has been 4.3 percent per annum, well above the 3.1 percent per annum nationally.

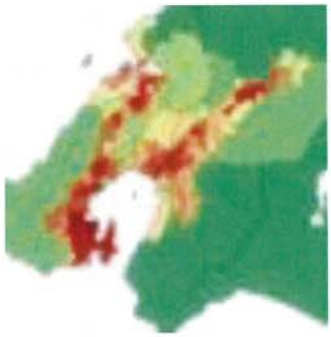
A number of businesses in key industries in the Wellington Urban Area are already demonstrating their willingness to use broadband to secure their competitive advantage in a global marketplace and to improve their services to local populations. There is also a stated, but latent, demand amongst a number of other businesses in the key industries that could be actualised with the UFBI. The UFBI will increase competition in this market, enhancing affordability, coverage and speed.

Grow Wellington's Centres of Excellence programme focus on three emerging sectors that have the potential for exponential growth, with UFB playing a major part. These sectors are Sustainable and Renewable Energy; Biotechnology and Life Sciences and Screen and Digital Technologies. Support for these sectors should see them continue to grow in the Wellington Urban Area.

<u>The place: ready, willing and cost-effective</u>

The Wellington Region has a compact geography and urban form that lends itself to a cost effective solution to UFB roll-out. Wellington is likely to be a relatively low cost option due to

its high urban density, linear form, the potential to leverage unused underground infrastructure.



Add to that, local government has invested in the processes and structures necessary to facilitate UFB roll-out. Therefore, there is lower-risk in terms of implementation due to the efforts of the Broadband Operating Group's (BOG) prioritised work streams.

The high residential and employment densities in Wellington's four cities mean it benefit from a comprehensive roll-out of fibre to the home as well as to fibre to business and mixed use premises in the central business district.

Three factors in Wellington's geography will support a relatively low cost roll-out: density, urban form and unused underground infrastructure.

1. Areas with high residential and commercial population densities tend to be cheaper to connect.
2. Wellington City has the highest resident population (6.4 people) and employment densities (3.5 people) per hectare compared with Auckland or Christchurch.
3. The four cities collectively have a higher population (2.6 people per ha.) and employment (1.4 people per ha.) density than Christchurch City.

The BOG's prioritised approach means that the Wellington Urban Area is developing an information base that will assist local fibre companies to develop their businesses cases and thereby to deliver substantial savings on the cost of the roll-out.

2 Introduction

The Greater Wellington Regional Council and Grow Wellington commissioned BERL to examine the economic benefits from UFB in the Wellington Urban Area, in order to support their case for inclusion in the first stage roll-out.

This report considers the potential economic benefits of UFB for the Wellington Urban Area based upon its unique demography; industry structure; and geography[2].

2.1 Wellington's urban economy and its hinterland

Most (almost 88 percent) of the Wellington Region's employment across all industries is located in the Wellington Urban Area. Table 2.1 shows the number of people by sector employed in the Wellington Urban Area, in the Region and the proportion located in the Wellington Urban Area. The total employed in New Zealand is also included to allow comparison.

Table 2.1 Total employment by sector (all industries, 2009)

Employment (FTEs), 2009	Wellington Urban	Wellington Region	%urban	New Zealand
Primary	919	4,348	21%	153,603
Manufacturing	11,999	14,436	83%	229,907
Construction	13,829	17,033	81%	148,767
Retail and Distribution	42,526	49,778	85%	485,329
Business Services	56,062	59,691	94%	357,211
Recreation Services	16,772	18,274	92%	118,633
Social Services	55,846	61,597	91%	373,298
Total	**197,953**	**225,158**	88%	**1,866,747**

Source: BERL, Statistics NZ

The concentration of the Wellington Region's employment in the Wellington Urban Area across most sectors means that a significant proportion of the Region's businesses will benefit from the UFBI.

2.2 Project brief

The Government's Ultra Fast Broadband Initiative (UFBI) aims to accelerate the roll out of UFB to over 75 percent of New Zealanders within ten years, concentrating in the first six years on priority broadband users including businesses, schools and health services. It is

[2] Given the substantial background work done to inform the Wellington Region Broadband Plan on the benefits due to geography, we concentrate on industry and demographic analysis.

unlikely that planned private sector investment outside the government's UFBI will be sufficient to deliver the bandwidth likely to be required by businesses and households (Lipscombe 2008, The New Zealand Institute 2007, 2008). This suggests that there is an important role for local government to play in intervening in the broadband market.

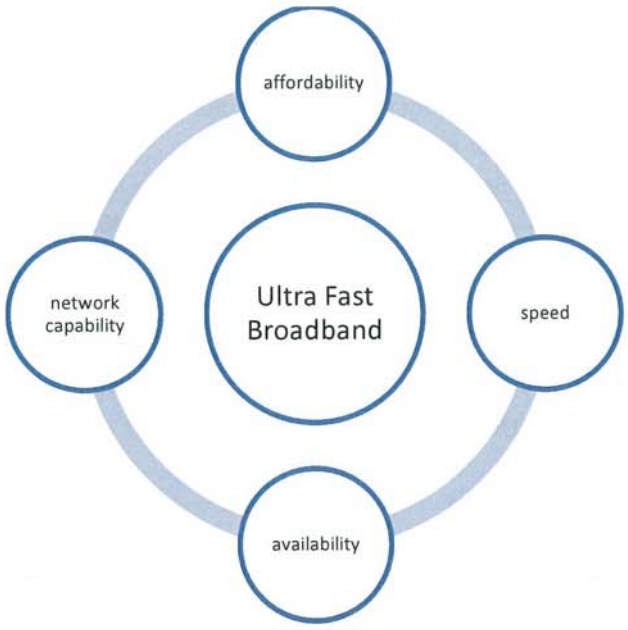
The *Wellington Regional Strategy* (WRS) highlights growing broadband availability and use as a key initiative to achieve sustainable economic growth for the region. In fact it is highlighted as being one of the two most important factors that position the region to compete in the global economy.

An interim target in the WRS is that "the region adopt a target of 5Mbps symmetrical data rate", which is based on the definition of fast broadband in the Government's *Digital Strategy 2.0*. Linking in to the UFBI will be critical to achieving the targets for the Wellington Urban Area.

2.3 Wellington Urban Area's fibre context

The Wellington Urban Area is already at the forefront of digital technology use, with fibre optic cable being available for the last 15 years. The four key issues identified by business with regard to UFB are: cost, speed, availability, and network capability.

Figure 2.1 UFB – Business requirements



While there are a number of existing fibre providers in the Wellington Urban Area, incomplete coverage and connection speed are frequently cited as issues. Further, Grow

Wellington has undertaken research that suggests affordability is holding back a number of businesses from upgrading to fast broadband.

