8 PROFILE

This section reviews the information available on the LGA. It provides a snapshot of key data, what it means for land use planning, and focuses on key issues relevant to the preparation of the Strategy.

The structure of this section will reflect the organisation and presentation of the Strategy. Demographic and development trends are presented, followed by land use issues relating to infrastructure and settlement structure, biodiversity and natural ecosystems, land and water, and development design.

8.1 Overview of Data Availability and Organisation

The profile provides a summary of important information necessary to underpin the project. Data for the profile has been sourced from published sources and government agencies. Collection of data has been selective, with the focus being on issues which are directly relevant to a development and land use strategy, and will inform the preparation of a future LEP. As far as possible, original data sources have been referenced. The project scope provided for desktop review of existing data and did not allow for field data collection in relation to some key issues.

Presentation of spatial data has used data layers included in the Council's geographic information system (GIS), and that of Hunter Councils.

The general approach is to aggregate information for the LGA as a whole. Some data is presented for planning areas ('districts') where there are significantly different planning issues that may need to be reflected in the strategy. These districts primarily focus on population centres and their surrounding rural areas, and in some cases may be further differentiated between urban and rural areas within the district (urban and rural 'precincts'). These planning districts and precincts are shown on Map 3.6. Analysis according to these areas shows significant variation within the Dungog LGA in demographic characteristics.

In addition, some planning precincts have been selected to identify areas of specific interest which may influence future planning policy, specifically the proposed Tillegra Dam catchment and Dungog Shire Council's Section 94 catchments. These areas may overlap with the general districts and precincts listed above, and for this reason are not compared to other precincts or regions listed within this Section.

8.2 Demographic profile

This section contains information on the population in the LGA and its characteristics, including; age distribution, income, occupation, and mobility. Australian Bureau of Statistics (ABS) data was used for the last 10 years (3 census periods) from 1996 to 2006. Comparisons are generally made with NSW as a whole and the Hunter Region. Note that the 'Hunter Region' as listed in this demographic analysis is defined in the *Australian Standard Geographical Classification* (July 2007) as the 'Hunter Statistical Division', and incorporates the Local Government Areas of Cessnock, Dungog, Gloucester, Great Lakes, Lake Macquarie, Maitland, Muswellbrook, Newcastle, Port Stephens, Singleton, and The Upper Hunter. Please note that this area differs from the 'Hunter Region' as defined by the Department of Planning, by the exclusion of Greater Taree, Wyong, and Gosford LGAs. It was not feasible to source data from the ABS that exactly matched DoP's delineation of the Hunter Region.

In some cases data is also compared with the Lower Hunter Planning Region (Newcastle Statistical Subdivision), comprising the Port Stephens, Lake Macquarie, Newcastle, Cessnock and Maitland LGAs. While the Dungog LGA is not itself a part of any formal Planning Region as defined by the Department of Planning (with the exception of the Hunter Region), it is considered useful to include data from the Lower Hunter Region as it is located in close proximity to Dungog LGA and can offer a broader context for comparison.

Information on dwellings and tenure types is presented in Section 8.7.6.1 while employment data is contained in the Employment Profile Section 8.3.

The ABS census data provides a statistically reliable estimate of population and characteristics, however there is known to be some marginal error. Some data presented here may not correspond exactly with other data published for the Dungog LGA. Important demographic characteristics in the Dungog LGA are presented in Table 6 below and are analysed in more detail in the following sections of the document.

Table 6: Dungog LGA - Summary of Important Demographic Characteristics

Characteristic	Data
Total population	8,062 at the 2006 Census.
LGA population growth	The population of the LGA increased by 404 people, or 5.3%, between 1996 and 2006.
Key characteristics of Dungog LGA 2006 population	A lower proportion of households were in the higher income bracket than the NSW average, while a higher proportion of households were in the lower income bracket. Between 1996 and 2006 the proportion of people over 65 has increased 2.2%, which is double the NSW change. In the same period, the proportion of people aged under 15 has decreased by 2.6% which is significantly higher than the NSW rate (of 1.6%). The older population is expected to increase until 2031 and the population of people under 15 is expected to decrease.
Spatial variation in population characteristics 2006	The Dungog planning district had the highest population, followed by Clarence Town, Paterson and Gresford. The rural precincts contained higher populations than their urban counterparts, excepting Dungog Urban which contained nearly double the Rural population. The precincts with the highest proportion of households in the higher income bracket were Paterson Rural, Paterson Urban and Clarence Town Rural, while the precincts with the highest proportion of households in the lower income bracket were

Characteristic	Data
	Dungog Urban, Gresford Urban and Clarence Town Urban.
Dwellings	The total number of occupied private dwellings in the LGA in 2006 was 3,059 and the dwelling occupancy rate was 2.6.
Age dependency 2001-2031	At 2006, the 'dependency ratio' of Dungog was 55, the same as the overall Hunter Region. However the ratio for Dungog is expected to increase steadily over the next 25 years to 84, surpassing the Hunter Region's ratio of 76.
Population mobility	Over 85% of the LGA's population were living at the same address 1 year prior to the 2006 Census, while 63% were at the same address in the 5 years prior to 2006.
Workforce	The total workforce was 3,459 in 2006 and has grown steadily since 2001.
Employment by industry sector	In 2006 the agriculture sector accounted for 13% of the workforce; manufacturing and construction and retail accounted for just under 9% of the workforce.
Changes in employment by industry sector 1996-2006	Employment in each industry sector was relatively stable from 1996 - 2006. The industry sector with the largest proportional workforce loss in the LGA was agriculture, forestry and fishing. The largest proportional growth occurred in the health care and social assistance sector; and the construction sector.
Unemployment	In 2006 the unemployment rate for Dungog LGA was 4.8%, falling from 8.7% in 2001. The planning precinct with the highest unemployment was Clarence Town Urban at 9.4% and Dungog Urban at 7.4%.

Sources: ABS Census Data 2006

8.2.1 Current population

At the 2006 Census, the Dungog LGA had a population of 8,062. This equates to approximately 1.4% of the Hunter Region's population of 589,239. The population was distributed across the LGA's 'planning districts and precincts' as shown in Table 7 below.

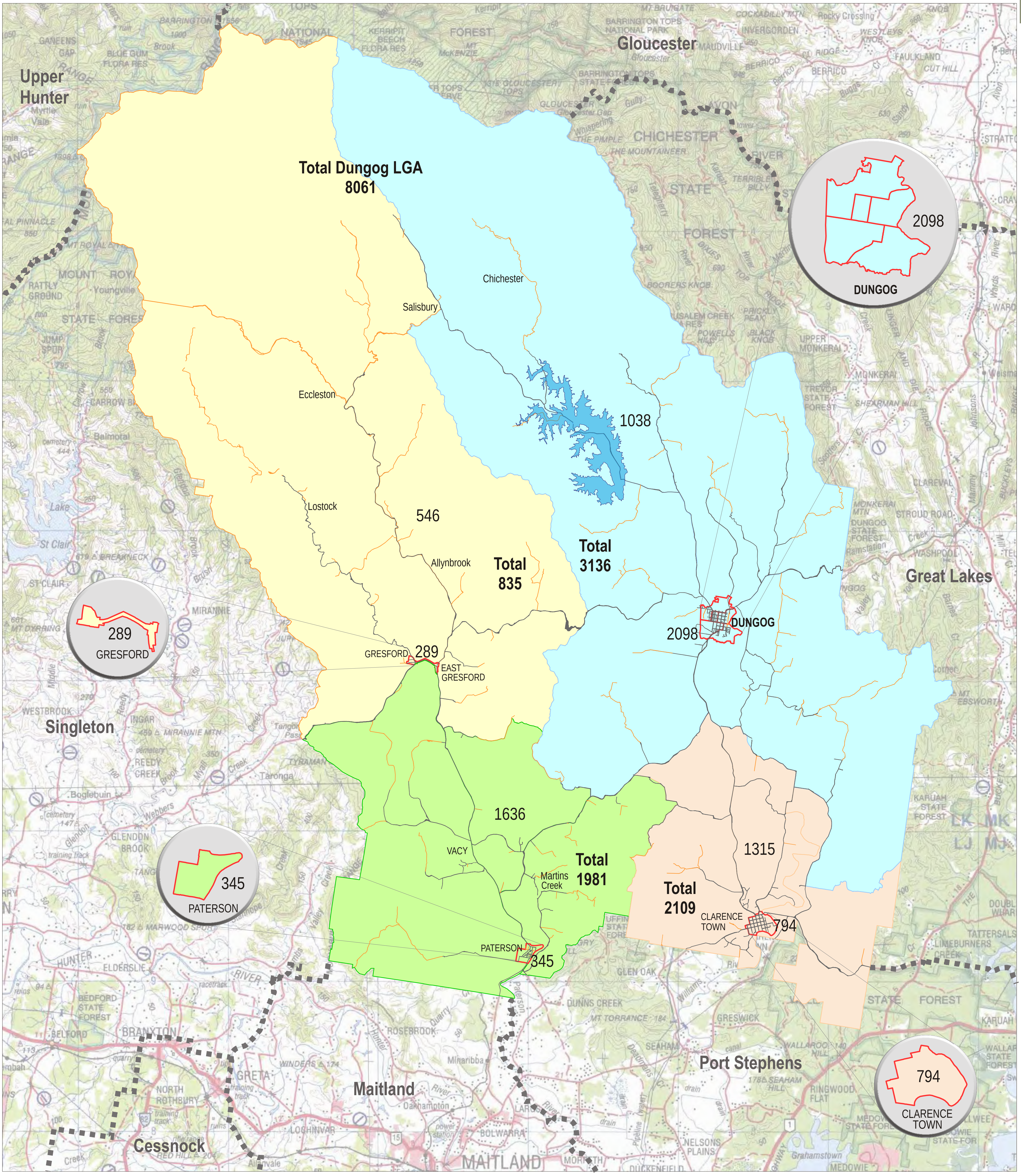
Note: The planning districts comprise the urban and rural precincts combined. Population distribution patterns are shown on Map 8.1.

Table 7: Population by Planning Precinct, 2006

Planning precincts and districts	Total persons
Gresford Urban	289
Gresford Rural	546
Gresford Planning District	835
Dungog Urban	2,098
Dungog Rural	1,038
Dungog Planning District	3,136
Paterson Urban	345
Paterson Rural	1,636
Paterson Planning District	1,981
Clarence Town Urban	794
Clarence Town Rural	1,315
Clarence Town Planning District	2,109
Total Dungog LGA	**8,061**

Source: ABS Census Data 2006

The population density (persons per km²) of the Dungog LGA is approximately 3.6 (based on a total area of 2,251 km² (See Table 1). This density is consistent with the population density rates of other rural LGA's, and contrasts with the Lower Hunter Planning Region's density of 122 persons per km², and the Hunter Region's overall density of around 18 persons per km² (calculated from data provided by Hunter Councils).



DISCLAIMER:

This map has been produced to assist individuals in determining land details within Dungog Shire Council, the information contained is made in good faith but on the basis that Council or its staff are not liable (wether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of representation, statement or advice referred to above.

Source & Copyright: Dungog Shire Council (2008) LPI(2008), DNR(2008), RFS(2008), HCED(2008)

This map has been prepared for Dungog Shire Council for the purposes of the Tillegra Dam Situation Analysis and should be read in conjunction with the report.

POPULATION DISTRIBUTION

RURAL PRECICT	URBAN	RURAL	TOTAL
GRESFORD	289	546	**835**
DUNGOG	2098	1038	**3136**
PATERSON	345	1636	**1981**
CLARENCE TOWN	794	1315	**2109**
DUNGOG LGA		TOTAL	**8061**

LEGEND

- URBAN PRECINCTS
- GRESFORD RURAL PRECINCT
- DUNGOG RURAL PRECINCT
- PATERSON RURAL PRECINCT
- CLARENCE TOWN RURAL PRECINCT
- PROPOSED TILLEGRA DAM
- ROADS - SEALED / UNSEALED

Population Distribution

8.2.2 Past Population Change

Table 8 shows the population change in the LGA at the 1996, 2001 and 2006 census counts, in comparison to the surrounding Region.

Table 8: Population Growth 1996-2006

Persons					
Region	1996	2001	2006	Population change 1996-2006	% change 1996-2006
Dungog LGA	7,658	7,875	8,062	404	5.3%
Lower Hunter Planning Region	452,519	473,474	493,467	40,948	9.0%
Hunter Region	540,491	561,522	589,239	48,748	9.0%
NSW	6,038,696	6,311,168	6,549,177	510,481	8.5%

Source: ABS Census Data 1996, 2001, 2006

Table 8 shows that the population of the LGA increased by 404 people or 5.3% from 1996 to 2006. This compares with a 9% growth rate during the same period for the Lower Hunter Planning Region (led by significant growth in the Maitland and Port Stephens LGA's of 23% and 18% respectively). There was a 9% increase for the total Hunter Region with growth in the Lower Hunter accounting for most of this. By comparison, NSW grew by 8.5%.

The table above shows population changes from 1996 to 2006. However, differing time periods show different average annual growth rates (AAG). Table 9 below shows various AAG rates for various time periods and highlights a decreasing growth rate (AAG) over various time periods for the Dungog LGA when compared with the rest of the Hunter and NSW.

Table 9: Average Annual Growth Rates

	Time period		
	1991-1996 (1)	1996-2001(1)	2001-2006(2)
Dungog LGA	0.8%	0.6%	0.4%
Hunter Region	1.0%	0.8%	1.0%
NSW	1.0%	1.1%	0.8%

Sources: 1) Base data from ABS Census 1991, 1996 and 2001. Presented by the Hunter Valley Research Foundation in 'Newcastle and Hunter Region 2005-2006'
2) Calculated from base data from ABS Census 2001 and 2006

For example, while both the Dungog LGA and the Hunter Region experienced a steady growth rate of 0.8% and 1.0% respectively between 1991-1996, growth in the Dungog LGA has since slowed (to 0.6% between 1996-2001 and to 0.4% between 2001-2006). Growth in the Hunter Region slowed in 1996-2001 to 0.8%, however recovered to an average annual increase of 1.0% in the period 2001-2006.

8.2.3 Population Projections

Trends in population growth within an LGA are a key factor underpinning development strategies and future planning policy. The following analysis uses two population projections for the Dungog LGA, derived from the NSW Government and Hunter Valley Research Foundation (HVRF).

It should be noted that population projection is based upon assumptions of future growth and base data from past trends. Each of the projection sources uses different assumptions and base data for their projections. As a generalisation, all models use the basic factors of births and deaths (the difference of which is called 'natural increase'); fertility rates of women and 'net migration' (the difference between the number of people moving into an area and out of it). Differing assumptions can include varying interpretations of, land use and development patterns, and future land use analysis.

Note: Dungog Shire Council has not produced any of it's own population projections.

8.2.3.1 NSW Government Population Projections

In 2005 the NSW Department of Planning released population projections to 2031 for the Dungog LGA, the Lower Hunter Planning Region, the Hunter Region and NSW. Table 10 below reflects these projections, based on population modelling techniques used for each LGA in the State. It shows the Dungog LGA's population increasing to 9,775 by 2031 (compared to 8,620 in 2006), while the Lower Hunter Planning Region's population steadily increases from 492,549 in 2001 to 610,240 in 2031. The Hunter Region's population is expected to increase from 588,820 in 2001 to 731,212 in 2031.

Table 10: Projected population by NSW Government, 2001 to 2031

Region	2001	2006	2011	2016	2021	2026	2031
Dungog LGA	8,405	8,620	8,848	9,085	9,330	9,567	9,775
Lower Hunter Planning Region	492,549	513,616	534,978	555,267	574,971	593,593	610,240
Hunter Region	588,820	613,953	639,436	663,930	687,937	710,739	731,212

Source: Department of Planning, Transport and Population Data Centre. Projected Population by Sex, SLAs in NSW 2001-2031, 2005 release, Detailed Data Version 1.1, (2001 data estimated by TPDC from Australian Bureau of Statistics, Population by Age and Sex, New South Wales - Electronic Delivery, ABS Catalogue No. 3235.1.55.001)

Based on this projection, the average population increase in Dungog LGA over a 25 year period is approximately 47 people per year. Many factors can influence population growth including; availability of residential land; improvements to roads and public transport; the local attraction of a new industry or development; and increasing land prices in adjoining communities. It should be noted that the actual population on census night 2006 was measured at 8,061, being 570 residents less than the NSW Governments projection (produced in 2005).

Table 11 below shows the expected *average annual population growth rate* until 2031, projected in percentage terms. This Table shows that Dungog LGA is expected to continue having positive growth until 2031. Growth rates in the Lower Hunter Planning Region and the Hunter Region are also expected to remain positive during that time. It is important to note that the actual numbers as opposed to percentages for Dungog LGA are relatively small given the original small population base.

Table 11: Projected average annual population growth rate by NSW Government, 2001- 2031

Region	2001-06	2006-11	2011-16	2016-21	2021-26	2026-31
Dungog LGA	0.51%	0.52%	0.53%	0.53%	0.50%	0.43%
Lower Hunter Planning Region	0.84%	0.82%	0.75%	0.70%	0.64%	0.55%
Total Hunter Region	**0.84%**	**0.82%**	**0.75%**	**0.71%**	**0.65%**	**0.57%**

Source: Department of Planning, Transport and Population Data Centre. Projected Annual Average Population Growth Rate, SLAs in NSW 2001-2031, 2005 release, Detailed Data Version 1.1, (2001 data estimated by TPDC from Australian Bureau of Statistics, Population by Age and Sex, New South Wales - Electronic Delivery, ABS Catalogue No. 3235.1.55.001)

8.2.3.2 Hunter Valley Research Foundation Population Projections

The Hunter Valley Research Foundation (HVRF) provides a range of population, economic and social statistics, research and modelling for the Hunter Region. In the 2006 report '*Newcastle and the Hunter Region 2005-2006*' the Foundation gives 'medium growth' projections for each of the LGA's within the Hunter to 2026. The assumptions behind this population projection model are given at page 45 of that document.