Demand for UFB is evident, with several businesses having come up with 'work around' solutions where there is only a single fibre provider; and either a connection could not be made or the proposed roll-out cost was unaffordable.

And from a supply side there is evidence in the Wellington Urban Area to suggest that affordability improves when several providers compete. Similarly, when a provider extends its network to contest a new part of the market, it is generally at a substantially lower price.

An early roll-out of UFB in the Wellington Urban Area will continue to improve competition amongst providers, enhancing affordability and therefore improving UFB up-take. This will ultimately result in productivity and production gains.

3 Literature review: key factors favouring or supporting roll-out in the Wellington Urban Area

The literature review provides an evidence base to understand the benefits of early roll-out, who benefits from broadband and what factors favour broadband uptake.

To summarise the findings, the literature suggests that broadband can benefit businesses (economic benefits), people (social benefits) and democracy (political).

From an economic perspective, IT intensive sectors are likely to benefit the most, potentially adding a further one percent to employment growth. Further, earlier adoption will provide better outcomes from a productivity, expansion/creation, and strategic innovation.

Uptake or demand for UFB will be higher in economies that have: a higher proportion of employment in services or higher skill occupations; younger people; a larger migrant population; higher incomes and smaller household size.

3.1.1 Who benefits from broadband and its early roll-out

Ferro et al (2007) analyse the impact of broadband in three different contexts.

- The **economic context:** increased efficiency, productivity and economic growth.
- The **social context**: broadband diffusion leads to a better quality of life, by providing better healthcare, expanded education opportunities, increased responsiveness by governments to the citizen needs.
- The **political context**: enables e-democracy and promotes a democratic forum in cyberspace.

The impacts across these contexts are not insignificant. In the economic context, a number of studies have found broadband to have a positive and independent effect on economic activity. Fehr et al's (2005) analysis of US data over 1998-2002, found broadband added:

- about 1 percent to the growth rate of employment
- 0.5 percent to the growth rate of business units
- over 0.5 percent to share of establishments in IT-intensive sectors; but,
- reduced the share of small establishments by about 1 percent.

The New Zealand Institute (2007) estimated the potential economic benefits to New Zealand of 'unconstrained' broadband at $2.4 billion to $4.4 billion per annum. Grow Wellington suggests that, on the basis of region and city shares of national GDP, this translates to potential benefits for the Wellington region of $400 million to $650 million.

Below we outline how early roll-out delivers benefits and the factors likely to support UFB update. In sections 4 and 5 we relate these factors to Wellington's economic, social and political contexts and how these are well suited to delivering the benefits of early UFB roll-out.

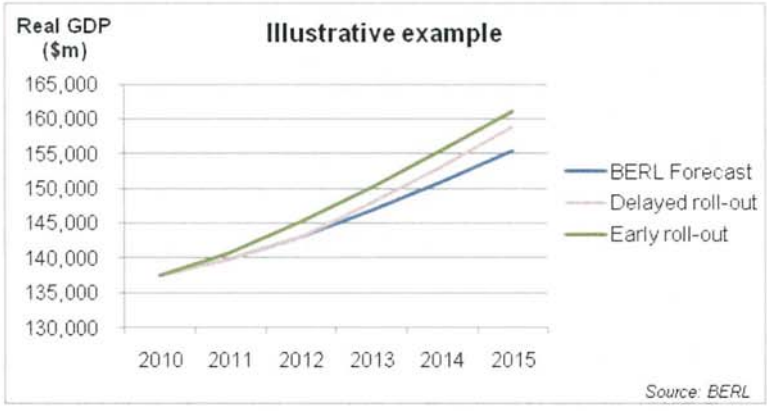
3.1.2 The earlier, the better

In the economic context, early roll-out may be thought of as having three benefits. The first is to improve productivity within existing businesses and processes. The second benefit comes from the creation of new business opportunities and development of innovative business processes. A third benefit is the strategic advantage that comes from being on the leading edge of innovation.

Delaying broadband roll-out defers when these benefits are received, and benefits received earlier are usually valued more highly (Crandall and Jackson, 2001). A second cost of delaying roll-out is that society misses out on the 'compounding' effect of growth. That is, the new and expanded businesses also grow over time.

Figure 3.1 provides an illustrative example that visualises these potential effects of early roll-out. The first effect of early roll-out (the green line) is that output is higher from 2011 than would be the case without UFB (the blue line) or if roll-out were delayed two years to 2013 (the pink line).[3] A second effect of early roll-out is the compounding effect of higher growth, which causes the green line to continue to pull away from both the blue (no UFB roll-out) and pink lines (delayed roll-out), as growth builds on growth.

Figure 3.1 Illustration of the effect of early broadband roll-out on the NZ economy



[3] This simple example does not include the benefit of early roll-out securing a competitive advantage for New Zealand by being on the leading edge of innovation. In such a scenario, the early roll-out profile would pull away from the delayed roll-out and base forecasts more quickly. Delayed roll-out would imply a further cost above the delayed benefits and lost growth as it erodes New Zealand's global market share and lifts its growth profile by less.

From an industry perspective, delayed roll-out holds back the engine of growth for those industries that could benefit from the increased availability of UFB to them and their customers. As noted below in section 5, Wellington's economic base is particularly well suited to taking advantage of broadband, and therefore the lost benefits would be relatively significant.

In addition, residents miss out on the network and dynamic benefits of increased uptake. Network benefits (or "externalities") refer to the greater gain that comes from more people using a system. Over time, this increased uptake can also create dynamic benefits by making it easier and more attractive for existing and new residents/businesses to join the network.

3.1.3 Factors favouring uptake

A number of studies and consumer surveys have investigated the determinants of broadband penetration (Madden and Simpson 1997, OECD 2003b, Jakopin et al 2007). Below we summarise some of the key factors favouring broadband uptake.

- Employment in service sectors or higher skill occupations, which is positively correlated with the need for information access
- Teleworking, which increases the base of potential early broadband adopters
- The number of people in younger age groups, which may affect the willingness and ability of these people to use ICT
- Region of origin (i.e. if a member of the household was born in a non-English speaking country), which may affect the desire to stay connected and access non-English material, but also English language proficiency, which affects the attractiveness of global Web content for the countries' population.
- Household income (positive relationship), household size (negative relationship) and unemployment (negative relationship), which affect the spending power of consumers.
- Fixed voice (traditional) telephony prices, narrowband Internet access prices. Broadband prices at the time of mass market introduction and installation costs, which influence the attractiveness of switching to a broadband subscription and the speed of adoption.

Cava-Ferreruela and Alabau-Muñoz 2004 also note broadband up-take is higher where (dial-up) internet access penetration is greater. While dial-up may be a substitute for broadband, its presence may reflect a favourable ICT eco-system and an adeptness of the population to take up new technologies.

LECG (2009) finds that countries that had, and continue to have, high levels of general Information Communication Technology (ICT) diffusion have been faster to adopt broadband

and the broadband that has been added seems to have produced quite significant productivity gains. They also find that productivity benefits of ICT are best realised when there is sufficient investment in complementary factors such as "re-skilling" of the workforce and general population, and an environment is created where the costs of technology adoption are minimal.

4 Demographic factors – young, highly skilled and globally connected

In its own right, the Wellington Urban Area has a large population and labour market. The population in the four cities is almost 375,000 with employment of almost 200,000 FTEs. The area accounts for nine percent of population, and 11 percent of employment in New Zealand.

The Wellington Urban Area has a higher proportion of people that would benefit from UFB – younger, more educated, with greater incomes and globally connected.

The Wellington Urban Area's population tends to be younger, highly educated and paid, and diverse in terms of ethnicity and nationality. As identified in the literature review, these factors are likely to support high levels of demand for network access, thereby supporting better demand for, and uptake of, UFB.

Table 4.1 Proportion of an area's population by age (2006 Census)

Age band	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
0-9	14.4%	13.7%	14.6%	12.3%	12.5%	13.9%
10-14	7.5%	7.0%	8.2%	6.5%	7.2%	7.6%
15-19	7.7%	7.5%	7.3%	7.4%	7.3%	7.5%
20-24	8.1%	8.2%	5.5%	7.9%	6.0%	6.7%
25-39	23.1%	23.7%	18.2%	21.1%	18.5%	20.4%
40-64	29.8%	30.5%	32.3%	31.1%	34.1%	31.6%
65-74	5.1%	5.2%	7.6%	6.6%	7.7%	6.6%
75+	4.3%	4.2%	6.4%	6.9%	6.6%	5.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: BERL, Statistics NZ

Almost 70 percent of Wellington City's[4] population in 2006 was working aged (15-64 years old). This was the highest proportion in the country, and was above the national average of just under two thirds (66.2 percent). Wellington City also had comparable or higher proportions of people in the young age groups of 15-24 year olds, and had a higher

[4] The following demographic analysis is based on Wellington City as opposed to the wider Wellington Urban Area. The short time-frame meant there was not enough time to order census data for the broader area. However, we could reasonably expect that with Wellington City accounting for a significant proportion of employment in the Wellington Urban Area, and with a large proportion of the population in the other areas working in Wellington City, the Wellington Urban Area demographics would be relatively similar to those of Wellington City (although obviously not quite as high).

proportion of young people (0-14 years old) than Christchurch City. It also had below the national average proportion of people in older age groups (65 years old plus).

Table 4.2 Proportion of an area's population by occupation (2006 Census)

Occupation (2006 Census)	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Managers	11.0%	11.1%	8.1%	14.2%	8.0%	9.3%
Professionals	11.0%	15.0%	8.0%	15.5%	7.5%	9.6%
Technicians	9.3%	9.8%	6.7%	13.2%	6.6%	7.9%
Clerks	8.1%	9.1%	6.3%	11.4%	6.2%	7.1%
Service and Sales Workers	8.2%	9.2%	8.6%	15.4%	9.5%	8.8%
Primary Sector Workers	0.8%	0.6%	6.6%	2.0%	8.3%	4.2%
Trades Workers	5.0%	4.6%	5.9%	8.6%	5.9%	5.5%
Machine Operators	3.9%	3.0%	5.5%	7.5%	6.5%	4.9%
Labourers	3.6%	3.2%	4.1%	6.7%	4.8%	4.0%
Not Elsewhere Included	3.5%	3.3%	4.0%	5.4%	3.5%	3.7%
No occupation	35.5%	31.0%	36.1%	55.4%	33.2%	35.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: BERL, Statistics NZ

Wellington City has a disproportionately high proportion of highly skilled workers, as shown in Table 4.2. This reflects the concentration of government, business service, education, creative and skilled manufacturing industries based in the region. For example, the 2006 Census shows that more than one third (35.9 percent) of Wellington City's population were in the top three occupational skill categories, compared to just under one third (31.4 percent) in Auckland City. In absolute terms, almost 101,000 people worked as managers, professionals or technicians in Wellington City, while the equivalent number was just over 76,000 in Christchurch City.

Wellington City's large working age population and high skill base is reflected in their incomes. Table 4.3 shows a significantly higher proportion of workers in Wellington City are in higher income bands than most other areas in New Zealand.

Table 4.3 Proportion of an area's population by income (2006 Census)

Income band	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
<=15,000	29.7%	27.4%	30.9%	31.9%	32.4%	30.6%
15-30.000	18.2%	19.0%	23.9%	23.7%	24.8%	22.0%
30-50,000	21.2%	21.9%	20.5%	21.6%	21.6%	21.1%
50-70,000	9.8%	11.1%	8.2%	8.4%	8.0%	8.9%
70-100,000	4.8%	6.4%	3.3%	3.6%	2.9%	4.0%
100,001+	4.4%	5.8%	2.5%	2.8%	2.2%	3.3%
Not specified	11.9%	8.3%	10.7%	8.0%	8.1%	10.2%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: BERL, Statistics NZ

About one in three people in Wellington City earned above the average wage, compared to around one quarter nationally. Wellington City also had the highest proportion of people (12.2 percent) in the top income brackets ($70,000+ p.a.), compared to Auckland City (9.3 percent), Christchurch City (5.8 percent) or the rest of New Zealand.

Wellington City has an ethnically diverse population, even though Auckland and Christchurch are perceived as gateways for immigration. This diversity is supported by both its education sector (with students from overseas) as well as its labour market, which attracts both recent and established immigrants.[5]

Table 4.4 Proportion of an area's population by birthplace (2006 Census)

Birthplace	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Born overseas	37.5%	24.0%	14.3%	20.2%	12.8%	22.0%
Born in NZ	57.3%	72.4%	80.7%	76.6%	83.7%	73.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: BERL, Statistics NZ

Over one quarter (27.6 percent) of Wellington City's residents were born overseas, which is above the national average.

As Table 4.5 shows, Wellington City has the highest proportion of immigrants from the UK, Ireland, European Union and North America.