The HVRF's projection for the Dungog LGA, the Lower Hunter Planning Region and the Hunter are given in Table 12 below, and show that over a 20 year period the HVRF expects that the Dungog LGA's population will increase from 7,994 to 8,443. This is an increase of 449 people, or 5.6% over the 20 year period.

Table 12: Hunter Valley Research Foundation 'Medium Growth' Population Projections 2006- 2026

Region	2006	2011	2016	2021	2026
Dungog LGA	7,994	8,083	8,184	8,308	8,443
Lower Hunter Planning Region	495,464	521,173	546,254	571,405	596,794
Total Hunter Region	**591,297**	**620,122**	**648,564**	**677,312**	**706,338**

Source: Hunter Valley Research Foundation, 2006

8.2.3.3 Implications of population projections

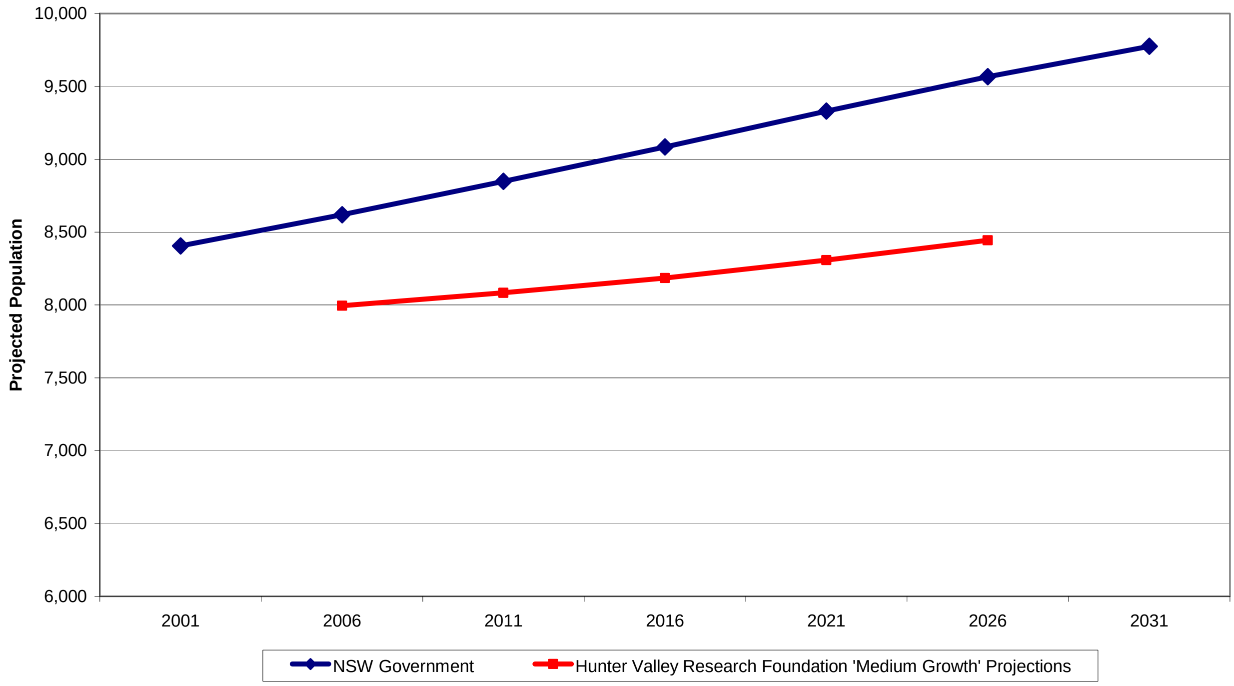


Figure 1: Comparison of population projections- Dungog LGA

The graph above shows that the NSW Government and HVRF predict different populations for the Dungog LGA. By 2026, the HVRF predicts that there will be 8,443 people in the Dungog LGA, 1,124 people less than the NSW Government's prediction of 9,567.

In the 2008 document '*Dungog Shire Council and the Tillegra Dam Project: Economic Profile, Dynamics and Potential Impacts Paper*' developed by HVRF (refer to Appendix 2), population growth is raised as an issue of concern. While the 2006 HVRF projections shown in the previous section indicate a small amount of future growth, in this new document HVRF note that actual growth is relatively static and has been for the past five years. In order to address the issue of static population growth, land use strategies need to address the issues influencing the attraction or determent for residents in the Dungog LGA.

Issues to be considered in the Strategy with regard to population growth include:

- Urban land availability.
- Accessibility to transport, local services and amenities. Commuter patterns and petrol prices have a significant influence on the distribution of population. Rising petrol prices are likely to influence the distribution of population through the desire of residents to live closer to the services they use most frequently. The current higher fuel price trend is likely to continue.
- The potential to attract new local employment opportunities with a possible shift in emphasis from agriculture to other industries.
- Rising interest rates and property affordability influence the distribution of population. Increasing housing prices in the Lower Hunter could increase pressure on communities in the southern portion of the Dungog LGA.

8.2.4 Age structure

The age structure of the Dungog LGA, derived from the ABS Census 2006, is shown in Figure 2 below. The number of males (on the left) and females (on the right) is given for each 5 year age bracket.

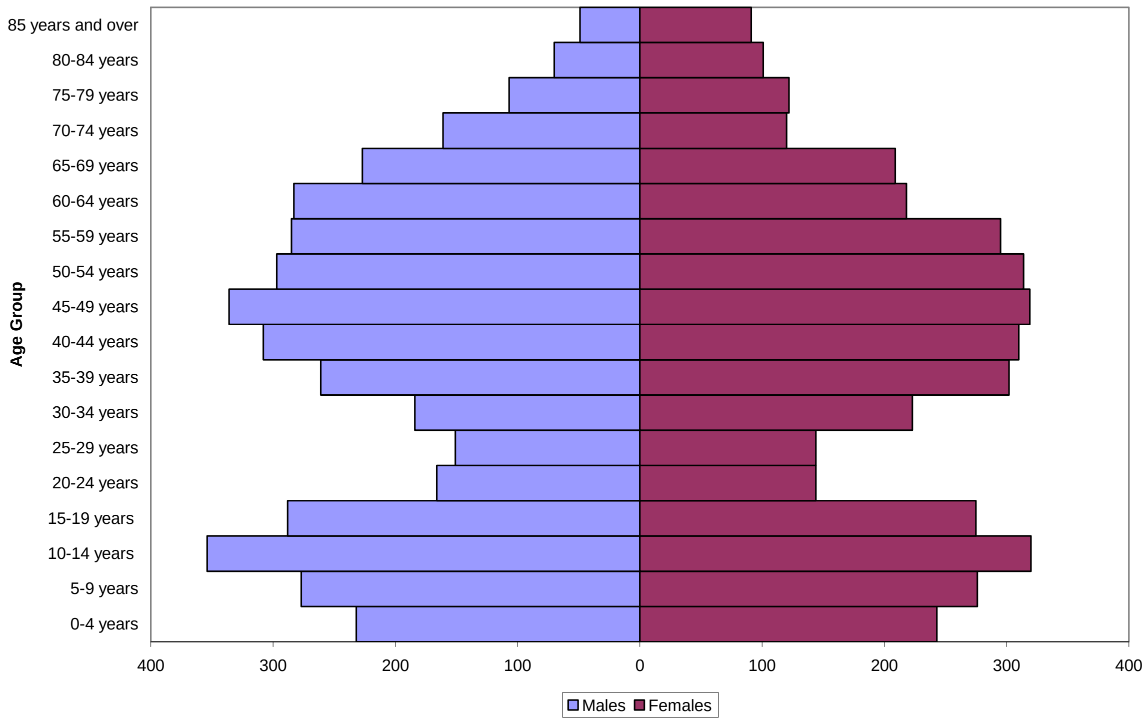


Figure 2: Age structure of the Dungog LGA- population pyramid

Figure 2 shows a relatively 'typical' rural age pyramid, with a high proportion of young children and corresponding proportions of middle aged people. The pyramid indicates a decrease in the number of people in their 20's and a progressive decrease in the number of people aged over 65 years.

An age pyramid for each of the planning precincts at 2006 is included at Appendix 3.

Some of the highlights from the planning precinct age pyramids for 2006 are:

- Dungog Urban has a high proportion of people aged under 20, particularly boys aged 10-14. In line with Australian trends there are a slightly higher number of females than males in the over 75 age brackets.

- Dungog Rural shows a high proportion of females aged 10-14 and 55-59 years. Paterson Rural has a high proportion of people aged under 20, with a corresponding bulge in the age pyramid of people aged 40-64 years. Clarence Town Urban shows similar trends.

- Paterson Urban has the highest proportion of females aged 35-44 years, and males aged 45-54 years.

- Gresford Urban has a small population, however there are some notable absences from some age groups: there are no females aged between 25-29 and 35-39 years, and no males aged between 80 and 84. There are also very low populations of males aged 20-24 and 35-39, and females aged 5-9, 15-19 and 30-34.

- Clarence Town Rural has a high proportion of people under 20, particularly boys aged 15-19.

- All rural precincts tend to show a relatively smaller proportion of people aged 20- 30 years.

Table 13 below compares the percentage of people in each age bracket in the Dungog LGA in 2006, with the corresponding percentages from the Hunter Region and NSW.

Table 13: Age Distribution, 2006

	Persons	% of population		
Age	Dungog LGA	Dungog LGA	Hunter Region	NSW
0-4	475	5.9%	6.2%	6.4%
5-9	553	6.9%	6.6%	6.6%
10-14	674	8.4%	7.0%	6.8%
15-19	563	7.0%	6.8%	6.7%
20-24	310	3.8%	6.2%	6.6%
25-29	295	3.7%	5.5%	6.5%
30-34	407	5.0%	6.2%	7.1%
35-39	563	7.0%	6.7%	7.2%
40-44	618	7.7%	7.0%	7.4%
45-49	655	8.1%	7.2%	7.3%
50-54	611	7.6%	6.7%	6.6%
55-59	580	7.2%	6.4%	6.1%
60-64	501	6.2%	5.4%	4.8%
65-69	436	5.4%	4.4%	3.9%
70-74	281	3.5%	3.7%	3.2%
75-79	229	2.8%	3.4%	2.9%
80-84	171	2.1%	2.5%	2.1%
85 and over	140	1.7%	1.9%	1.7%
Total persons	**8,062**	**-**	**589,240**	**6,549,177**

Source: ABS Census Data 2006

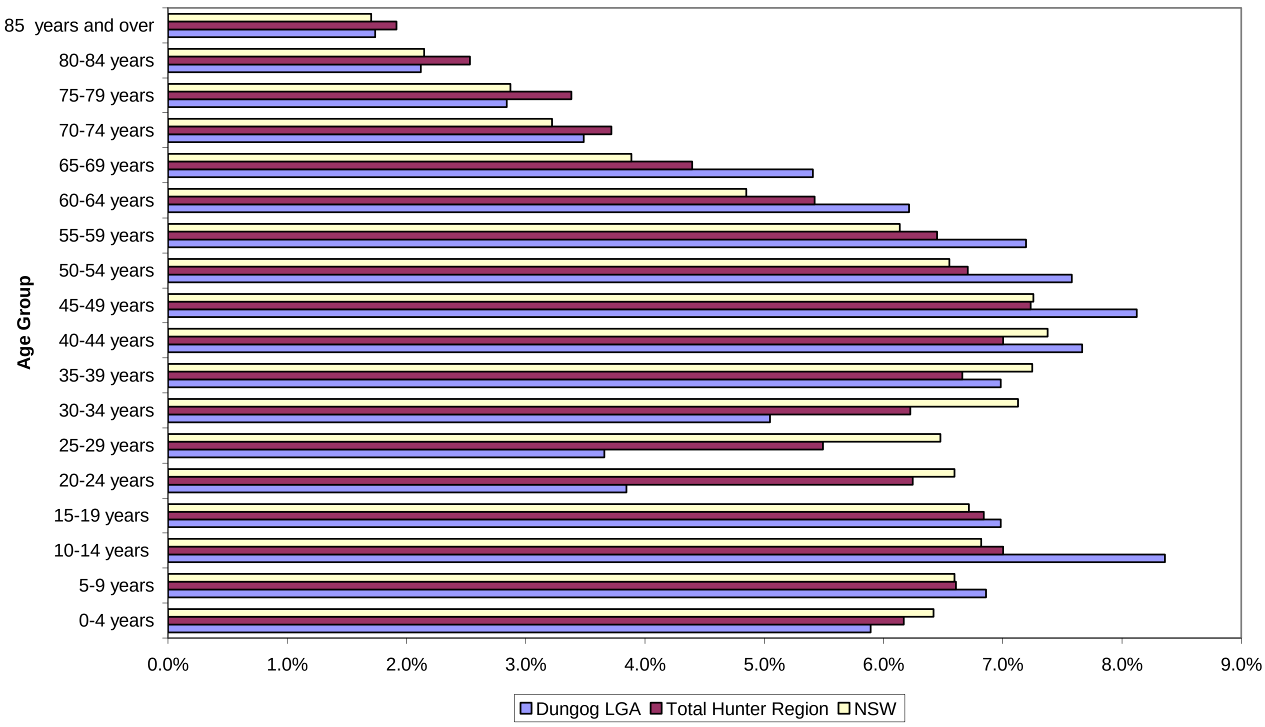


Figure 3: Age Distribution, 2006

Figure 3 shows that the Dungog LGA has proportionally more children aged between 5 and 9, and in particular aged between 10 and 14, than the Hunter Region or NSW. The Dungog LGA then shows a decrease in people aged between 20 and 34 compared to the other regions. There are proportionally more people aged from 35 to 69 in the LGA, and less people aged over 65. This pattern points to a future 'bulge' in the ageing of the population, as the people now aged in their 40s, 50s and 60s move into the older age brackets. It is predicted that by the year 2031 over 30% of the population will be aged over 65.

Considering the above the following issues become important in the development of land use strategies for the LGA.

- The loss of young people from the LGA leaks vibrancy, creativity and economic potential. There is a need to stimulate local employment and educational opportunities in an attempt to keep or attract young people in the community.
- Given the predicted dependency ratio increases, the community will need to retain as many wage earning residents as possible to maintain community affluence.

8.2.4.1 Median age

Table 14 shows the median age of people living within the Dungog LGA, Hunter Region and NSW at the 1996, 2001 and 2006 Census.

Table 14: Median Age 1996 – 2006

Region	1996	2001	2006	Change 1996-2006 (years)
Dungog LGA	36	39	41	5
Lower Hunter Planning Region	34	37	38	4
Hunter Region	35	37	39	4
NSW	34	35	37	3

Source: ABS Census Data 1996, 2001, 2006

The median age of people living within the Dungog LGA has increased by 5 years between 1996 and 2006. In 1996, 2001 and 2006 the median age within the Dungog LGA was higher than the Hunter Region and NSW, by between 1 and 4 years. It should be noted that both the Lower Hunter and Hunter Regions have also experienced an increase in the median age of 3 to 4 years since 1996.

Given the increasing median age of residents, there are significant implications for the provision of housing and health services into the future. The current NSW Government policy trend is to encourage people to live independently within their own home environment for as long as possible, by providing additional support services. If housing for older people is provided in clusters this becomes a more practical and financially viable way to provide support services to those in need.

Investigation should be considered to identify land suitable for the development of housing for older people in accessible urban centres, where facilities and services are available.

8.2.4.2 People aged 65 and over

Table 15 shows the change in the percentage of persons aged 65 and over in the Dungog LGA from 1996 to 2006.

Table 15: Change in percentage of persons aged 65 and over 1996 – 2006

Region	1996	2001	2006	% change 1996-2006
Dungog LGA	13.4%	13.8%	15.6%	2.2%
Lower Hunter Planning Region	14.2%	14.8%	15.6%	1.4%
Hunter Region	14.3%	15.0%	15.9%	1.6%
NSW	12.7%	13.1%	13.8%	1.1%

Source: ABS Census Time Series Data 2006, and Census data 1996, 2001, and 2006

The percentage of people in the LGA aged 65 years and over increased 2.2% to 15.6% of the population from 1996 to 2006. This change is double that of NSW at 1.1%, and significantly higher than the Lower Hunter Planning Region's at 1.4%, and the Hunter Region's at 1.6%. The actual percentage of the population aged over 65 years in 2006 in the Dungog LGA was 15.6%, slightly lower than the Hunter Region's at 15.9%, and higher than that of NSW at 13.8%.

Table 16 below shows the NSW State Government's projections for the percentage of population over the age of 65 in the Dungog LGA through to 2031.