Table 4.5 Proportion of an area's population by country/region of birth (2006 Census)

Country/region of birth	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Australia	1.5%	1.6%	1.5%	1.7%	1.6%	1.6%
Pacific Islands	8.6%	4.0%	1.1%	1.3%	0.5%	3.4%
UK and Ireland	6.4%	7.1%	6.1%	6.6%	5.7%	6.2%
EU and Nth America	2.7%	3.0%	1.9%	2.7%	2.2%	2.4%
Asia	14.3%	6.0%	2.3%	6.3%	1.7%	6.2%
Other	3.8%	2.1%	1.4%	1.5%	1.0%	2.1%
Total overseas born	37.5%	24.0%	14.3%	20.2%	12.8%	22.0%
NZ born	57.3%	72.4%	80.7%	76.6%	83.7%	73.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: BERL, Statistics NZ

These immigrants tend to have above average incomes compared with other overseas born **and** New Zealand born people, and tend to have stayed in New Zealand for longer than migrants in other regions (see Table 4.6).

[5] Recent migrants are people born overseas that have lived in New Zealand between 5 and 15 years; established migrants are people that have lived in New Zealand for 15 years plus.

Table 4.6 Proportion of an area's population by duration of residency (2006 Census)

Overseas born, years in NZ	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Less than 5	33%	27%	27%	33%	31%	31%
Between 5 and 14	30%	22%	20%	24%	20%	26%
15 or more	32%	47%	49%	39%	45%	39%
Not specified	5%	4%	4%	4%	4%	4%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Wellington City tends to attract people from overseas that are likely to have a high propensity to demand broadband services, and these people tend to remain for long periods. This suggests sustained demand, so that the investment in broadband will continue to pay off.

5 Industry analysis – it's Wellington's businesses

As noted in the literature review, the Wellington region share of the potential economic benefits to New Zealand of unconstrained broadband has been estimated at between $400 million to $650 million. We would argue that the benefits of investing early in UFB rollout in the Wellington Urban Area are higher than that. This is because the Wellington Urban Area has a greater proportion of businesses that would benefit most from UFB.

The Wellington Urban Area accounts for around nine percent of employment in New Zealand. However, the Wellington Urban Area accounts for over 18 percent of total employment in those industries that would benefit most from UFB within New Zealand

> The **Film/Screen and Digital** sector has over 900 businesses employing 1,200 people. Screen Industry businesses in the Wellington region received half of New Zealand's total post production revenue.
>
> The sector includes companies such as Park Road Post, Wingnut, Weta Workshop and Sidhe
>
> Gross revenue received by screen industry businesses in the Wellington region in 2009 was $530 million, an increase of 50 percent on the $350 million received in 2008.
>
> The sector is global and highly competitive. UFB breaks down the tyranny of distance, allowing businesses to send large files to, and video-conference with, clients anywhere in the world - instantaneously. Without UFB these businesses would find it very hard to compete for projects outside of New Zealand.
>
> *Source: Grow Wellington (2010)*

And just as important, these industries that most benefit from UFB are growing faster in the Wellington Urban Area than they are nationally. Over the last five years, industries that are most likely to benefit from UFB have grown 40 percent faster than they have nationally.

5.1 Key industries in Wellington likely to benefit from UFB

Based on the findings from the literature review, we investigated 16 key industries in the Wellington region that are most likely to receive the greatest advantage from UFB rollout. These industries cover health, education, government, research, services, media and communications.

Employment in these driver industries is high in both relative and absolute terms. Over 49,000 workers and almost 4,700 businesses work in the identified industries.

Table 5.1 shows the employment statistics for these selected industries, measured in full time equivalent (FTE) terms.

Table 5.1 Total employment in the key industries

	Employment Number (FTEs)						%pa change	
	2004	2005	2006	2007	2008	2009	2009	2004 to 2009
Wellington Urban	39,685	40,999	43,713	45,913	45,289	49,062	8.3	4.3
Wellington Region	42,137	43,413	45,965	48,291	47,953	52,084	8.6	4.3
New Zealand	229,139	237,231	238,748	248,329	250,057	267,421	6.9	3.1

Source: BERL, Statistics NZ

The key industries are those that would be most likely to benefit from an upgrade and expansion of UFB in the Wellington Urban Area. Almost 50,000 FTEs, or one quarter of all FTEs, in the Wellington Urban Area could be assisted by an early roll-out.

Table 5.2 breaks down the total in the table above by industry, and shows the share of national employment in an industry that is located in the Wellington Urban Area, using a concentration ratio.[6]

Table 5.2 Employment by industry (key industries, 2009)

	Wellington Urban			Wellington Region			Zealand
Employment, 2009	**FTEs**	**Conc. Ratio**	**% of NZ ind**	**FTEs**	**Conc. Ratio**	**% of NZ ind**	**FTEs**
Scientific Research	1,439	1.98	21.0%	1,439	1.74	21.0%	6,848
Computer Consultancy Services	6,077	2.27	24.1%	6,394	2.10	25.3%	25,258
Central Government Administration	19,044	4.39	46.6%	19,218	3.89	47.0%	40,911
Primary Education	2,959	0.85	9.1%	3,530	0.90	10.8%	32,634
Secondary Education	2,166	0.80	8.5%	2,711	0.88	10.6%	25,598
Combined Primary and Secondary Edı	234	0.75	8.0%	295	0.83	10.0%	2,936
Higher Education	4,316	1.32	14.0%	4,584	1.24	14.9%	30,760
Technical and Further Education	737	2.64	28.0%	757	2.38	28.8%	2,631
Other Education	2,360	1.53	16.3%	2,520	1.44	17.4%	14,503
Film and Video Production	618	2.14	22.7%	632	1.92	23.2%	2,724
Television Services	177	0.58	6.2%	182	0.53	6.4%	2,861
Telecommunication Services	1,569	1.49	15.8%	1,655	1.38	16.6%	9,961
Hospitals (excl Psychiatric Hospitals)	5,684	1.02	10.9%	6,176	0.98	11.8%	52,358
Psychiatric Hospitals	121	1.06	11.2%	121	0.93	11.2%	1,078
General Practice Medical Services	1,049	0.84	8.9%	1,330	0.94	11.3%	11,722
Specialist Medical Services	513	1.04	11.1%	541	0.97	11.7%	4,637
Selected industries (average)	**49,062**	**(1.54)**	**18.3%**	**52,084**	**(1.44)**	**19.5%**	**267,421**
Total all industries	**197,953**			**225,158**			**1,866,747**

Source: BERL, Statistics NZ

All together, the key industries have a concentration ratio of 1.54, which suggests that people are 1.54 times more likely to work within those industries in the Wellington Urban Area than nationally. This ratio increases in a number of industries such as central

[6] A **concentration ratio** measures employment in an industry for a particular area relative to employment in that industry for New Zealand overall. Concentration ratios provide an insight into the structure of a local labour market and the relative importance of an industry to that locality. When the ratio is larger than 1.0, the percentage of those employed in the industry locally is higher than the percentage of those employed the overall New Zealand economy. That is, a concentration ratio larger than 1.0 indicates that the local economy has a particularly high concentration of employment in that industry, which suggests that the local economy has a comparative advantage in that industry.

government administration (4.4 times), technical and further education (2.6 times), computer and consultancy services (2.3 times) and film and video production (2.1 times).

These key sectors are consistent with Grow Wellington's Centres of Excellence programme, which focuses on three emerging sectors - Sustainable and Renewable Energy; Biotechnology and Life Sciences, and Screen and Digital Technologies.

Interviews with a number of local businesses in these industries show that UFB is already delivering value in some cases, and has the potential to deliver significant benefits based on the profile of Wellington Urban Area businesses (see the MetService case study).

Table 5.3 focuses on the number of business ("business units") within the key industries.

Table 5.3 Total business units in the key industries

	Business Units (number)						%pa change	
	2004	2005	2006	2007	2008	2009	2009	2004 to 2009
Wellington Urban	3,792	3,999	4,320	4,376	4,483	4,688	4.6	4.3
Wellington Region	4,159	4,397	4,763	4,840	4,951	5,168	4.4	4.4
New Zealand	22,754	23,798	24,708	25,352	26,177	26,808	2.4	3.3

Source: BERL, Statistics NZ

There are almost 4,700 Business units in key industries, which represent just over 11 percent of the total business units within the Wellington Urban Area and 17 percent of the total business units nationally.

The benefits are likely to be particularly concentrated to producers of 'digital value', which regularly upload large files and interact with offshore clients. Wellington has a large number (and proportion) of "digital value" businesses, particularly in the film and screen production and software development areas. These businesses have the potential to significantly increase exports with the appropriate UFB infrastructure.

<u>Key industries are growing faster in Wellington than nationally.</u>

Nationally these key industries make up just over 14 percent of the total workforce and just

MetService is the Government provider of weather information. The initial decision to connect to UFB was to support increasing traffic volumes to their website.

Since then, overseas customer numbers and data requirements for weather modelling purposes have increased, and data sharing with suppliers and other institutions such as universities and CRIs means MetService has become dependent on UFB at a fundamental level.

UFB is increasingly important to MetServices future business, where the movement of large volumes of data become viable. MetServices is now able to provide solutions to clients irrespective of their physical locations.

Source: Grow Wellington (2010)

over five percent of the total business units. In the last five years, FTE numbers in these industries have grown at an annual rate of 4.3 percent in the Wellington Urban Area, while nationally the annual growth rate was 3.3 percent.

5.2 Fibre in Wellington Urban Area

The Wellington Urban Area has had fibre optic cable to parts of the area for over fifteen years, and there are now a number of providers. But coverage is not complete, and affordability and connection speed are frequently cited as issues for Wellington businesses considering adopting the technology. An early roll-out of UFB in the Wellington Urban Area will improve competitiveness, enhancing affordability that would improve UFB up-take; thereby maximising the potential gains from this technology.

A number of Wellington Urban Area businesses in the identified key industries are eager to secure the benefits of UFB. These benefits include:

The **Health Sector** has close to 1,900 businesses and 19,600 employees in the Wellington Urban Area (BERL Regional Database, 2009).

An exciting new development in the health sector is the Health Education and Research Collaborative (HERC) hub, where health businesses can collaborate to research and commercialise new techniques and products.

Telemedicine links to Mayo Clinic will provide a virtual network of global research and expertise for education and clinical research, leveraging New Zealand's capability in this digital arena.

Source: Grow Wellington (2010)

- Data sharing within an organisation
- Sourcing and processing data, and consuming the resulting solutions, without the hindrance of physical location, as all of these processes could be in based in different continents.
- The speed, frequency and format of data transfer with overseas clients
- Delivering more effective web-conferencing and use of interactive tools
- Access to the latest technological developments and the feasibility of deploying these, especially where excellence not cost is the client's priority
- Increased international presence
- Quicker time to market and permitting rush deliveries
- Efficient, effective communication, such as demonstrating models to existing and potential clients.
- The ability to provide hosting and cloud computing services, reducing the impact on a client of installing the product and the necessity of the client purchasing/ maintaining its own server.

Interviews completed by Grow Wellington with businesses in the Wellington region found that:

- some businesses have come up with 'work around' solutions where there was only a single fibre provider and either a connection could not be made or the proposed roll-out cost was unaffordable.
- affordability is holding back a number of eager businesses from upgrading to broadband.
- there are examples where the presence of multiple providers generated competing proposals and improved the affordability of switching to broadband and a provider extending its network to contest a new part of the market at a substantially lower price.

6 Geography, preparedness and support for early roll- out

The Wellington Urban Area's geography and urban form will reduce the cost of UFB roll-out. Combined with local government efforts to streamline the processes and structures will support UFB roll-out.

6.1 Geography

Three factors in Wellington Urban Area's geography will support a relatively low cost roll-out:

1. density,
2. urban form and
3. unused underground infrastructure.[7]

These factors mean that government funding will be relatively cost-effective in the case of the Wellington Urban Area. Funding an early roll-out in the Wellington Urban Area means the government can maximise the 'bang per buck' of infrastructure investment, and thereby the industry and residential benefits that flow from that investment.

The following tables show that the Wellington Urban Area has a relatively high urban population density. Wellington's central city area is the most densely populated area in the country.[8,9] Although Wellington City's core CBD has fewer residents per hectare than Auckland's CBD, it has a greater density of employment (around 284 people per hectare in Wellington City versus 225 people in Auckland City).

Some people will both work and live in the same area (so we do not add these figures in the table below because of the risk of double counting). However, it is likely that the combined resident population plus people employed in Wellington's CBD mean its total density would be greater than Auckland's CBD. It is clear, though, that Wellington has a higher resident and employment density in the central city area than Auckland.

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[7] Since fibre optic cable is inert, unaffected by water and usually in a sheathed cable, even a poor quality pipe could be useful as long as it provides an access path (Wellington City Council paper on ICT Policy, 2007).

[8] We define Wellington's urban core as the Lambton and Willis Street-Cambridge Terrace Census Area Units (CAUs). Central Wellington includes these two CAUs plus the CAUs of Thorndon-Tinakori Road, Aro Street-Nairn Street, Mt Cook-Wallace Street and Mt Victoria West.