Table 16: Projected Population Aged 65 years and over as a % of Total Population, 2001-2031

Region	2001	2006	2011	2016	2021	2026	2031
Dungog LGA	14%	16%	19%	22%	26%	29%	32%
Hunter Region	15%	16%	18%	20%	23%	26%	28%
NSW	13%	14%	15%	16%	18%	20%	22%

Source: Department of Infrastructure, Planning and Natural Resources, Transport and Population Data Centre. Projected Population Aged 65 Years or Over, 2001- 2031, 2005 Release - Detailed Data Version 1.11. (2001 data from ABS, *Population by Age and Sex, NSW*)

It is predicted that by 2031 almost a third of the population will be aged over 65. This proportion is higher than that for the Hunter Region (at 28%), and significantly higher than the projection for NSW (at 22%). These projections have critical implications for the provision of aged care housing and services in the LGA and wider Region.

Currently there is one Aged Care Facility in the Dungog Township with 63 beds. There are also two locations providing self care units.

The Survey of Disability Ageing and Carers (SDAC) conducted by the ABS in 2003 (ABS 2004b) found 43% of people aged over 65 in Australia and living in households expressed a need for some form of assistance to help them maintain their independence. Areas of highest need were property maintenance, transport, housework, healthcare and mobility followed by self care, meal preparation, paperwork, cognition and communication. Of the 43% requiring assistance, 83% received it from informal sources and 64% from formal providers.

If the above percentages are applied to the Dungog LGA based on the 2006 ABS, there are 1,277 people over the age of 65 years. Of these, 43% require some level of formal assistance and of these 64% get that assistance from formal sources. This equates to approximately 300 people in the Dungog LGA aged over 65 years who still require some form of formal assistance.

The Australian Government uses the formula of 88 residential aged care places per 1,000 persons aged 70 and over. Of these 72% are women, of whom 87% are over 75 years, and 53% are aged over 85 years. Based on the 2006 census figures Dungog LGA has a population of 841 persons aged over 70 years and current provision of residential aged care is 62 beds.

The supply of housing and services for older people is a major consideration for land use strategies into the future. With the ageing of the population into the future efficiency in the delivery of housing and services will become crucial.

8.2.4.3 People aged under 15 years

Table 17 below shows the change in percentage of persons aged less than 15 years from 1996 to 2006.

Table 17: Change in % of persons aged under 15 years 1996 – 2006

Region	1996	2001	2006	% change 1996-2006
Dungog LGA	23.7%	22.8%	21.1%	-2.6%
Lower Hunter Planning Region	21.6%	20.9%	19.6%	-2.0%
Hunter Region	21.8%	21.0%	19.8%	-2.0%
NSW	21.4%	20.7%	19.8%	-1.6%

Source: ABS 2006 Census Time Series Data, 1996, 2001, 2006 census data

The percentage of people aged less than 15 years in the LGA has decreased by 2.6% during 1996 to 2006, which is more than double the decrease in the Hunter Region and NSW (–1.3%). Despite these decreases, in 2006 the percentage of people aged under 15 years (21.1%) remains higher than that of the Lower Hunter (19.6%) or the Hunter (19.8%).

The decrease in the percentage of people aged less than 15 years coincides with the increase in the percentage of people aged over 65, which reinforces the ageing population trend.

Table 18 below shows the NSW State Government's projections for the percentage of the population aged under 15 years in the Dungog LGA, until 2031. By 2031, the NSW Government predicts that 14% of the LGA's population will be aged under 15. This is similar to the projections for NSW (16%) and the Hunter's expected 15%. These projections again reinforce the ageing population trends.

Table 18: Projected population aged 0-14 as a % of total population, 2001 – 2031

Region	2001	2006	2011	2016	2021	2026	2031
Dungog LGA	22%	20%	17%	16%	15%	14%	14%
Hunter Region	21%	19%	18%	17%	16%	15%	15%
NSW	20%	19%	18%	17%	17%	16%	16%

Source: Department of Infrastructure, Planning and Natural Resources, Transport and Population Data Centre. Projected Population Aged 0-14 Years, 2001- 2031, 2005 Release - Detailed Data Version 1.11. (2001 data from ABS, *Population by Age and Sex, NSW*)

If the projected figures, Table 18 above, are realised there will ultimately be less demand for children's services and higher demand for support services for older people.

The attraction and/or retention of young people into the LGA is an important issue for consideration within land use strategies. Local employment opportunities and access to educational and recreational opportunities are attractors for young people.

8.2.4.4 Age Dependency

The 'age dependency ratio' is a calculation of the number of persons aged under 15 years or over 65 years, per 100 people aged 15 to 64 years. It essentially describes the 'dependency' factor of the young and old on the working age population.

Table 19 and Figure 4 below show the NSW Government's expected dependency ratio to 2031.

Table 19: Dependency ratio, (persons aged 0-14 or 65+ per 100 people aged 15-64) 2001 – 2031

Region	2001	2006	2011	2016	2021	2026	2031
Dungog LGA	56	55	56	61	68	77	84
Hunter Region	55	55	55	59	64	70	76
NSW	50	49	49	51	53	57	61

Source: Department of Infrastructure, Planning and Natural Resources, Transport and Population Data Centre. Projected Dependency Ratio (people aged 0-14 or 65+ per 100 people aged 15-64), 2001- 2031, 2005 Release- Detailed Data Version 1.11. (2001 data from ABS, *Population by Age and Sex, NSW*)

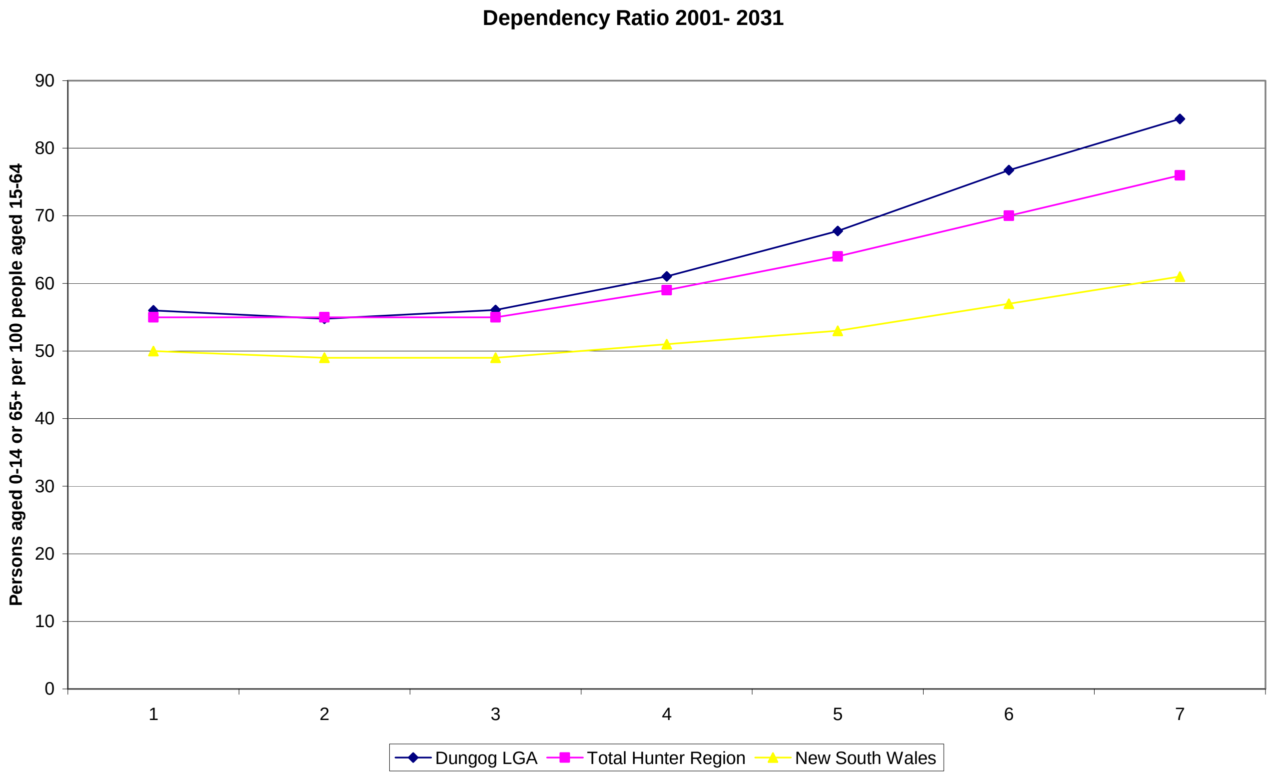


Figure 4: Dependency ratio 2001 – 2031

The table and accompanying graph show that in 2001, Dungog LGA had a dependency ratio of 56, which was similar to the Hunter Region's ratio of 55 and slightly more than NSW at 50. A ratio of 50 means that there are half the number of young and old as there are working age population (or in other words, there is one young or old person for every two working aged people).

In the Dungog LGA, this ratio is expected to remain relatively stable until 2016, when the ratio is likely to steadily increase until 2031, reaching 84. If the ratio reaches 100, there will be as many young and old people as there are working aged people (for every one young or older person there is one working person). It should be noted that Dungog LGA has a rapidly ageing population and the predicted dependency ratio is both higher and faster than NSW. NSW's dependency ratio is predicted to be 61 in 2031, and the Hunter Region's is predicted to be 76 by 2031. In order to maintain its current economic position the increase/retention of people of working age is an important goal for the LGA.

8.2.5 Household Access to Motor Vehicles and Journeys to Work

The dominant method of travel to work within the Dungog LGA is by car (for at least one part of the journey), with 86.2% of people travelling as either the driver or passenger in 2006 (2006 Census data).

ABS Census statistics in 2006 showed that approximately 95% of the Dungog LGA's households had at least one vehicle counted at their house on Census night (not including households where number of vehicles was not stated), while the corresponding figures for the Lower Hunter Planning Region, Hunter Region and NSW were 90%, 90% and 88% respectively. In contrast, only 5% of the LGA's households had no motor vehicles, compared with 10% for the Lower Hunter Planning Region, 10% in the Hunter Region and 12% in NSW.

These figures correspond with the patterns of car usage and low level of public transport provision that are expected in regional and rural areas compared with the larger metropolitan centres.

A proportion of LGA residents commute significant distances to work. Journey to work data for 2001 presented by the Hunter Valley Research Foundation (2006: 337-8) shows the following:

- Over 51% of working LGA residents worked within the Dungog LGA.
- Newcastle was the highest Hunter LGA of employment outside of Dungog LGA, at 10.6%, while the Maitland LGA accommodated 9.7% of Dungog LGA workers.
- 13.1% of working Dungog LGA residents travelled outside of the Hunter Region for work.

Employment statistics indicate that while a large percentage of people are still employed within the LGA, over the last 5 years this figure has decreased annually by 4.6%. This contrasts with actual employment for Dungog LGA residents (working either within or outside the Dungog LGA) which has risen by 2.7% annually over the corresponding period. Both travel and employment data indicate that while many people are still living and working within the LGA there is a growing trend to live within the LGA and be employed outside the LGA, with Dungog becoming more of a 'dormitory suburb' of the Lower Hunter.

With more people commuting out of the LGA for work, fuel costs and road conditions are an ever increasing issue. Reducing car movements is a major focus of Ecological Sustainability. Land use strategies need to consider opportunities to promote the use of and increase access to public transport.

8.2.6 Population Mobility (Changes of Address)

Population mobility refers to whether people have changed addresses (i.e. moved), and indicates whether people stay in one location or move around. Note that for the purposes of this data, if someone has moved, it could either be a short distance to another address within the same area, or a move out of the LGA.

Population mobility is shown in Table 20 and Table 21 below.

Table 20: Address 1 Year Ago

	Dungog LGA		Hunter Region		NSW	
	No. of people	% of total	No of people	% of total	No of people	% of total
Same address 1 year ago	6,757	84.7%	471,510	81.0%	5,139,825	79.5%
Different address 1 year ago						
Within same LGA	346	4.3%	36,832	6.3%	377,211	5.8%
NSW	400	5.0%	37,366	6.4%	388,562	6.0%
VIC	5	0.1%	890	0.2%	16,641	0.3%
QLD	33	0.4%	2,490	0.4%	25,654	0.4%
SA	0	0.0%	375	0.1%	3,981	0.1%
WA	6	0.1%	531	0.1%	5,161	0.1%
TAS	0	0.0%	173	0.0%	1,760	0.0%
NT	5	0.1%	421	0.1%	2,376	0.0%
ACT	0	0.0%	329	0.1%	7,865	0.1%
Other Territories	0	0.0%	5	0.0%	75	0.0%
Overseas	18	0.2%	3,318	0.6%	88,560	1.4%
Not stated or visitors*	404	5.1%	27,688	4.8%	404,335	6.3%
Total	**7,974**	**100%**	**581,908**	**100%**	**6,462,006**	**100%**

Source: ABS Census 2006

* Includes persons who stated that they were usually resident at a different address 1 year ago but did not state that address, and persons who did not state whether they were usually resident at a different address 1 year ago. NB: Excludes persons less than 1 year of age

Table 21: Address 5 Years Ago

	Dungog LGA		Hunter Region		NSW	
	No. of people	% of total	No of people	% of total	No of people	% of total
Same address 5 years ago	4,756	62.7%	313,870	56.8%	3,369,032	55.0%
Different address 5 years ago						
Within same LGA	830	10.9%	80,032	14.5%	798,806	13.0%
NSW	1,360	17.9%	103,706	18.8%	1,056,840	17.2%
VIC	15	0.2%	2,358	0.4%	43,970	0.7%
QLD	58	0.8%	5,940	1.1%	60,134	1.0%
SA	3	0.0%	938	0.2%	11,418	0.2%
WA	10	0.1%	1,446	0.3%	13,900	0.2%
TAS	3	0.0%	464	0.1%	4,779	0.1%
NT	0	0.0%	996	0.2%	5,466	0.1%
ACT	0	0.0%	1,133	0.2%	22,710	0.4%
Other Territories	0	0.0%	6	0.0%	158	0.0%
Overseas	43	0.6%	8,405	1.5%	277,961	4.5%
Not stated or visitors*	509	6.7%	33,587	6.1%	463,572	7.6%
Total	**7,587**	**100%**	**552,881**	**100%**	**6,128,746**	**100%**

Source: ABS Census 2006

* Includes persons who stated that they were usually resident at a different address 1 year ago but did not state that address, and persons who did not state whether they were usually resident at a different address 1 year ago. NB: Excludes persons less than 5 years of age

Table 20 shows that in the one year prior to the 2006 Census, 4% of the Dungog LGA's population had moved within the LGA. This percentage is lower than the proportion of people moving within a single LGA throughout the Hunter Region (at 6.3%) and NSW (at 5.8%). In the 5 years prior to the 2006 Census, 11% of Dungog LGA's population had moved within the LGA, which is still a slightly lower proportion than the Hunter Region and NSW. Conversely, a higher proportion of Dungog LGA's population did not change address in the 1 and 5 years prior to 2006 (at 84.7% and 62.7%) than the Hunter Region (81% and 56.8%) and NSW (at 79.5% and 55%).

Where Dungog LGA residents had a different address 1 and 5 years prior to the Census, these people tended to originate from other areas of NSW. The Hunter Region and NSW show similar trends.

8.2.7 Country of Birth

Only a small proportion of the population in the LGA was born overseas, with the vast majority of those people from English speaking backgrounds.

According to the ABS Census 2006, 7,157 people (89%) living in the Dungog LGA stated that they were Australian born.

8.2.8 People of Indigenous Origin

The number of people who identified as being of indigenous origin within the LGA at the ABS Census 2006 was 174 or 2.2% of the LGA's population. This is comparable with the average indigenous population across NSW.

8.2.9 Social and Economic Indicators of the Population

Data concerned with a variety of issues, compiled from the Census and other sources, can help to indicate the social and economic prosperity of an area. Some of these issues are discussed below, including income, educational level and social indexes. An additional report related to the Dungog LGA's economic situation, titled '*Economic Profile, Dynamics and Potential Impacts Paper*', (HVRF, 2008) is attached at Appendix 2.

A separate '*Dungog Social Issues Paper*' was prepared by jms.services and is attached at Appendix 4. This paper examined social issues across the LGA, identified through community consultation; review of Dungog Shire Council's Community Profile and Community and Social Plan; and an analysis of demographic data. The proposed development of Tillegra Dam was also taken into consideration.

A tourism related report, '*Tillegra Dam- Assessment of Recreation and Tourism Potential*' was prepared by Jenny Rand and Associates in 2008, and is primarily concerned with potential tourism influences from the proposed Tillegra Dam. The Assessment is attached at Appendix 5.

Table 22 and Figure 5 below show the distribution of weekly household income for the Dungog LGA, the Lower Hunter Planning Region, Hunter Region and NSW.

Table 22: Weekly Household Income, 2006

	Dungog LGA		Lower Hunter Planning Region	Hunter Region	NSW
	No of households	% of total households	% of total households	% of total households	% of total households
Negative/Nil income	32	1.1%	0.7%	0.8%	1.2%
$1-$149	62	2.1%	1.3%	1.4%	1.5%
$150-$249	183	6.3%	6.1%	6.1%	5.2%
$250-$349	214	7.3%	8.8%	8.7%	7.0%
$350-$499	215	7.4%	6.7%	6.9%	5.2%
$500-$649	315	10.8%	11.3%	11.5%	10.0%
$650-$799	202	6.9%	6.2%	6.2%	6.0%
$800-$999	196	6.7%	6.7%	6.7%	6.5%
$1,000-$1,199	351	12.0%	10.1%	10.1%	10.0%
$1,200-$1,399	159	5.4%	5.3%	5.2%	5.1%
$1,400-$1,699	204	7.0%	7.3%	7.1%	7.2%
$1,700-$1,999	163	5.6%	5.8%	5.7%	5.9%
$2,000-$2,499	139	4.8%	5.5%	5.4%	6.0%
$2,500 -$2,999	75	2.6%	4.1%	4.1%	6.0%
$3,000 or more	77	2.6%	3.1%	3.2%	6.0%
Partial income stated(a)	255	8.7%	7.9%	7.8%	8.3%
All incomes not stated(b)	77	2.6%	3.0%	3.0%	2.9%
Total	**2,919**	**100%**	**100%**	**100%**	**100%**

Source: ABS Census Data 2006

(a) Comprises households where at least one, but not all, member(s) aged 15 years and over did not state an income and/or was temporarily absent on Census Night.
(b) Comprises households where no members present stated an income.