[9] We define Auckland's urban core as the Auckland Central West and Auckland Central East CAUs. Central Auckland includes these two CAUs plus the CAUs of Auckland Harbourside, Newton, Grafton West, Grafton East, St Marys, Ponsonby East, Eden Terrace, Parnell East and Newmarket.

Table 6.1 Population and urban density in Wellington and Auckland (2006)

2006 Census	Area (ha)	Resident population	Density (popn/ha)	Workplace Employed	Emp density (emp/ha)
Wellington Core	201	9,294	46.1	57,183.0	283.8
Central Wellington	715	27,036	37.8	73,443.0	102.7
Auckland Core	209	15,144	72.4	47,013.0	224.7
Central Auckland	1,003	37,515	37.4	95,439.0	95.2

Source: BERL, Statistics NZ

Table 6.1 also shows the importance of rolling out fibre to premises in both Wellington's CBD and to its suburban areas. Central Wellington, which covers both the CBD and the surrounding suburbs, has high resident and employment densities.

BERL's regional database has more recent population data and allows comparison with a greater range of areas, but at a more aggregated geographic level.[10] Reflecting its dense urban core, Wellington City has the highest resident population (6.4 people) and employment densities (3.5 people) per hectare compared with Auckland or Christchurch. In addition, the four cities that make up the Wellington Urban Area collectively have a higher population (2.6 people per ha.) and employment (1.4 people per ha.) density than Christchurch City.

Table 6.2 City, urban area and regional population densities (2009)

2009	Area (ha)	Resident population	Popn density (popn/ha)	Workplace Employed	Emp density (emp/ha)
Wellington City	29,015	186,949	6.4	102,642	3.5
Wellington Urban	138,901	374,142	2.6	194,067	1.4
Wellington Region	805,636	460,700	0.6	233,607	0.3
Auckland City	66,853	419,642	6.3	202,521	3.0
Aucklannd Metropolis	184,853	1,178,265	6.1	541,626	2.9
Auckland Region	658,201	1,382,707	2.0	636,219	1.0
Christchurch City	160,991	358,884	2.2	178,062	1.1
Canterbury Region	3,899,084	535,103	0.1	266,700	0.1
New Zealand	**41,483,511**	**4,154,789**	**0.1**	**1,985,778**	**0.05**

Source: BERL Regional Database, Statistics NZ

The statistics in the tables above reflect that Wellington City has a relatively dense core and moderate densities in its wider urban area. Again, this reinforces the potential value that the Wellington Urban Area will receive from a comprehensive roll-out of fibre to the home as well as fibre to business and mixed use premises in the central business district.

[10] We define the Auckland Metropolis as the four Cities of North Shore, Manukau, Auckland and Waitakere.

6.2 Cost

The Wellington Urban Area is likely to be a relatively low cost option due to its high urban density, linear form, the potential to leverage unused underground infrastructure and the evidence base being built by the BOG's prioritised work streams. This means that the LFCs serving the Wellington Urban Area should be able to put together cost-effective proposals to Crown Fibre Holdings.

Urban areas with high residential and commercial population densities tend to be cheaper to connect, as demonstrated in the literature and background analysis by the territorial authorities and Grow Wellington. This essentially reflects the returns-to-scale of serving a large population clustered in a relatively small area. As noted above, the Wellington Urban Area has an extremely dense CBD and central city area with relatively dense urban nodes. This favours a lower cost rollout or improved connection to a broad range of users.

Wellington's urban form is relatively linear compared with other major cities, such as Auckland, Hamilton or Christchurch. This will have benefits at a number of stages. It will facilitate planning and resource management processes as there is an existing infrastructure network that is large and straight, making it easier to access with less disruption to the surrounding businesses and residents. The distance between and number of connections between end users and the network backbone will be smaller. This will lower the cost and time involved in rolling out fibre and connecting users.

In addition to the Wellington urban area's density and form, the extent of existing unused underground infrastructure is being investigated for its ability to support the rapid and effective roll-out of UFB.

WCC has identified over 100 kilometres of abandoned or decommissioned pipes that could potentially be utilised as empty ducting. While not all will be economically viable for fibre, those that can be used provide a low cost (and more politically acceptable) alternative to new trenches or aerial lines. In addition, the BOG has been working on asset access policies across the Wellington Urban Area to ensure that such assets can be readily used and sensibly funded.

6.3 Preparedness and support

The Wellington Urban Area has worked together through the BOG and Grow Wellington to improve broadband access and uptake. As well, individual councils are looking at ways to improve processes and systems within their own boundaries to ensure effective implementation and uptake of broadband.

6.3.1 *Regional coordination and support*

Broadband Operating Group (BOG)

Key local government agencies in the Wellington Urban Area have established the BOG.[11] Its intent is to facilitate the rollout of fast affordable broadband in the region and promote its use, thereby ensuring that the Wellington region is at the forefront of the UFBI developments. The BOG reports to the Chief Executives Group and ultimately the Wellington Regional Strategy Committee. Therefore, local government in the Wellington Urban Area has considerable oversight of and commitment to the broadband initiative. The BOG also recognises that it may wish to formally constitute some allied groups, such as road infrastructure engineers or GIS officers, as and when appropriate.

The focus for BOG has been to develop a series of workstreams aimed at reducing the cost and increasing the speed of in-ground fibre installation across the region.

The four workstreams are establishing a stocktake of:

1. council policies on access to council assets with a view to developing a region-wide policy
2. region-wide rules for aerial deployment
3. region-wide rules for new trenching technologies and determine whether a common rule can be achieved across the region
4. current processes for coordinating road openings across the region and investigate opportunities to improve these processes.

The BOG's prioritised approach will deliver substantial savings on the cost of the roll-out as the Wellington Urban Area is developing an information base that will assist LFCs to develop their businesses cases. For example, one of the work-streams has investigated trenching technologies, including a trial and the development of a full technical proposal (now under consideration). Given some hundreds of kilometres of trenching will be required in Wellington region, at a ballpark cost of $150,000 per kilometre, a roll-out in Wellington could be achieved at a substantially reduced cost.

[11] The BOG includes representatives from GWRC, Grow Wellington, the eight territorial local authorities and LTNZ.

Grow Wellington

Grow Wellington is the region's economic development agency and is focused on supporting high growth, export-oriented businesses in the region. As UFB is implemented across the Wellington Urban Area, Grow Wellington will work to ensure value is achieved immediately.

Grow Wellington will promote UFB to those businesses/sectors for which it will be most advantageous; and develop initiatives that encourage businesses in the Wellington Urban Area to focus on opportunities for innovation and commercialization using UFB.