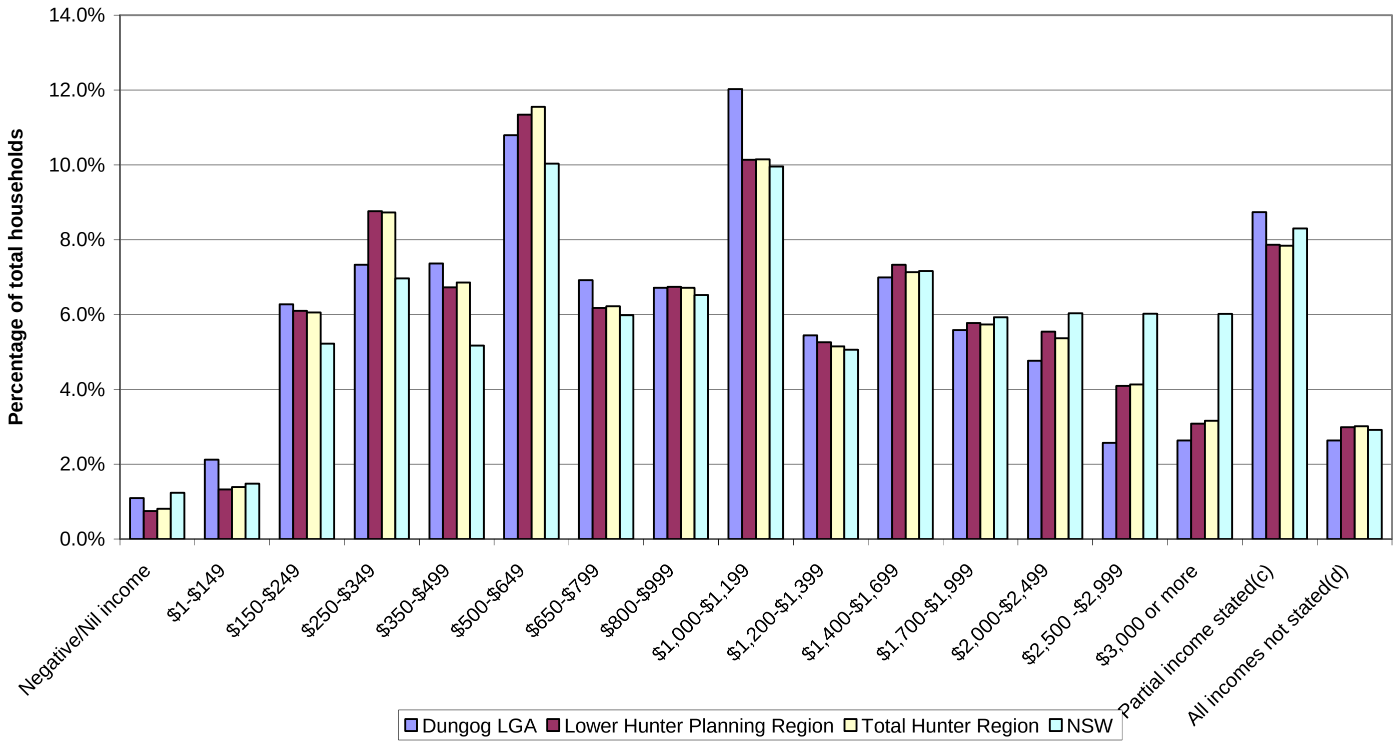


Figure 5: Weekly Household Income, 2006

Table 22 and the accompanying Figure 5 suggest that income levels were lower in Dungog LGA for those working in the LGA than the State average. Those employed within Dungog LGA had a higher representation for all income brackets below $600 per week and a lower representation for those earning more than $600 per week. The highest proportion of households in Dungog LGA earned between $1,000 and $1,199, with the next highest group earning $500 - $649. A relatively smaller proportion of households, earned over $1,700 than the Hunter or the rest of the State.

Table 23 below shows the distribution of weekly household income for each planning precinct and district, while Table 24 and Table 25 shows the proportion of higher and lower income households in the planning areas within the LGA. Note that figures for Gresford Rural precinct did not include data from all households (excludes Census Collection District 201) as the population was too small for statistical analysis. This may cause slight inaccuracies when figures are totalled.

Table 23: Weekly Household Income, 2006 by Planning District

	Gresford Urban		Gresford Rural*		Gresford Planning District		Dungog Urban		Dungog Rural		Dungog Planning District	
	No of households	% of total households	No of households	% of total households	No of households	% of total households	No of households	% of total households	No of households	% of total households	No of households	% of total households
Negative/Nil income	0	0%	0	0%	0	0%	8	1%	5	1%	13	1%
$1-$149	5	5%	0	0%	5	2%	13	2%	10	3%	23	2%
$150-$249	16	15%	13	8%	29	11%	78	9%	24	7%	102	8%
$250-$349	5	5%	0	0%	5	2%	94	11%	26	7%	120	10%
$350-$499	4	4%	19	12%	23	8%	78	9%	14	4%	92	8%
$500-$649	19	17%	10	6%	29	11%	117	14%	39	11%	156	13%
$650-$799	13	12%	15	9%	28	10%	75	9%	27	7%	102	8%
$800-$999	9	8%	13	8%	22	8%	45	5%	23	6%	68	6%
$1,000-$1,199	11	10%	19	12%	30	11%	94	11%	52	14%	146	12%
$1,200-$1,399	0	0%	4	2%	4	1%	38	4%	21	6%	59	5%
$1,400-$1,699	4	4%	14	9%	18	7%	55	6%	26	7%	81	7%
$1,700-$1,999	4	4%	11	7%	15	5%	39	5%	15	4%	54	4%
$2,000-$2,499	4	4%	8	5%	12	4%	19	2%	17	5%	36	3%
$2,500-$2,999	0	0%	6	4%	6	2%	4	0%	7	2%	11	1%
$3,000 +	0	0%	8	5%	8	3%	3	0%	14	4%	17	1%
Partial income stated(c)	11	10%	19	12%	30	11%	67	8%	39	11%	106	9%
All incomes not stated(d)	4	4%	5	3%	9	3%	28	3%	6	2%	34	3%
Total	**109**	**100%**	**164**	**100%**	**273**	**100%**	**855**	**100%**	**365**	**100%**	**1220**	**100%**

* Gresford Rural precinct does not include data from Census Collection District 201 as the population is too small for statistical analysis.

Table 23: Continued

	Paterson Urban		Paterson Rural		Paterson Planning District		Clarence Town Urban		Clarence Town Rural		Clarence Town Planning District	
	No of households	% of total households	No of households	% of total households	No of households	% of total households	No of households	% of total households	No of households	% of total households	No of households	% of total households
Negative/Nil income	0	0%	3	1%	3	0%	0	0%	4	1%	4	1%
$1-$149	6	5%	19	3%	25	4%	6	2%	3	1%	9	1%
$150-$249	8	6%	20	4%	28	4%	18	6%	18	4%	36	5%
$250-$349	5	4%	24	4%	29	4%	28	10%	20	5%	48	7%
$350-$499	7	5%	37	7%	44	6%	28	10%	27	6%	55	8%
$500-$649	11	9%	44	8%	55	8%	26	9%	47	11%	73	10%
$650-$799	14	11%	35	6%	49	7%	21	7%	24	6%	45	6%
$800-$999	5	4%	39	7%	44	6%	21	7%	26	6%	47	7%
$1,000-$1,199	13	10%	64	12%	77	11%	40	14%	59	14%	99	14%
$1,200-$1,399	8	6%	27	5%	35	5%	23	8%	32	7%	55	8%
$1,400-$1,699	7	5%	42	8%	49	7%	29	10%	49	11%	78	11%
$1,700-$1,999	9	7%	43	8%	52	8%	10	3%	35	8%	45	6%
$2,000-$2,499	15	12%	37	7%	52	8%	9	3%	19	4%	28	4%
$2,500-$2,999	0	0%	25	5%	25	4%	7	2%	16	4%	23	3%
$3,000 +	3	2%	25	5%	28	4%	0	0%	14	3%	14	2%
Partial income stated(c)	12	9%	50	9%	62	9%	20	7%	34	8%	54	8%
All incomes not stated(d)	5	4%	18	3%	23	3%	0	0%	4	1%	4	1%
Total	**128**	**100%**	**552**	**100%**	**680**	**100%**	**286**	**100%**	**431**	**100%**	**717**	**100%**

Table 23: Continued

	Total Dungog LGA		NSW	
	No of households	% of total households	No of households	% of total households
Negative/Nil income	32	1%	28,841	1%
$1-$149	62	2%	34,454	1%
$150-$249	183	6%	121,575	5%
$250-$349	214	7%	162,152	7%
$350-$499	215	7%	120,360	5%
$500-$649	315	11%	233,507	10%
$650-$799	202	7%	139,260	6%
$800-$999	196	7%	151,854	7%
$1,000-$1,199	351	12%	231,702	10%
$1,200-$1,399	159	5%	117,738	5%
$1,400-$1,699	204	7%	166,833	7%
$1,700-$1,999	163	6%	138,028	6%
$2,000-$2,499	139	5%	140,563	6%
$2,500-$2,999	75	3%	140,184	6%
$3,000 +	77	3%	139,990	6%
Partial income stated(c)	255	9%	193,199	8%
All incomes not stated(d)	77	3%	67,978	3%
Total	**2,919**	**100%**	**2,328,218**	**100%**

Source: ABS Census Data 2006

Table 24: Proportion of households with income below $500 per week by planning precincts, 2006

	Proportion of households with income under $500 per week
Gresford Urban	28%
Gresford Rural	20%
Gresford Planning District	23%
Dungog Urban	32%
Dungog Rural	22%
Dungog Planning District	29%
Paterson Urban	20%
Paterson Rural	19%
Paterson Planning District	19%
Clarence Town Urban	28%
Clarence Town Rural	17%
Clarence Town Planning District	21%
Total Dungog LGA	**24%**

Source: ABS Census Data 2006. NB: Doesn't include 'partial income stated' or 'all incomes not stated'

Table 25: Proportion of households with income over $1400 per week by planning precincts, 2006

	Proportion of households with income over $1400 per week
Gresford Urban	11%
Gresford Rural	29%
Gresford Planning District	22%
Dungog Urban	14%
Dungog Rural	22%
Dungog Planning District	16%
Paterson Urban	27%
Paterson Rural	31%
Paterson Planning District	30%
Clarence Town Urban	19%
Clarence Town Rural	31%
Clarence Town Planning District	26%
Total Dungog LGA	**23%**

Source: ABS Census 2006. NB: Doesn't include 'partial income stated' or 'all incomes not stated'

The Tables above show that, when comparing precincts, the Dungog Urban precinct has the highest proportion of low income households, with 32% and 29% respectively, earning less than $500 per week in 2006. This was followed by Gresford Urban and Clarence Town Urban, both at 28%. Conversely, Clarence Town Rural had the lowest proportion of households earning less than $500 per week, at 17%.

In the higher income brackets, Clarence Town Rural and Paterson Rural had the highest proportion of households earning more than $1,400 per week, both at 31%.

8.2.9.1 Educational level

Table 26 below describes the educational qualifications of the population within the LGA, Lower Hunter Planning Region, Hunter Region and NSW.

Table 26: Educational level attained, 2006

	Dungog LGA		Lower Hunter Planning Region	Hunter Region	NSW
	Persons	Percentage	Percentage	Percentage	Percentage
Postgraduate Degree	81	2.6%	3.2%	2.8%	5.6%
Graduate Diploma and Graduate Certificate	71	2.2%	2%	2%	2.3%
Bachelor Degree	462	14.6%	16.6%	16%	22.2%
Advanced Diploma and Diploma	413	13%	12.8%	12.7%	13.6%
Certificate	1,351	42.7%	41.4%	42%	30.9%
Not stated (a)	784	24.8%	24%	24.5%	25.4%
Total	**3,162**	**100%**	**100%**	**100%**	**100%**

Source: ABS Census Data 2006 Note: Excludes schooling up to year 12. (a) Includes 'inadequately described'.

Table 26 shows that the Dungog LGA, Lower Hunter Planning Region and the Hunter have lower proportions of people with bachelor degrees or higher than NSW. However, the LGA has similar proportions of people with graduate diplomas and certificates (2.2%) and diplomas (13%) with the NSW comparisons (2.3% and 13.6%). Dungog LGA and the Hunter have markedly higher proportions of people with certificates (42.7% and 42%) than the NSW average (30.9%). These figures reflect the historical predominance of primary industry.

8.2.9.2 Centrelink support

Centrelink data on the number of people receiving income support or benefits is not available on an LGA-wide basis.

8.2.9.3 Socio-economic indexes

The following data presents 'Socio-Economic Indexes for Areas', which is compiled by the Australian Bureau of Statistics (ABS) from data collected from the 2006 Census. There are 4 indexes presented, namely disadvantage, advantage/disadvantage, economic resources, education and occupation. These indexes can be used to 'rank' different areas by their index number (i.e. relative advantage or disadvantage), but they cannot be used, for example, to say that an area scoring 1,200 has twice the wellbeing of an area scoring 600.

A summary of each of the characteristics of the indices for 2006 is given below. These characteristics are described in detail in *Newcastle and the Hunter Region 2005- 2006,* prepared by the HVRF. The data presented in that document has been derived from the 2001 Census; data from the 2006 census is expected to be incorporated during 2008.

- Advantage/disadvantage – indicates that an area has attributes such as a relatively high proportion of people with high incomes or a skilled workforce.
- Disadvantage – derived from attributes such as low income, low educational attainment, high unemployment, jobs in relatively unskilled occupations, etc. Higher scores reflect lack of disadvantage, rather than high advantage.
- Economic resources – reflects the profile of the economic resources of families, and reflects income and expenditure variables such as income, rent, dwelling size, family structure, etc.
- Education and occupation – reflects the educational and occupational structure of communities, using level of qualification achieved and whether further education is being undertaken.

Table 27: Socio-economic indexes for areas (SEIFA), 2006

Region	SEIFA Index			
	Advantage/ Disadvantage	Disadvantage	Economic Resources	Education & Occupation
Dungog LGA	968	1,001	1,014	969
Lower Hunter Planning Region	967	979	980	941
Hunter Region	955	979	993	933

Source: ABS Census Data 2006

Table 27 above shows the indexes for the Dungog LGA, the Lower Hunter Planning Region, and the Hunter Region. This comparison shows that:

- Dungog LGA had a score comparable to the Lower Hunter and higher than the Hunter for the advantage/ disadvantage index (meaning that Dungog LGA had a relatively high proportion of people with high incomes or a skilled workforce compared to the rest of the Hunter).
- Dungog LGA had a higher score than the Lower Hunter or Hunter of ‘disadvantage’, reflecting a relative lack of disadvantage.
- Dungog LGA scored higher then the Lower Hunter or Hunter in terms of economic resources (meaning that the LGA has a relatively higher proportion of families on high income, low income families and households living in large houses compared to the rest of the Hunter).
- Dungog LGA scored higher in the education and occupation index compared to the Lower Hunter and Hunter Region, meaning that the LGA has a relatively high concentration of people with higher education qualifications or undertaking further education, with a high percentage of people employed in more skilled occupations.

8.3 Employment profile

8.3.1 Summary

The employment profile in the Dungog LGA reflects the relatively high proportion of the population employed in the agriculture sector. Despite the substantial changes that have passed through and continue to evolve in the agriculture and forestry industries this sector remains the dominant activity within the LGA.

Unlike other Lower Hunter communities, mining and manufacturing contribute relatively little (through direct local employment) to the local economy. However, both contribute to the employment of residents within the LGA. Education, Health Care and Social Assistance are significant employers and the data supports the emergence of the retail and tourism sector as areas of growth. Construction also ranks as one of the higher employment categories.

8.3.1.1 Employment by industry sector

Table 28 shows the changes in employment in each industry sector between 1996 and 2006 for the Dungog LGA, the Lower Hunter Planning Region, Hunter Region, and NSW. The accompanying graph compares the 2006 data for the Dungog LGA and NSW.

Table 28: Percentage of employed persons in industry sectors 1996-2006

	Dungog LGA						
	1996		2001		2006		% change in total employed persons 1996-2006
Agriculture, forestry & fishing	551	17.8%	512	16.3%	465	13.4%	-4.4%
Mining	45	1.5%	38	1.2%	75	2.2%	0.7%
Manufacturing	285	9.2%	248	7.9%	322	9.3%	0.1%
Electricity, gas, water & waste services	50	1.6%	47	1.5%	56	1.6%	0.0%
Construction	216	7.0%	262	8.3%	339	9.8%	2.8%
Wholesale trade	108	3.5%	119	3.8%	102	2.9%	-0.5%
Retail trade	307	9.9%	285	9.1%	309	8.9%	-1.0%
Accommodation & food services	176	5.7%	226	7.2%	201	5.8%	0.1%
Transport, postal & warehousing	164	5.3%	160	5.1%	197	5.7%	0.4%
Information media & telecommunications	40	1.3%	34	1.1%	36	1.0%	-0.3%
Financial & insurance services	51	1.6%	57	1.8%	51	1.5%	-0.2%
Rental, hiring & real estate services	42	1.4%	36	1.1%	51	1.5%	0.1%
Professional, scientific & technical services	110	3.6%	146	4.6%	150	4.3%	0.8%
Administrative & support services	45	1.5%	68	2.2%	71	2.1%	0.6%
Public administration & safety	163	5.3%	171	5.4%	162	4.7%	-0.6%
Education & training	267	8.6%	259	8.2%	263	7.6%	-1.0%
Health care & social assistance	213	6.9%	260	8.3%	343	9.9%	3.0%
Arts & recreation services	17	0.5%	18	0.6%	32	0.9%	0.4%
Other services	125	4.0%	115	3.7%	127	3.7%	-0.4%
Inadequately described/Not stated	121	3.9%	81	2.6%	107	3.1%	-0.8%
Total	**3,096**	**100%**	**3,142**	**100%**	**3,459**	**100%**	**-**

Note: (a) Industry of Employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC) edition. This replaced the 1993 ANZSIC edition. Data for 1996 and 2001 have been concorded. Source: ABS Census Data 2006

Table 28: Continued

	Lower Hunter Planning Region						
	1996		2001		2006		% change in total employed persons 1996-2006
Agriculture, forestry & fishing	2,071	1.2%	2,135	1.1%	2,013	1.0%	-0.2%
Mining	5,999	3.4%	4,153	2.2%	4,896	2.4%	-1.0%
Manufacturing	23,765	13.4%	22,355	12.0%	23,124	11.1%	-2.3%
Electricity, gas, water & waste services	2,561	1.4%	2,556	1.4%	3,022	1.5%	0.0%
Construction	11,996	6.8%	13,462	7.2%	16,772	8.1%	1.3%
Wholesale trade	8,789	5.0%	8,277	4.5%	7,048	3.4%	-1.6%
Retail trade	20,300	11.5%	23,347	12.6%	25,801	12.4%	0.9%
Accommodation & food services	12,475	7.0%	14,068	7.6%	14,985	7.2%	0.2%
Transport, postal & warehousing	8,229	4.6%	8,239	4.4%	9,075	4.4%	-0.3%
Information media & telecommunications	2,950	1.7%	2,718	1.5%	2,508	1.2%	-0.5%
Financial & insurance services	5,197	2.9%	5,037	2.7%	6,239	3.0%	0.1%
Rental, hiring & real estate services	2,791	1.6%	3,146	1.7%	3,393	1.6%	0.1%
Professional, scientific & technical services	7,938	4.5%	8,821	4.7%	11,171	5.4%	0.9%
Administrative & support services	4,620	2.6%	5,752	3.1%	5,713	2.7%	0.1%
Public administration & safety	10,256	5.8%	11,027	5.9%	13,687	6.6%	0.8%
Education & training	13,197	7.5%	14,767	7.9%	16,524	7.9%	0.5%
Health care & social assistance	19,357	10.9%	21,649	11.7%	26,652	12.8%	1.9%
Arts & recreation services	1,630	0.9%	1,915	1.0%	2,359	1.1%	0.2%
Other services	8,080	4.6%	8,496	4.6%	8,629	4.1%	-0.4%
Inadequately described/Not stated	4,899	2.8%	3,905	2.1%	4,675	2.2%	-0.5%
Total	**177,100**	**100.0%**	**185,825**	**100%**	**208,286**	**100.0%**	**0.0%**

Note: (a) Industry of Employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC) edition. This replaced the 1993 ANZSIC edition. Data for 1996 and 2001 have been concorded. Source: ABS Census Data 2006

Table 28: Continued

	Hunter Region						
	1996		2001		2006		% change in total employed persons 1996-2006
Agriculture, forestry & fishing	6,613	3.1%	6,370	2.9%	5,765	2.3%	-0.8%
Mining	9,347	4.4%	6,829	3.1%	8,706	3.5%	-0.9%
Manufacturing	26,319	12.5%	24,947	11.3%	26,012	10.5%	-1.9%
Electricity, gas, water & waste services	3,623	1.7%	3,466	1.6%	4,045	1.6%	-0.1%
Construction	14,145	6.7%	16,108	7.3%	20,017	8.1%	1.4%
Wholesale trade	10,086	4.8%	9,788	4.4%	8,055	3.3%	-1.5%
Retail trade	23,680	11.2%	27,183	12.3%	30,058	12.1%	0.9%
Accommodation & food services	14,985	7.1%	16,832	7.6%	18,026	7.3%	0.2%
Transport, postal & warehousing	9,505	4.5%	9,572	4.3%	10,517	4.2%	-0.2%
Information media & telecommunications	3,269	1.5%	3,014	1.4%	2,764	1.1%	-0.4%
Financial & insurance services	5,835	2.8%	5,583	2.5%	6,809	2.8%	0.0%
Rental, hiring & real estate services	3,346	1.6%	3,727	1.7%	4,110	1.7%	0.1%
Professional, scientific & technical services	8,931	4.2%	9,995	4.5%	12,706	5.1%	0.9%
Administrative & support services	5,239	2.5%	6,709	3.0%	6,672	2.7%	0.2%
Public administration & safety	12,154	5.8%	12,733	5.8%	15,635	6.3%	0.6%
Education & training	15,184	7.2%	16,950	7.7%	18,918	7.6%	0.5%
Health care & social assistance	21,735	10.3%	24,287	11.0%	29,974	12.1%	1.8%
Arts & recreation services	1,871	0.9%	2,272	1.0%	2,810	1.1%	0.2%
Other services	9,411	4.5%	9,928	4.5%	10,208	4.1%	-0.3%
Inadequately described/Not stated	5,965	2.8%	4,722	2.1%	5,675	2.3%	-0.5%
Total	**211,243**	**100%**	**221,015**	**100%**	**247,482**	**100%**	**-**

Note: (a) Industry of Employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC) edition. This replaced the 1993 ANZSIC edition. Data for 1996 and 2001 have been concorded. Source: ABS Census Data 2006

Table 28: Continued

	NSW						
	1996		2001		2006		% change in total employed persons 1996 - 2006
Agriculture, forestry & fishing	92,552	3.6%	90,235	3.3%	78,661	2.7%	-0.9%
Mining	21,633	0.8%	14,737	0.5%	20,315	0.7%	-0.1%
Manufacturing	295,078	11.5%	299,886	11.0%	277,985	9.6%	-2.0%
Electricity, gas, water & waste services	25,779	1.0%	26,115	1.0%	29,187	1.0%	0.0%
Construction	159,045	6.2%	182,848	6.7%	212,730	7.3%	1.1%
Wholesale trade	151,039	5.9%	145,250	5.3%	136,758	4.7%	-1.2%
Retail trade	257,805	10.1%	295,696	10.8%	323,929	11.1%	1.1%
Accommodation & food services	165,316	6.4%	182,310	6.7%	190,455	6.5%	0.1%
Transport, postal & warehousing	131,551	5.1%	135,560	5.0%	145,516	5.0%	-0.1%
Information media & telecommunications	74,553	2.9%	82,174	3.0%	68,978	2.4%	-0.5%
Financial & insurance services	122,165	4.8%	131,804	4.8%	144,868	5.0%	0.2%
Rental, hiring & real estate services	41,068	1.6%	49,056	1.8%	50,585	1.7%	0.1%
Professional, scientific & technical services	169,500	6.6%	202,766	7.4%	213,253	7.3%	0.7%
Administrative & support services	74,772	2.9%	92,240	3.4%	90,430	3.1%	0.2%
Public administration & safety	142,462	5.6%	143,034	5.2%	174,913	6.0%	0.5%
Education & training	179,247	7.0%	195,772	7.2%	219,676	7.6%	0.6%
Health care & social assistance	236,202	9.2%	253,456	9.3%	304,341	10.5%	1.2%
Arts & recreation services	33,260	1.3%	35,361	1.3%	39,578	1.4%	0.1%
Other services	111,573	4.4%	111,445	4.1%	110,094	3.8%	-0.6%
Inadequately described/Not stated	78,715	3.1%	64,808	2.4%	77,192	2.7%	-0.4%
Total	**2,563,315**	**100.0%**	**2,734,553**	**100.0%**	**2,909,444**	**100.0%**	**0.0%**

Note: (a) Industry of Employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC) edition. This replaced the 1993 ANZSIC edition. Data for 1996 and 2001 have been concorded. Source: ABS Census Data 2006

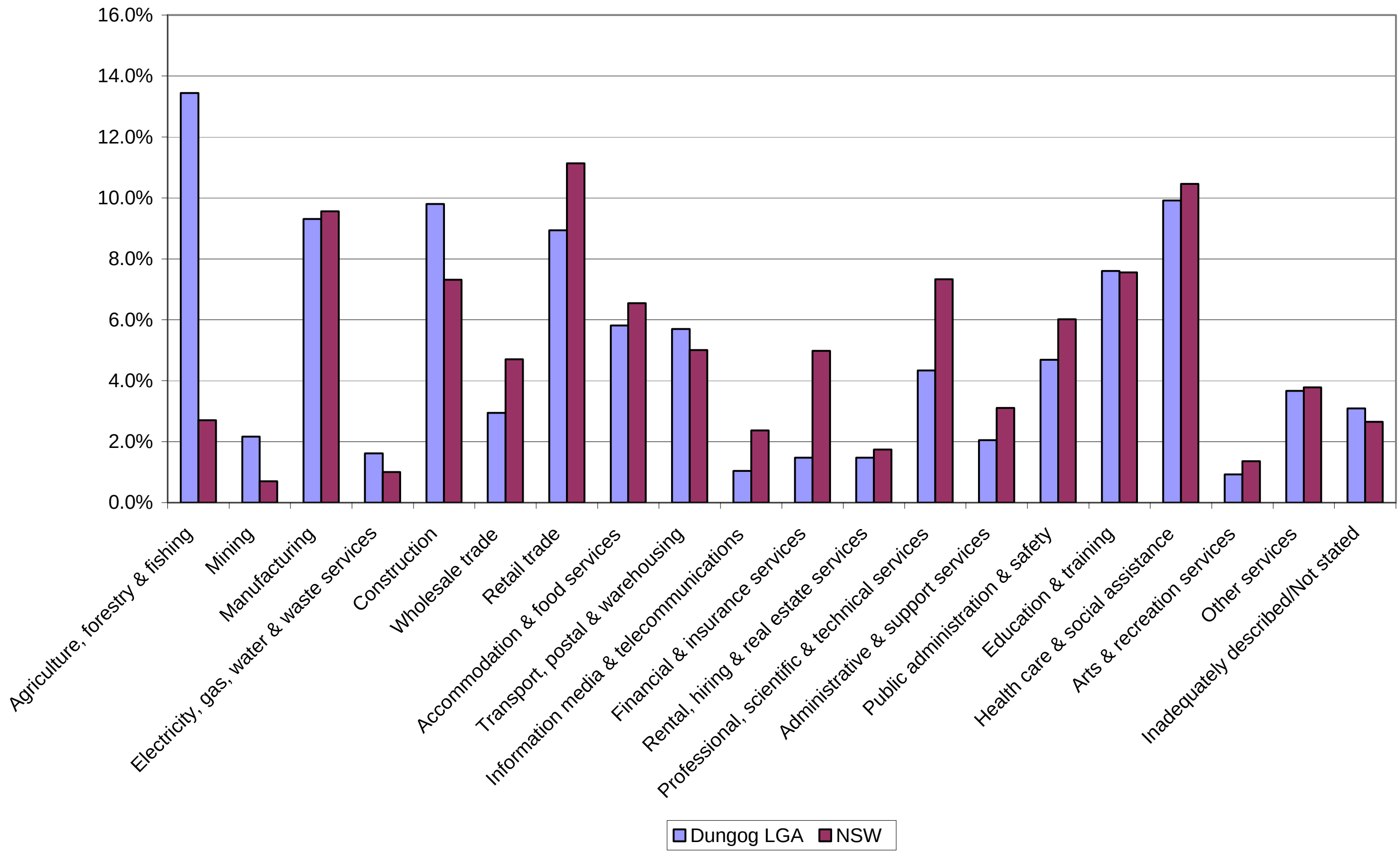


Figure 6: Employment by sector in the LGA, 2006

The table and graph illustrate changes in the structure of Dungog LGA's workforce between 1996 and 2006:

- The workforce for the Dungog LGA increased from 3,096 in 1996 to 3,459 in 2006.
- There were only small changes in the structure of the workforce, with none of the growths or declines exceeding 2.8%. The exception was agriculture, forestry and fishing which declined by 4.4% and health care and social assistance which increased by 3%.

Sectors that showed significantly different proportions in employment types to the Hunter or NSW in 2006 were:

- The agriculture, forestry and fishing sector (13.4%) compared to 2.3% of the Hunter's workforce and 2.7% of the NSW workforce. These figures reflect the expected higher proportion of the workforce employed in agriculture in rural areas of NSW.
- Construction (9.8%) compared to 8.1% of the Hunter's workforce and 7.3% of the NSW workforce.
- Financial and insurance services; and professional, scientific and technical services, which recorded 1.5% and 4.3% respectively for the Dungog LGA, 2.8% and 5.1% for the Hunter Region, and 5% and 7.3% for NSW.

Table 29 below shows employment by sector for each of the planning precincts and districts in 2006. As discussed in Section 8 of this Analysis, each 'district' has been broken down into its rural and urban 'precincts' for comparison purposes.

Table 29: Industry of employed persons, 2006 by planning precincts and districts

	Gresford Urban		Gresford Rural		Gresford Planning District		Dungog Urban		Dungog Rural	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Agriculture, forestry & fishing	19	14.5%	88	39.5%	107	30.2%	53	7.0%	130	27.9%
Mining	6	4.6%	6	2.7%	12	3.4%	9	1.2%	9	1.9%
Manufacturing	7	5.3%	11	4.9%	18	5.1%	69	9.1%	37	7.9%
Electricity, gas, water & waste services	0	0.0%	3	1.3%	3	0.8%	16	2.1%	3	0.6%
Construction	9	6.9%	27	12.1%	36	10.2%	67	8.8%	39	8.4%
Wholesale trade	3	2.3%	3	1.3%	6	1.7%	13	1.7%	10	2.1%
Retail trade	18	13.7%	6	2.7%	24	6.8%	77	10.1%	31	6.7%
Accommodation & food services	12	9.2%	3	1.3%	15	4.2%	62	8.1%	28	6.0%
Transport, postal & warehousing	12	9.2%	3	1.3%	15	4.2%	43	5.7%	13	2.8%
Information media & telecommunications	0	0.0%	9	4.0%	9	2.5%	0	0.0%	3	0.6%
Financial & insurance services	3	2.3%	6	2.7%	9	2.5%	6	0.8%	0	0.0%
Rental, hiring & real estate services	6	4.6%	3	1.3%	9	2.5%	0	0.0%	16	3.4%
Professional, scientific & technical services	0	0.0%	7	3.1%	7	2.0%	25	3.3%	20	4.3%
Administrative & support services	3	2.3%	3	1.3%	6	1.7%	22	2.9%	9	1.9%
Public administration & safety	3	2.3%	0	0.0%	3	0.8%	64	8.4%	6	1.3%
Education & training	0	0.0%	12	5.4%	12	3.4%	75	9.9%	39	8.4%
Health care & social assistance	18	13.7%	18	8.1%	36	10.2%	86	11.3%	40	8.6%
Arts & recreation services	3	2.3%	0	0.0%	3	0.8%	6	0.8%	4	0.9%
Other services	3	2.3%	3	1.3%	6	1.7%	51	6.7%	10	2.1%
Inadequately described/Not stated	6	4.6%	12	5.4%	18	5.1%	17	2.2%	19	4.1%
Total	**131**	**100.0%**	**223**	**100.0%**	**354**	**100.0%**	**761**	**100.0%**	**466**	**100.0%**

Industry of employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC). This has replaced the 1993 ANZSIC first edition.
Source: ABS Census Data 2006