Grow Wellington commissioned a broadband gap analysis in 2008. The purpose of this analysis was to assess broadband supply and demand in the Wellington region, and to identify unserved (or under-served) areas by geography and/or industry.

One of the findings of this analysis is that all Telecom New Zealand exchanges in the Wellington region are ASDL-enabled. Total uptake for the Wellington Urban Area is 38.3 percent, compared to the national average of 35.4 percent. *This suggests that Wellington businesses and residents are prepared – both financially and skill-wise – to take up new ICT.*

Alongside BOG and Grow Wellington's efforts, individual councils have progressed their own agendas to improve broadband access and uptake in their areas.

6.3.2 Council Activity

Wellington City Council

The Wellington City Council (WCC) has developed and agreed on a Broadband Vision: high speed, affordable and ubiquitous broadband. To achieve this vision, WCC has completed a number of steps.

- Quantitative and qualitative analysis of potential broadband benefits for Wellington City;
- Scoping developments in the New Zealand telecommunications sector and outlining a rationale for Council intervention in the broadband market.
- Completion of a Request for Concept process and ongoing dialogue with stakeholders to engage potential industry partners in developing implementation options for the vision;
- Discussion of ways in which Council could achieve public good objectives and drive investment and competition in the broadband market;
- Development of a policy framework to address issues related to its broadband vision and continued development of a business model for possible direct Council investment in an urban fibre network.

- Developed recommendations for next steps in four key areas: policy changes; establishment of a duct network; advocacy to government; and preparation of a business model for direct investment in an urban fibre network.
- Preparation of a communication and consultation plan.

The Council has simplified the resource consent/RMA process for telecommunication companies (telcos). It has appointed a single telecommunications coordinator to manage all telecommunications infrastructure roll-out requests and provide feedback to improve the quality of applications. A key issue in this process has been ensuring that the telcos take the lead in communicating with neighbours and interested parties to avoid the Council being overloaded with enquiries and complaints from the public.

Additional resources have also been contracted to ensure the large number of consent applications being received in this area are being processed in an efficient and timely way. Officers are looking to further streamline the Council's processes by identifying a single point of contact who will coordinate not just the resource consent process but the processes for seeking permissions from the Council's Roading and Property teams.

Wellington City also received funding from the Community Partnership Fund to link six schools in Wellington City to a high-speed fibre optic loop.[12] The connection runs at 1 Gbps and is connected to KAREN (Kiwi Advanced Research and Education Network).

Porirua City Council

Porirua City Council (PCC) has a number of initiatives that aim to increase the presence and ability of its residents and businesses to access and use ICT. Many of these initiatives are supported by funding from the Community Partnership Fund, including:

- development of a digital hub, establishing an ICT learning strategy and implementation of four community access points (centres), and Digital Porirua Vision, which aims to develop Porirua as a 'digital city'.
- an Asset Map Project, which is researching how ICT is used across a range of users in the community, and challenges they experience in using ICT and realising their aspirations for future growth, to inform PCC discussions and planning.
- a grant for 150 families in Porirua to join the Computers in Homes programme, which aims to support low income communities to use ICT to strengthen their education.

[12] The Community Partnership Fund (CPF) aims to support local, regional and national initiatives, through partnerships, to develop and achieve capability, confidence, relevant content, and connections around Information and Communications Technology.

- funding for the Porirua Pacific Island Forum to expand its ICT Learning Centre and the development of a prototype eLearning tool called Tohitapu, which has been designed to meet the needs of the Tongan community.

Hutt City Council

Hutt City Council (HCC) has a number of initiatives that aim to support its community to use ICT, develop an on-line presence and participate via e-government.

One initiative is a website portal offering free web space and site management tools. It aims to encourage target groups that are unlikely to have previously had an online presence to doing business and communicating using the internet.

An e-government initiative is HCC's Digitisation Programme, which aims to create electronic versions of existing Council paper and microfiche documents.

Another initiative underway in the Hutt Valley is a community ICT Learning Centre, which has been set-up alongside the community centre in Timberlea with funding from the Community Partnership Fund. This project aims to increase the community's connection to the digital world, reducing the barriers for a low-decile, geographically separated area where many household lack landlines and IT knowledge.

HCC has also sought funding to develop a Computer Clubhouse.[13] The Computer Clubhouse provides an after-school learning environment where young people from under-served communities work with adult mentors to achieve a range of goals through the use of computer technology.

Upper Hutt City Council

One Upper Hutt City Council (UHCC) broadband project involves the use of GPS readings to record the locations of all the plaques and headstones at the Akatarawa Cemetery. The council's website will provide access to this spatial information, along with photographs and links to existing cemetery records.

Also, Smartlinx3 is an open access provider, whose shareholders include the three city councils of Porirua, Hutt and Upper Hutt. It has funding from the Broadband Challenge fund to build an open access fibre and wireless network, providing at least 2 Mbps symmetrical connection speeds to CBDs in Porirua, Hutt and Upper Hutt.

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[13] The Museum of Science (Boston) established the first Computer Clubhouse in collaboration with MIT Media Laboratory in 1993. The Clubhouse Trust NZ wants to clubhouses throughout New Zealand and the Pacific.

7 Abbreviations and Glossary

	High speed broadband	a broadband service usually at speeds greater than 1.5 megabits per second (Mbps)
BOG	Broadband Operations Group	established under the WRS to drive and coordinate regional broadband initiatives
CAU	Census Area Unit	
DSL	Digital Subscriber Line	alternative to cable modems
GWRC	Greater Wellington Regional Council	
HCC	Hutt City Council	
ICT	Information and Communications Technology	
LFCs	Local Fibre Companies	
Mbps	megabits per second	a measure of data transfer speed
PCC	Porirua City Council	
RBI	Rural Broadband Initiative	
TSO	Telecom Service Obligation	
UFB	Ultra fast broadband	fibre to the premise broadband (FTTP) service providing downlink speeds of at least 100 Mbps and uplink speeds of at least 50 Mbps
UFBI	Ultra-Fast Broadband Initiative	its objective is to invest $1.5b to accelerate the roll out of UFB to 75 percent of New Zealanders over ten years, with delivery to priority broadband users (businesses, schools and health services) in the first six years.
UHCC	Upper Hutt City Council	
VOIP	Voice over internet protocol	
WCC	Wellington City Council	
WRS	Wellington Regional Strategy	Wellington's sustainable economic growth strategy

8 Appendix

Note that the totals in the tables below may differ as not all respondents answered all questions in the Census. The rows and columns may not sum to their respective totals as due to rounding and non-responses across different questions.