Table 29: Continued

	Dungog Planning District		Paterson Urban		Paterson Rural		Paterson Planning District		Clarence Town Urban	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Agriculture, forestry & fishing	183	14.9%	7	4.2%	107	13.6%	114	12.0%	6	2.0%
Mining	18	1.5%	6	3.6%	18	2.3%	24	2.5%	9	3.1%
Manufacturing	106	8.6%	24	14.5%	67	8.5%	91	9.6%	38	12.9%
Electricity, gas, water & waste services	19	1.5%	6	3.6%	6	0.8%	12	1.3%	4	1.4%
Construction	106	8.6%	10	6.0%	81	10.3%	91	9.6%	40	13.6%
Wholesale trade	23	1.9%	7	4.2%	18	2.3%	25	2.6%	11	3.7%
Retail trade	108	8.8%	16	9.6%	61	7.8%	77	8.1%	44	15.0%
Accommodation & food services	90	7.3%	16	9.6%	42	5.4%	58	6.1%	21	7.1%
Transport, postal & warehousing	56	4.6%	16	9.6%	41	5.2%	57	6.0%	18	6.1%
Information media & telecommunications	3	0.2%	0	0.0%	15	1.9%	15	1.6%	0	0.0%
Financial & insurance services	6	0.5%	3	1.8%	15	1.9%	18	1.9%	3	1.0%
Rental, hiring & real estate services	16	1.3%	3	1.8%	12	1.5%	15	1.6%	4	1.4%
Professional, scientific & technical services	45	3.7%	3	1.8%	41	5.2%	44	4.6%	11	3.7%
Administrative & support services	31	2.5%	3	1.8%	19	2.4%	22	2.3%	5	1.7%
Public administration & safety	70	5.7%	11	6.6%	27	3.4%	38	4.0%	16	5.4%
Education & training	114	9.3%	13	7.8%	71	9.0%	84	8.8%	15	5.1%
Health care & social assistance	126	10.3%	10	6.0%	80	10.2%	90	9.5%	34	11.6%
Arts & recreation services	10	0.8%	0	0.0%	9	1.1%	9	0.9%	3	1.0%
Other services	61	5.0%	3	1.8%	26	3.3%	29	3.0%	12	4.1%
	0	0.0%		0.0%	0	0.0%	0	0.0%		0.0%
Inadequately described/Not stated	36	2.9%	9	5.4%	29	3.7%	38	4.0%	0	0.0%
	0	0.0%		0.0%	0	0.0%	0	0.0%		0.0%
Total	**1,227**	**100.0%**	**166**	**100.0%**	**785**	**100.0%**	**951**	**100.0%**	**294**	**100.0%**

(a) Industry of employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC). This has replaced the 1993 ANZSIC first edition.
Source: ABS Census Data 2006

Table 29: Continued

	Clarence Town Rural		Clarence Town Planning District		Lower Hunter Region		Hunter Region		NSW	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Agriculture, forestry & fishing	57	9.3%	63	6.9%	2,013	1.0%	5,765	2.3%	78,661	2.7%
Mining	9	1.5%	18	2.0%	4,896	2.4%	8,706	3.5%	20,315	0.7%
Manufacturing	80	13.0%	118	13.0%	23,124	11.1%	26,012	10.5%	277,985	9.6%
Electricity, gas, water & waste services	6	1.0%	10	1.1%	3,022	1.5%	4,045	1.6%	29,187	1.0%
Construction	55	8.9%	95	10.5%	16,772	8.1%	20,017	8.1%	212,730	7.3%
Wholesale trade	20	3.3%	31	3.4%	7,048	3.4%	8,055	3.3%	136,758	4.7%
Retail trade	59	9.6%	103	11.3%	25,801	12.4%	30,058	12.1%	323,929	11.1%
Accommodation & food services	27	4.4%	48	5.3%	14,985	7.2%	18,026	7.3%	190,455	6.5%
Transport, postal & warehousing	37	6.0%	55	6.1%	9,075	4.4%	10,517	4.2%	145,516	5.0%
Information media & telecommunications	9	1.5%	9	1.0%	2,508	1.2%	2,764	1.1%	68,978	2.4%
Financial & insurance services	9	1.5%	12	1.3%	6,239	3.0%	6,809	2.8%	144,868	5.0%
Rental, hiring & real estate services	12	2.0%	16	1.8%	3,393	1.6%	4,110	1.7%	50,585	1.7%
Professional, scientific & technical services	36	5.9%	47	5.2%	11,171	5.4%	12,706	5.1%	213,253	7.3%
Administrative & support services	18	2.9%	23	2.5%	5,713	2.7%	6,672	2.7%	90,430	3.1%
Public administration & safety	23	3.7%	39	4.3%	13,687	6.6%	15,635	6.3%	174,913	6.0%
Education & training	40	6.5%	55	6.1%	16,524	7.9%	18,918	7.6%	219,676	7.6%
Health care & social assistance	58	9.4%	92	10.1%	26,652	12.8%	29,974	12.1%	304,341	10.5%
Arts & recreation services	6	1.0%	9	1.0%	2,359	1.1%	2,810	1.1%	39,578	1.4%
Other services	18	2.9%	30	3.3%	8,629	4.1%	10,208	4.1%	110,094	3.8%
Inadequately described/Not stated	36	5.9%	36	4.0%	4,675	2.2%	5,675	2.3%	77,192	2.7%
Total	**615**	**100.0%**	**909**	**100.0%**	**208,286**	**100.0%**	**247,482**	**100%**	**2,909,444**	**100.0%**

(a) Industry of employment was coded to the 2006 Australian and New Zealand Standard Industrial Classification (ANZSIC). This has replaced the 1993 ANZSIC first edition.
Source: ABS Census Data 2006

Highlights from Table 29 are:

- The precinct with the highest proportion of employed people in agriculture, forestry and fishing is Gresford Rural, at 39.5%. Other precincts with high employment in this sector include Dungog Rural (27.9%) and Paterson Rural (13.6%).
- Clarence Town Urban had the highest employment in construction at 13.6%, and the highest employment in retail trade (15%) of all precincts.
- All Gresford precincts had a lower proportion of people in the manufacturing industry then other precincts (ranging from 4.9% to 5.3%). Paterson Urban and Clarence Town Rural had the highest proportion of people in this sector, at 14.5% and 13% respectively.
- Gresford Urban had the highest employment in health care and social assistance (13.7%) followed by Clarence Town Urban at 11.6%. Paterson Urban had the lowest proportion employed in this sector, at 6%.

8.3.1.2 Industry Dependence

Industry dependences are indicative of economic diversity. HVRF (2005:67) analysis indicates that in the Dungog LGA the top ten industries accounted for 29% of resident employment in 2001. Lake Macquarie LGA had the lowest industry dependence (20%) while Merriwa had the highest (at 47%). Beef cattle and dairy cattle farming were the most important industry sectors in Dungog LGA, followed by accommodation and primary education.

The principle observations from an analysis of the business count data with the LGA are:

- Businesses based within the LGA comprise predominantly small operations with 1-4 employees
- There is a moderate share of medium-size firms (5-19 employees) particularly in:
  - Agriculture, forestry and fishing
  - Retail trade
  - Accommodation, cafés and restaurants
  - Transport and storage
  - Property and business services
- The small number of large business operations are concentrated in:
  - Accommodation, cafés and restaurants
  - Property and business services
  - Education
  - Health and community services

- The construction sector is identified as containing businesses that employ substantial numbers within the LGA, however, HVRF believe this reflects the legal registration of names rather than the actual operational activity.

- A brief comparison was undertaken between occupational structure of those employed within the LGA against those residing within but employed outside the LGA. The occupations most prevalent of those residing in but employed outside are technical trades and machinery operators reflecting those working within the Hunter Valley Mines, and in the industry sector such as Tomago.

8.3.1.3 Employment by Occupation

Table 30 below shows the changes in employment by occupation between 1996 and 2006 for the LGA, the Lower Hunter Sub-Region, Hunter Region and NSW. The accompanying graph compares the 2006 Dungog LGA data with the Hunter LGA and NSW.

Table 30: Percentage of employed persons by occupation 1996 – 2006

	Dungog Local Government Area						
	1996		2001		2006		% change 1996- 2006
Managers	723	23.3%	655	20.8%	649	18.7%	-4.6%
Professionals	388	12.5%	445	14.2%	522	15.1%	2.5%
Technicians and trades workers(b)	472	15.2%	489	15.6%	598	17.2%	2.0%
Community and personal service workers	199	6.4%	230	7.3%	301	8.7%	2.3%
Clerical and administrative workers	352	11.4%	389	12.4%	381	11.0%	-0.4%
Sales workers	173	5.6%	200	6.4%	240	6.9%	1.3%
Machinery operators and drivers	291	9.4%	271	8.6%	282	8.1%	-1.3%
Labourers	417	13.5%	398	12.7%	433	12.5%	-1.0%
Inadequately described/Not stated	82	2.6%	65	2.1%	61	1.8%	-0.9%
Total employed persons	**3,097**	**100.0%**	**3,142**	**100.0%**	**3,467**	**100.0%**	**0.0%**

(a) 'Occupation' was coded to the 2006 Australian and New Zealand Standard Classification of Occupations (ANZSCO). This has replaced the 1996 Australian Standard Classification of Occupations (ASCO) Second Edition. Data for 1996 and 2001 have been concorded. (b) In 1996 and 2001 'Technicians and trades workers' includes Engineering, Information and Communications Techn Technicians and Tradespersons. Source: ABS Census Data 2006

Table 30: Continued

	Lower Hunter Planning Region				Hunter Region				NSW			
	1996	2001	2006	Change 1996-2006	1996	2001	2006	Change 1996-2006	1996	2001	2006	Change 1996-2006
Managers	9.7%	9.7%	10.0%	0.3%	11.0%	10.7%	10.7%	-0.3%	13.5%	13.5%	13.6%	0.1%
Professionals	16.1%	17.1%	18.3%	2.3%	15.2%	16.2%	17.3%	2.1%	18.2%	19.8%	21.2%	3.0%
Technicians and trades workers(b)	18.2%	16.9%	16.8%	-1.3%	18.0%	16.9%	17.1%	-0.9%	14.9%	14.1%	13.6%	-1.3%
Community and personal service workers	7.7%	8.9%	9.5%	1.8%	7.7%	8.8%	9.4%	1.7%	7.4%	7.8%	8.6%	1.2%
Clerical and administrative workers	14.7%	14.7%	14.4%	-0.3%	14.1%	14.2%	13.9%	-0.3%	16.6%	16.3%	15.4%	-1.2%
Sales workers	10.6%	11.6%	10.9%	0.3%	10.1%	11.1%	10.5%	0.5%	9.3%	9.9%	9.7%	0.4%
Machinery operators and drivers	10.1%	8.7%	7.7%	-2.4%	10.4%	9.1%	8.2%	-2.1%	7.8%	7.2%	6.4%	-1.4%
Labourers	10.6%	10.7%	10.8%	0.2%	11.1%	11.1%	11.3%	0.2%	9.6%	9.4%	9.5%	-0.1%
Inadequately described/Not stated	2.3%	1.8%	1.6%	-0.8%	2.4%	1.8%	1.6%	-0.8%	2.6%	2.0%	1.9%	-0.7%
Total employed persons	**100.0%**	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**	**100.0%**	**100.0%**	**100.0%**	**0.0%**

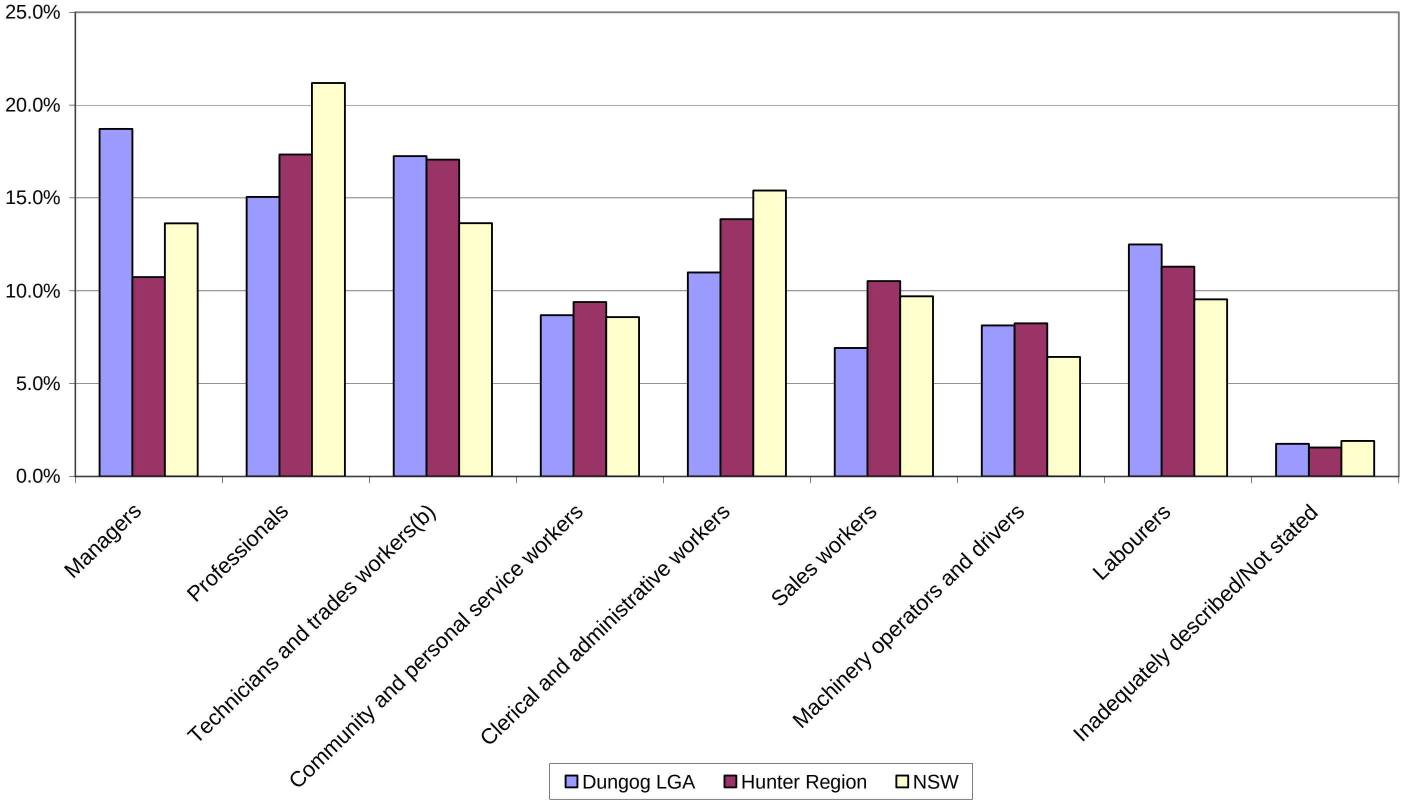


Figure 7: Employment by occupation in the LGA, 2006

The highest proportion of occupation type in 2006 in the Dungog LGA was ‘managers’ at 18.7% of the workforce, followed closely by ‘technicians and trades workers’ at 17.2%. These proportions are higher than for NSW at 13.6%, and 13.6%. The proportion of managers is also significantly higher than in the Hunter at 10.7%, although the Hunter shares a similar proportion of technicians/ trades workers at 17.1%. The high proportion of managers and administrators reflects the number of self employed farmers and small business operations.

Conversely, Dungog LGA recorded a lower number of professionals, at 15.1% than for the Hunter (17.3%) and NSW (21.2%) however given the low number of local professional employment opportunities professionals are well represented and this is reflective of the type of people living in rural residential lifestyles.

Table 31 below shows employment by occupation for each of the planning districts and precincts in 2006. As discussed in Section 8.2 of this Analysis, each ‘district’ has been broken down into its rural and urban ‘precincts’ for comparison purposes.

Table 31: Occupation of employed persons, 2006 by planning precincts and districts

	Gresford Urban		Gresford Rural		Gresford Planning District		Dungog Urban	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Managers	19	15.3%	88	41.9%	107	32.0%	75	9.8%
Professionals	12	9.7%	21	10.0%	33	9.9%	96	12.6%
Technicians and trades workers	17	13.7%	25	11.9%	42	12.6%	147	19.3%
Community and personal service workers	7	5.6%	6	2.9%	13	3.9%	84	11.0%
Clerical and administrative workers	18	14.5%	21	10.0%	39	11.7%	87	11.4%
Sales workers	17	13.7%	8	3.8%	25	7.5%	61	8.0%
Machinery operators and drivers	12	9.7%	14	6.7%	26	7.8%	70	9.2%
Labourers	22	17.7%	23	11.0%	45	13.5%	139	18.2%
Inadequately described/ Not stated	0	0.0%	4	1.9%	4	1.2%	3	0.4%
Total	**124**	**100.0%**	**210**	**100.0%**	**334**	**100.0%**	**762**	**100.0%**

Table 31: Continued

	Dungog Rural		Dungog Planning District		Paterson Urban		Paterson Rural	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Managers	162	34.5%	237	19.2%	23	14.1%	167	21.2%
Professionals	74	15.7%	170	13.8%	17	10.4%	147	18.7%
Technicians and trades workers	60	12.8%	207	16.8%	33	20.2%	141	17.9%
Community and personal service workers	34	7.2%	118	9.6%	11	6.7%	66	8.4%
Clerical and administrative workers	45	9.6%	132	10.7%	22	13.5%	84	10.7%
Sales workers	15	3.2%	76	6.2%	12	7.4%	45	5.7%
Machinery operators and drivers	21	4.5%	91	7.4%	25	15.3%	54	6.9%
Labourers	41	8.7%	180	14.6%	20	12.3%	75	9.5%
Inadequately described/ Not stated	18	3.8%	21	1.7%	0	0.0%	7	0.9%
Total	**470**	**100.0%**	**1,232**	**100.0%**	**163**	**100.0%**	**786**	**100.0%**

Table 31: Continued

	Paterson Planning District		Clarence Town Urban		Clarence Town Rural		Clarence Town Planning District	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Managers	190	20.0%	31	10.7%	85	14.1%	116	13.0%
Professionals	164	17.3%	38	13.1%	104	17.3%	142	15.9%
Technicians and trades workers	174	18.3%	63	21.7%	108	17.9%	171	19.2%
Community and personal service workers	77	8.1%	27	9.3%	49	8.1%	76	8.5%
Clerical and administrative workers	106	11.2%	32	11.0%	83	13.8%	115	12.9%
Sales workers	57	6.0%	32	11.0%	40	6.6%	72	8.1%
Machinery operators and drivers	79	8.3%	17	5.9%	54	9.0%	71	8.0%
Labourers	95	10.0%	45	15.5%	70	11.6%	115	12.9%
Inadequately described/ Not stated	7	0.7%	5	1.7%	9	1.5%	14	1.6%
Total	**949**	**100.0%**	**290**	**100.0%**	**602**	**100.0%**	**892**	**100.0%**

Source: ABS 2006 Census

Precinct highlights from the above table are:

- The precinct with the highest proportion of managers was Gresford Rural at 41.9%. This reflects the number of self employed farmers in rural areas who are classified as managers.
- The highest proportion of professionals was in Paterson Rural at 18.7%, followed by Clarence Town Rural at 17.3%.
- The precinct with the highest proportion of technicians and tradespersons was Clarence Town Urban at 21.7% followed by Paterson Urban at 20.2%.
- Gresford Urban accommodated the highest proportion of sales workers at 13.7%, followed by Dungog Urban at 8%.

8.3.1.4 Unemployment

Table 32 shows the percentage of unemployed people in the Dungog LGA, the Lower Hunter Planning Region, Hunter Region and NSW at the 1996, 2001 and 2006 Census dates.

Table 32: Unemployment 1996 – 2006

	1996	2001	2006	% change 1996-2006
Dungog LGA	8.7%	8.2%	4.8%	-3.9%
Lower Hunter Planning Region	11.6%	10.2%	7.1%	-4.5%
Hunter Region	11.3%	9.9%	6.9%	-4.4%
NSW	5.2%	4.2%	5.9%	0.7%

Source: ABS 2006 Census Quickstats and Community Profiles. All persons aged over 15 years and in the labour force.

Table 32 shows that there has been a trend towards higher employment and lower unemployment since 1996, in all areas except NSW. Unemployment was 4.8% for the Dungog LGA in 2006. The unemployment rate for Dungog LGA was lower than that of the Lower Hunter Planning Region (7.1%), the Hunter Region (6.9%) and NSW (5.9%).

Table 33 below shows unemployment rates by planning precincts and districts.

Table 33: Unemployment rate, 2006 by planning precincts and districts

	Unemployment rate
Gresford Urban	3.1%
Gresford Rural	1.3%
Gresford Planning District	1.9%
Dungog Urban	7.4%
Dungog Rural	3.5%
Dungog Planning District	5.7%
Paterson Urban	7.0%
Paterson Rural	3.7%
Paterson Planning District	4.5%
Clarence Town Urban	9.4%
Clarence Town Rural	2.4%
Clarence Town Planning District	4.1%
Total Dungog LGA	**4.5%**
NSW	**5.9%**

Source: ABS 2006 Census Quickstats

At 2006, the precinct with the highest unemployment was Clarence Town Urban at 9.4%, followed by Dungog Urban (7.4%) and Paterson Urban (7%). The area with the lowest unemployment rate was Gresford Rural at 1.3% followed by Clarence Town Rural at 2.4%.

8.4 Development Statistics

The number and type of building approvals determined by consent authorities within the Dungog LGA provides an indication of development trends. Table 34 below indicates the type and number of development consents granted between 2002 and 2007. It provides a general indication of trends and is subject to data inaccuracies. Note, not all consents from 2007 were available at the time of writing, and data has been provided for the year to March 2007.

Table 34: Dungog LGA development statistics, 2002 – March 2007

Type of development	2002	2003	2004	2005	2006	Year to March 2007	Total	Average '02- '07
New dwelling houses (detached dwelling units)	48	57	77	37	22	4	245	41
Other residential (more than 1 dwelling unit, e.g. townhouse, terrace etc)	1	-	-	1	-	-	2	0.3
Commercial*	8	5	4	4	9	1	31	5

* Classification includes commercial premises, cafés, kiosks, outdoor dining, tourist cabins, manager's residences and restaurants. Note: the data in this table was derived from Council development consent notifications in public newsletters and is subject to inaccuracy. The data should only be used to provide an indication of the extent of different types of development occurring and the trends over time.

Source: data supplied by Dungog Shire Council and interpreted by Planning Workshop Australia

Table 34 and Figure 8 show that there was considerable variation in the number of developments granted consent between 2002 and 2007. Residential dwelling consents showed a steady increase from 2002- 2004, reaching a peak of 77 before decreasing in 2005. The highest number of consents each year was for single dwellings. Total single dwelling applications averaged 41 per year (Note - this average is likely to be slightly higher with the inclusion of all 2007 data), with a very low proportion of medium density housing consents (total of 2 within the 6 year time period). These trends provide an indication of future dwelling construction trends.

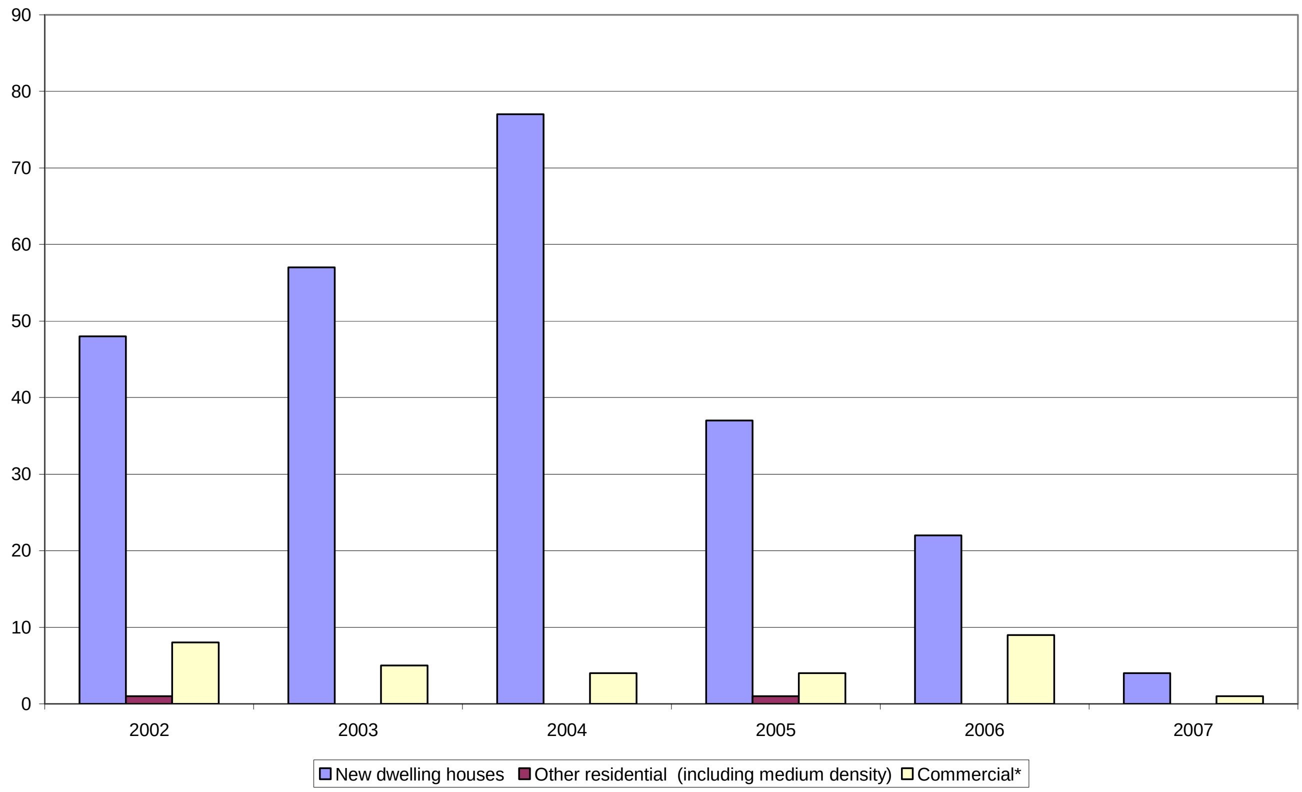


Figure 8: Dungog LGA development statistics, 2002 – 2007

The ABS also compiles data on building approvals within LGA's. ABS data (catalogue number 87310DO001) indicates that for the 7 months to 2008, 16 new houses were approved in the Dungog LGA, at a value of $4,154,500. This compares to housing developments valued at $3,178,900 in 2006-2007, and $5,464,600 in 2005-2006. Note that these ABS figures are sourced differently from the Dungog Shire Council figures, using different assumptions. These sources are explained in the explanatory notes that accompany the ABS data. For this reason, the two sets of data should only be used to indicate general development trends.

8.5 Tillegra Dam and S94 catchments (special interest planning precincts)

The demographic profiles below refer specifically to the proposed Tillegra Dam catchment and to the Dungog Shire Council's designated Section 94 catchment areas (identified as *Vacy*, *Martins Creek* and *Paterson Urban*). These areas are shown in Figure 6 to Figure 9, and are referred to collectively as 'special interest planning precincts'. Note that the Tillegra Dam and Section 94 information has not been compared to the profiles of other planning districts and precincts within the LGA, as these special interest areas are subsets of and overlap the general precincts and districts within the LGA.

Information is provided for the Tillegra Dam catchment as it existed in 2006, in order to gain an understanding of the existing demography of the area, before the commencement of any construction works on the proposed Tillegra Dam. This data will inform the future planning framework for the catchment and surrounding areas.

The Section 94 catchment areas refer to Council's defined s94 catchments and have been included in order to inform the Council's future S94 plans.

8.5.1 Demographics

At the 2006 Census, the Tillegra Dam catchment had a population of 576, which equates to approximately 7.1% of the Dungog LGA's population of 8,062. Within the S94 catchments, Vacy had a population of 1,006 (12.5% of Dungog LGA's population); Martins Creek a population of 630 (7.8%); and Paterson Urban a population of 345 (4.3%).

Figure 12 below show the age structure for the special interest planning precincts, derived from the ABS Census 2006. The number of males (on the left) and females (on the right) is given for each 5 year age bracket.

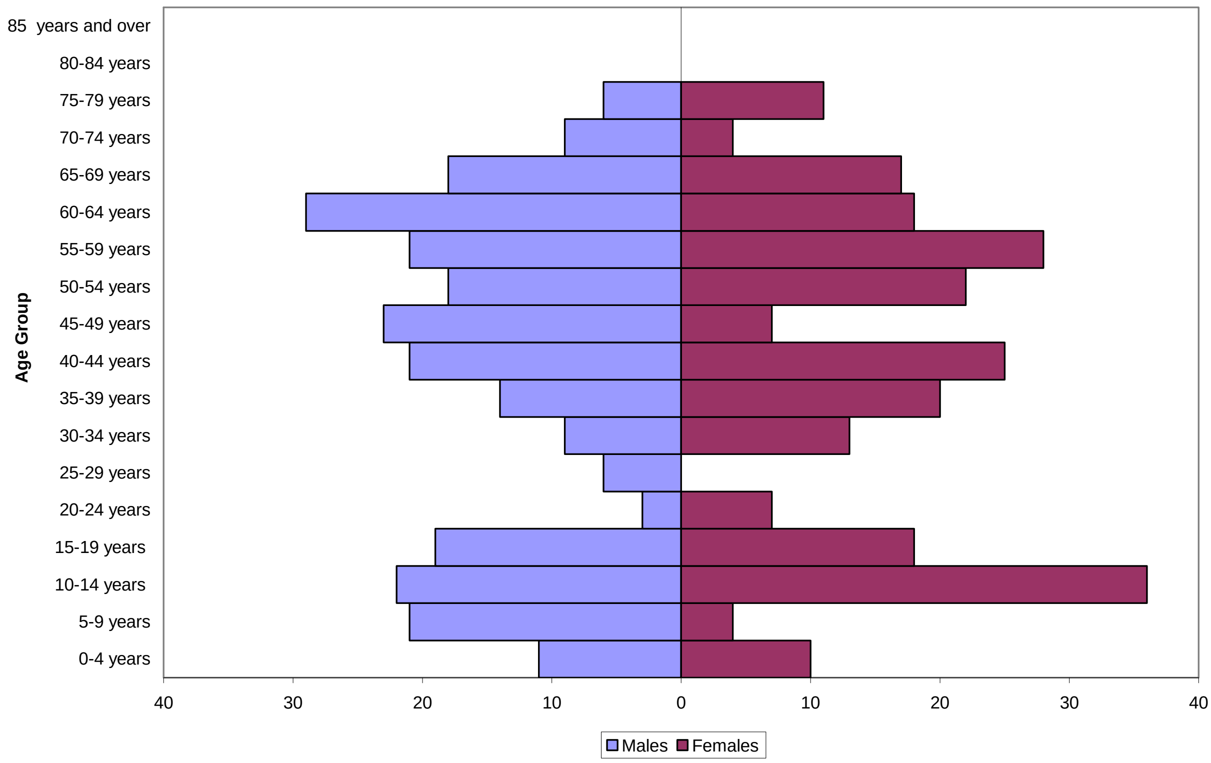


Figure 9: Age structure of the Tillegra Dam catchment in 2006 – population pyramid

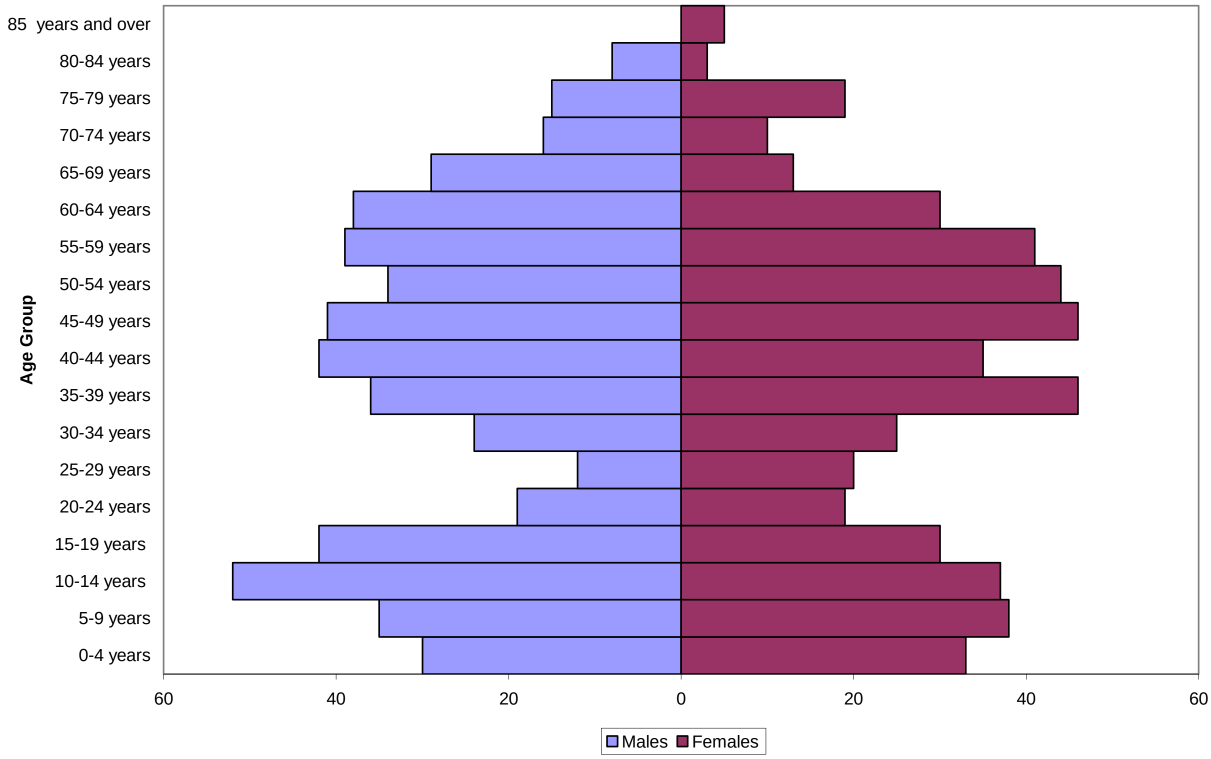


Figure 10: Age structure of the Vacy S94 catchment in 2006 - population pyramid

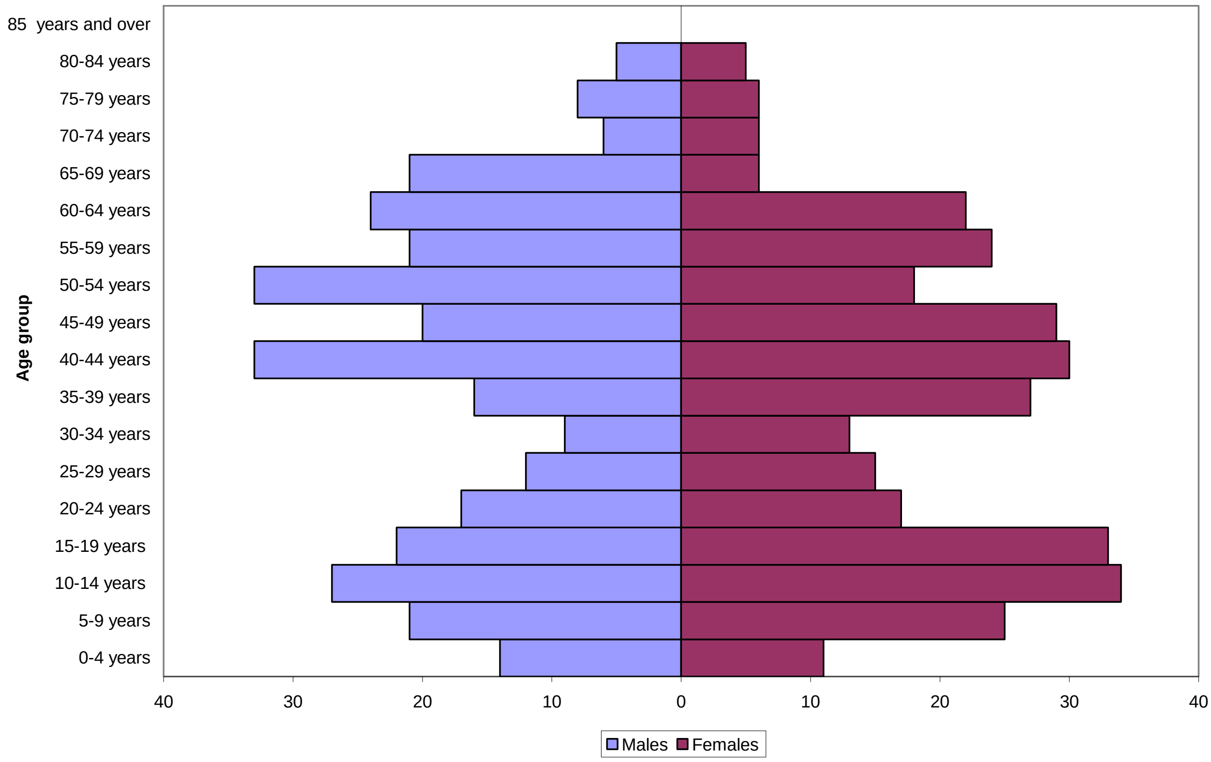


Figure 11: Age structure of the Martins Creek s94 catchment in 2006 - population pyramid