Appendix Table 8.1 Area populations by age (2006 Census)

Age band	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
0-9	162,537	49,980	228,387	42,873	77,775	561,552
10-14	84,825	25,371	128,229	22,797	44,781	306,003
15-19	86,649	27,480	115,065	25,872	45,114	300,180
20-24	90,630	29,700	85,689	27,600	37,338	270,957
25-39	259,947	86,367	285,600	73,674	114,882	820,470
40-64	335,286	110,892	506,472	108,423	211,737	1,272,810
65-74	57,075	18,939	118,896	22,992	47,544	265,446
75+	48,729	15,399	100,887	24,201	40,899	230,115
Total	1,125,678	**364,128**	1,569,225	348,432	620,070	4,027,533

Source: BERL, Statistics NZ

Appendix Table 8.2 Area populations by occupation (2006 Census)

Occupation	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Managers	92,367	31,326	95,319	25,287	38,934	283,260
Professionals	92,634	42,114	93,207	27,516	36,594	292,101
Technicians	78,453	27,546	78,603	23,595	31,860	240,081
Clerks	68,091	25,467	73,848	20,391	30,258	218,061
Service and Sales Workers	68,787	25,929	101,001	27,414	46,071	269,232
Primary Sector Workers	6,513	1,773	77,400	3,528	40,422	129,654
Trades Workers	42,297	13,035	68,862	15,396	28,530	168,138
Machine Operators	32,517	8,535	64,383	13,326	31,542	150,324
Labourers	30,249	8,961	47,634	12,009	23,364	122,220
Not Elsewhere Included	29,712	9,369	46,851	9,630	17,112	112,707
No occupation	298,050	86,994	422,856	98,577	161,685	1,068,285
Total	**839,670**	**281,049**	**1,169,964**	**178,092**	**486,372**	**3,054,063**

Source: BERL, Statistics NZ

Appendix Table 8.3 Area populations by income (2006 Census)

Income band	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
<=15,000	261,183	79,128	374,169	90,303	161,424	966,207
15-30.000	159,516	54,924	290,208	67,029	123,351	695,028
30-50,000	185,832	63,372	248,685	60,975	107,469	666,333
50-70,000	86,079	31,917	99,357	23,838	39,933	281,124
70-100,000	42,459	18,588	39,792	10,068	14,181	125,088
100,001+	38,919	16,782	30,891	7,878	11,052	105,522
Not specified	104,337	24,087	129,501	22,695	40,122	320,742
Total	**878,319**	**288,774**	**1,212,612**	**282,762**	**497,517**	**3,159,984**

Source: BERL, Statistics NZ

Appendix Table 8.4 Area populations by birthplace (2006 Census)

Birthplace	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Born overseas	422,625	87,558	224,904	70,443	79,485	885,147
Born in NZ	644,643	263,658	1,265,889	266,769	519,069	2,960,214
Total	**1,125,678**	**364,128**	**1,569,219**	**348,435**	**620,070**	**4,027,530**

Source: BERL, Statistics NZ

Appendix Table 8.5 Area populations by country/region of birth (2006 Census)

Country/region of birth	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Australia	17,202	5,736	23,643	5,964	10,188	62,742
Pacific Islands	96,702	14,736	16,743	4,590	3,072	135,852
UK and Ireland	72,066	25,929	95,271	22,824	35,553	251,688
EU and Nth America	30,612	11,070	30,147	9,576	13,554	95,007
Asia	160,671	21,819	36,093	21,852	10,680	251,133
Other	42,468	7,731	21,693	5,217	6,009	83,121
Total overseas born	422,625	87,558	224,904	70,443	79,485	885,147
NZ born	644,643	263,658	1,265,889	266,769	519,069	2,960,214
Total	**1,125,678**	**364,128**	**1,569,219**	**348,435**	**620,070**	**4,027,947**

Source: BERL, Statistics NZ

Appendix Table 8.6 Area populations by duration of residency in NZ (2006 Census)

Overseas born, years in NZ	Auckland City	Wellington City	Rest of the North Island	Christchurch City	Rest of the South Island	New Zealand Total
Less than 5	140,772	23,724	60,591	23,484	24,624	273,204
Between 5 and 14	128,742	18,954	45,726	17,031	15,801	226,251
15 or more	133,812	41,241	109,656	27,132	35,577	347,421
Not specified	19,290	3,642	8,931	2,796	3,483	38,271
Total	**422,625**	**87,558**	**224,904**	**70,443**	**79,485**	**885,147**

Source: BERL, Statistics NZ

Appendix Table 8.7 Wellington residents by duration of residency in NZ (2006 Census)

Country/region of birth	Overseas born, years in NZ				
	<5	5 to 15	>15	not spec	Total
Australia	1,653	1,158	2,709	213	5,736
Pacific Islands	2,370	2,877	8,199	1,293	14,736
UK and Ireland	5,022	3,429	16,821	657	25,929
EU and Nth America	3,030	2,331	5,343	369	11,070
Asia	8,232	6,201	6,504	882	21,819
Other	3,267	2,844	1,395	228	7,731
Not specified	150	114	270	0	534
Total overseas born	23,724	18,954	41,241	3,642	87,558

Country/region of birth	Overseas born, years in NZ (resident in Wgtn at Census)				
	<5	5 to 15	>15	not spec	Total
Australia	29%	20%	47%	4%	100%
Pacific Islands	16%	20%	56%	9%	100%
UK and Ireland	19%	13%	65%	3%	100%
EU and Nth America	27%	21%	48%	3%	100%
Asia	38%	28%	30%	4%	100%
Other	42%	37%	18%	3%	100%
Not specified	28%	21%	51%	0%	100%
Total overseas born	**27%**	**22%**	**47%**	**4%**	**100%**

Source: BERL, Statistics NZ

Appendix Table 8.8 Total employment and growth rates by sector (all industries, 2009)

Employment (FTEs), 2009	Wellington Urban		Wellington Region		New Zealand	
	Number	%p.a.	Number	%p.a.	Number	%p.a.
Primary	919	-0.4	4,348	3.4	153,603	2.0
Manufacturing	11,999	-3.7	14,436	-3.3	229,907	-2.5
Construction	13,829	-0.1	17,033	-1.8	148,767	-5.6
Retail and Distribution	42,526	0.5	49,778	0.9	485,329	-0.6
Business Services	56,062	0.2	59,691	0.0	357,211	-0.9
Recreation Services	16,772	-0.9	18,274	-0.3	118,633	2.1
Social Services	55,846	7.7	61,597	7.6	373,298	8.0
Total	**197,953**	**1.9**	**225,158**	**1.9**	**1,866,747**	**0.7**

Source: BERL, Statistics NZ

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