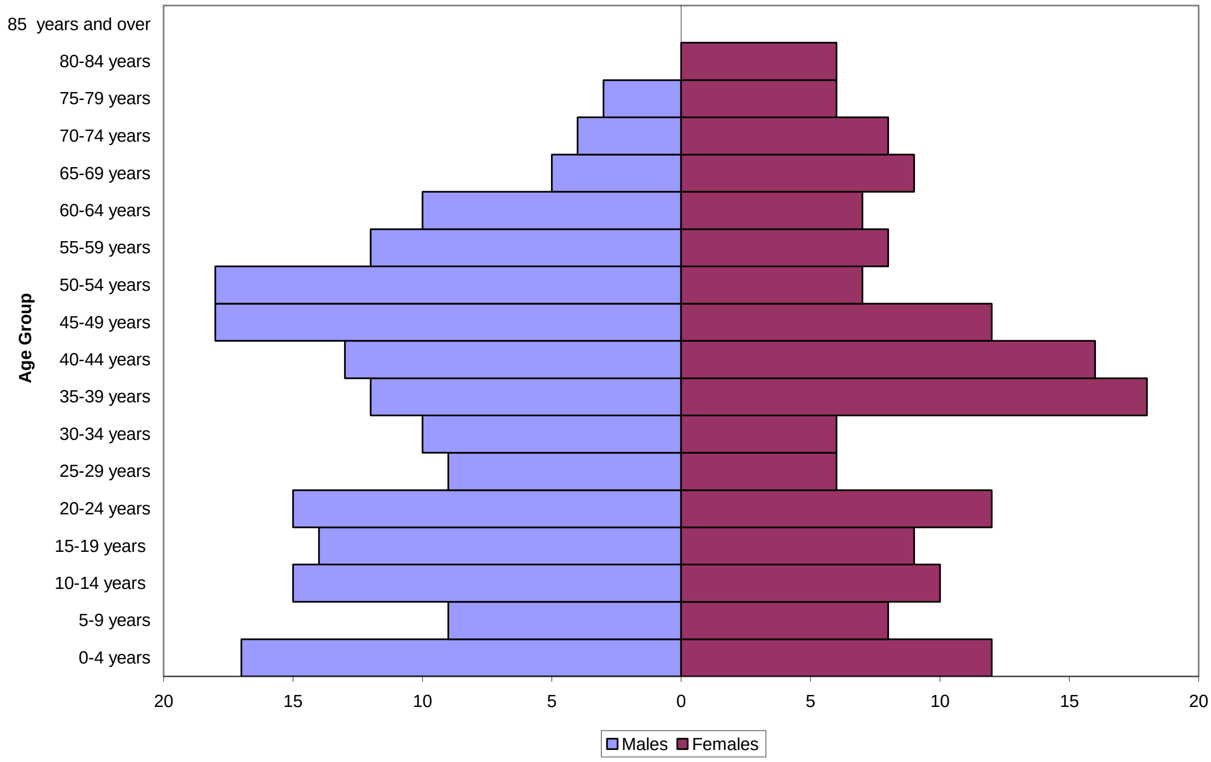


Figure 12: Age structure of the Paterson Urban s94 catchment in 2006 - population pyramid

Highlights from these age structure pyramids include the following:

- The Tillegra catchment has the highest proportion of young females in the 10-14 year age bracket, and has no females in the 25-29 group. There are generally a high number of people under 20 years with a correspondingly high number of people aged between 35 and 65. There are low proportions of people aged between 20 and 35.

- Martins Creek has a particularly high proportion of males aged between 40-44 and 50-54. There are also a high proportion of people under 20, particularly females.

- Vacy shows a relatively typical rural age pyramid, with a higher proportion of children, a lower number of people in the 20-29 year age groups, a correspondingly high number of middle-aged people and a tapering of the pyramid for people aged over 65 years of age.

- Paterson Urban has the highest proportion of females in the 35-44 year age brackets, and males in the 45-54 year age groups.

Table 35, below, shows the distribution of weekly household income for the special interest planning precincts, while Table 36 shows the proportion of higher and lower income households within the precincts.

Table 35: Weekly household income by special interest planning precinct, 2006

	Tillegra Dam Planning District		S94- Vacy		S94- Martins Creek		S94- Paterson Urban	
	No of house holds	% of total house holds	No of house holds	% of total house holds	No of house holds	% of total house holds	No of house holds	% of total house holds
Negative/Nil income	0	0%	0	0%	3	1%	0	0%
$1-$149	5	3%	14	4%	5	2%	6	5%
$150-$249	9	5%	12	4%	8	4%	8	6%
$250-$349	18	10%	13	4%	11	5%	5	4%
$350-$499	8	4%	25	7%	12	6%	7	5%
$500-$649	17	9%	26	8%	18	8%	11	9%
$650-$799	18	10%	22	7%	13	6%	14	11%
$800-$999	16	9%	27	8%	12	6%	5	4%
$1,000-$1,199	25	14%	35	10%	29	13%	13	10%
$1,200-$1,399	15	8%	12	4%	15	7%	8	6%
$1,400-$1,699	15	8%	30	9%	12	6%	7	5%
$1,700-$1,999	12	7%	31	9%	12	6%	9	7%
$2,000-$2,499	3	2%	16	5%	21	10%	15	12%
$2,500 -$2,999	4	2%	14	4%	11	5%	0	0%
$3,000 or more	4	2%	17	5%	8	4%	3	2%
Partial income stated(c)	11	6%	31	9%	19	9%	12	9%
All incomes not stated(d)	0	0%	12	4%	6	3%	5	4%
Total	**180**	**100%**	**337**	**100%**	**215**	**100%**	**128**	**100%**

Source: ABS Census Data 2006

Table 36 below shows that the highest proportion of households in Tillegra Dam catchment (14%); Vacy (10%) and Martins Creek (13%) earn a weekly income of $1,000-$1,199. The highest proportion of people in Paterson Urban (12%) earned $2,000-$2,499 per week, followed closely by those earning $650-$799 per week (11%).

However, as shown in Table 36, most special interest precincts had a very similar proportion of households with a higher income (above $1,400 per week) to those with a lower income (earning below $500 per week). The only exception is Paterson Urban, which had a 7% higher proportion of households with higher incomes (27%) than with lower incomes (20%).

Table 36: Proportion of households with lower incomes (below $500 per week) and higher incomes (above $1,400 per week) by special interest planning precinct, 2006

	Tillegra Dam catchment	S94-Vacy	S94-Martins Creek	S94-Paterson Urban	Total Dungog LGA
Proportion of households with lower incomes within each precinct	22%	32%	30%	20%	24%
Proportion of households with higher incomes within each precinct	21%	32%	30%	27%	23%

Source: ABS Census Data 2006

Table 37 below shows the sectors in which employed people worked in 2006, by special interest planning precinct.

Table 37: Industry of employed persons by special interest planning precincts, 2006

	Tillegra Dam catchment		S94 Vacy		S94 Martins Creek		S94 Paterson Urban	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Agriculture, forestry & fishing	73	31.6%	75	15.7%	32	10.5%	7	4.2%
Mining	6	2.6%	12	2.5%	6	2.0%	6	3.6%
Manufacturing	15	6.5%	36	7.5%	31	10.1%	24	14.5%
Electricity, gas, water & waste services	3	1.3%	6	1.3%	0	0.0%	6	3.6%
Construction	24	10.4%	53	11.1%	28	9.2%	10	6.0%
Wholesale trade	4	1.7%	9	1.9%	9	2.9%	7	4.2%
Retail trade	16	6.9%	33	6.9%	28	9.2%	16	9.6%
Accomm & food services	9	3.9%	24	5.0%	18	5.9%	16	9.6%
Transport, postal & warehousing	9	3.9%	24	5.0%	17	5.6%	16	9.6%
Information media & telecommunications	0	0.0%	12	2.5%	3	1.0%	0	0.0%
Financial & insurance services	0	0.0%	3	0.6%	12	3.9%	3	1.8%
Rental, hiring & real estate services	9	3.9%	9	1.9%	3	1.0%	3	1.8%
Professional, scientific & technical services	5	2.2%	26	5.4%	15	4.9%	3	1.8%
Admin & support services	0	0.0%	10	2.1%	9	2.9%	3	1.8%
Public administration & safety	3	1.3%	14	2.9%	13	4.2%	11	6.6%
Education & training	16	6.9%	46	9.6%	25	8.2%	13	7.8%
Health care & social assistance	24	10.4%	51	10.6%	29	9.5%	10	6.0%
Arts & recreation services	0	0.0%	3	0.6%	6	2.0%	0	0.0%
Other services	6	2.6%	11	2.3%	15	4.9%	3	1.8%
Inadequately described/Not stated	9	3.9%	22	4.6%	7	2.3%	9	5.4%
Total	**231**	**100%**	**479**	**100%**	**306**	**100%**	**166**	**100%**

Source: ABS Census Data 2006

Table 37 shows that the highest proportion of people in the Tillegra Dam catchment work in the agriculture, forestry and fishing sector (31.6%), followed by employment in the construction and health care and social assistance sectors, both at 10.4%. Vacy and Martins Creek also have the highest proportion of people working in the agricultural sector (at 15.7% and 10.5%), while Paterson Urban has a higher proportion of people working in the manufacturing sector (14.5%). Paterson Urban also had higher proportions of people in the retail; accommodation and food services; and transport, postal and warehousing sectors, all at 9.6%.

Table 38 shows employment by occupation for each of the precincts in 2006.

Table 38: Occupation of employed persons by special interest planning precincts, 2006

	Tillegra Dam Planning District		S94 Vacy		S94 Martins Creek		S94 Paterson Urban	
	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people	No. of employed people	% of employed people
Managers	81	34.8%	111	23.1%	56	18.4%	23	14.1%
Professionals	32	13.7%	89	18.5%	58	19.0%	17	10.4%
Technicians and trades workers	34	14.6%	89	18.5%	52	17.0%	33	20.2%
Community and personal service workers	17	7.3%	40	8.3%	26	8.5%	11	6.7%
Clerical and administrative workers	22	9.4%	49	10.2%	35	11.5%	22	13.5%
Sales workers	3	1.3%	20	4.2%	25	8.2%	12	7.4%
Machinery operators and drivers	13	5.6%	30	6.2%	24	7.9%	25	15.3%
Labourers	19	8.2%	46	9.6%	29	9.5%	20	12.3%
Inadequately described / Not stated	12	5.2%	7	1.5%	0	0.0%	0	0.0%
Total	**233**	**100%**	**481**	**100%**	**305**	**100%**	**163**	**100%**

Source: ABS Census Data 2006

As shown in Table 38, above, Tillegra Dam and Vacy had the highest proportion of managers. This most likely reflects the number of self employed farmers in rural areas who are classified as managers. Martins Creek had the highest proportion of professionals at 19%, while Paterson Urban had the highest proportion of technician and trade workers at 20.2%.

With regard to unemployment in 2006, Paterson Urban had the highest rate of unemployed people, at 7% of the total workforce (people aged 15 years or over). The Tillegra Dam precinct had a low rate of unemployment at 1.7%. Vacy had an unemployment rate of 4%, while Martins Creek had a rate of 3.2% (ABS Quickstats, 2006).

8.6 Economic characteristics and trends

The economy of the LGA relies substantially on agriculture, particularly dairying, beef production and poultry meat production. The Hunter Valley Research Foundation compiles regional economic data for the Hunter Region, including the Dungog LGA. Dungog Shire Council also compiles data on some economic indicators. A summary of the review of key economic data is shown in Table 39 below.

Table 39: Summary of key economic data indicators (Dungog LGA)

Indicator	Data source	Comments
Residential dwelling approvals and construction	Dungog Shire Council	Historic data shows considerable fluctuations in residential building approvals in Dungog LGA.
House prices and affordability	Newcastle and the Hunter Region – annual review, Hunter Valley Research Foundation, and Centre for Affordable Housing (Department of Housing)	House prices have generally risen over the last few years, though housing affordability for low income earners is much higher than for the rest of NSW. Rental affordability is relatively high and has remained stable over the last 2 years.
Number of businesses in Dungog LGA	Newcastle and the Hunter Region – annual review, Hunter Valley Research Foundation	Small business, employing less than four people dominates this sector. The larger operations are concentrated within health and community services, tourism, education and property and business services.
Hunter region economic indicators	Hunter Valley Research Foundation quarterly reports	Provides regional data on the labour force, household spending, business profits and investment and economic outlook.
Regional economic and social statistics	Newcastle and the Hunter Region – annual review, Hunter Valley Research Foundation	Provides a review of regional social and economic profile and trends.
Tourism	Newcastle and the Hunter Region – annual review, Hunter Valley Research Foundation, and ABS Census data	Dungog LGA had about 39 accommodation businesses, cafés and restaurants in 2006, and 5.8% of the working population in the accommodation and food services sector.
Employment in Agriculture	ABS Agricultural Census	About 468 persons directly employed in agriculture in 2001.
Economic or age dependency ratio (the proportion of population in receipt of earned income)	ABS Census data	The age dependency ratio is about the Hunter Region average

8.7 Infrastructure and settlement structure

8.7.1 Land use and settlement

8.7.1.1 Past and present

The Indigenous people of the Dungog area were from the Awabakal, Gringai and Kattang Tribes with people of the Gringai subgroup being known as the Wonnarua people and people of the Worimi being known as the Kattang. The various tribes were historically distributed in 'relatively large' numbers throughout the district in local groups or 'urras' approximately 8 km apart, in villages which consisted of 8 or 9 huts or families. People lived mostly by hunting and fishing, and though nomadic in nature, congregated in particular places for particular times and events (DSC, 2005).

The first white men in the area arrived in the early 1800's and were thought to be searching for wayward cattle. Soon afterwards, timber getters were attracted into the area by the thick stands of mature cedar. The first white settlements were established along the Paterson and Williams Rivers around 1801, and mainly consisted of convicts employed in cutting the stands of timber along the riverbanks. The first land grant in the area was made in 1821, paving the way for free settlers and further development (DSC, 2005).

The ongoing European settlement of Dungog was largely fuelled by various forms of agriculture, though a range of other industries were established including trading posts, market centres, ship building industries, and acite quarries and small factories. White settlement gradually extended into the traditional birthplace and hunting lands of the Aboriginal people and so began the eroding of indigenous social structure and society. While there is anecdotal evidence that Kooris and white settlers enjoyed a generally amiable relationship throughout these early years (DSC, 2005), European diseases, European/Koori conflicts and the effects of dispossession led to the gradual breakdown of the indigenous society. The last survivor of the Gringai tribe died in 1905.

Land tenure in the early years of white settlement typically comprised large estates of flat or undulating land containing open forests or woodland, which were either granted by the government or purchased. Mountains and hills were generally reserved as Crown Land and were generally not populated until after 1861 when the NSW Land Act made it possible to select portions between 40 and 320 acres (DSC, 2005). As time progressed, many of the original large estates were subdivided into smaller farms which were leased out or sold. Subdivision was driven by a number of factors, including increasing labour costs and lack of profitability and eventually led to a closer settlement pattern. These former large estates often evolved into rural communities such as Glen William, Underbank and Wallarobba (DSC, 2005).

Today, land use in the Dungog LGA continues to be driven by agriculture, with large areas dedicated to cattle grazing and more intensive agricultural uses along the rich alluvial plains. Other major land uses include catchments for water supply, forestry, nature conservation, rural/ residential development and scattered centres of urban settlement.

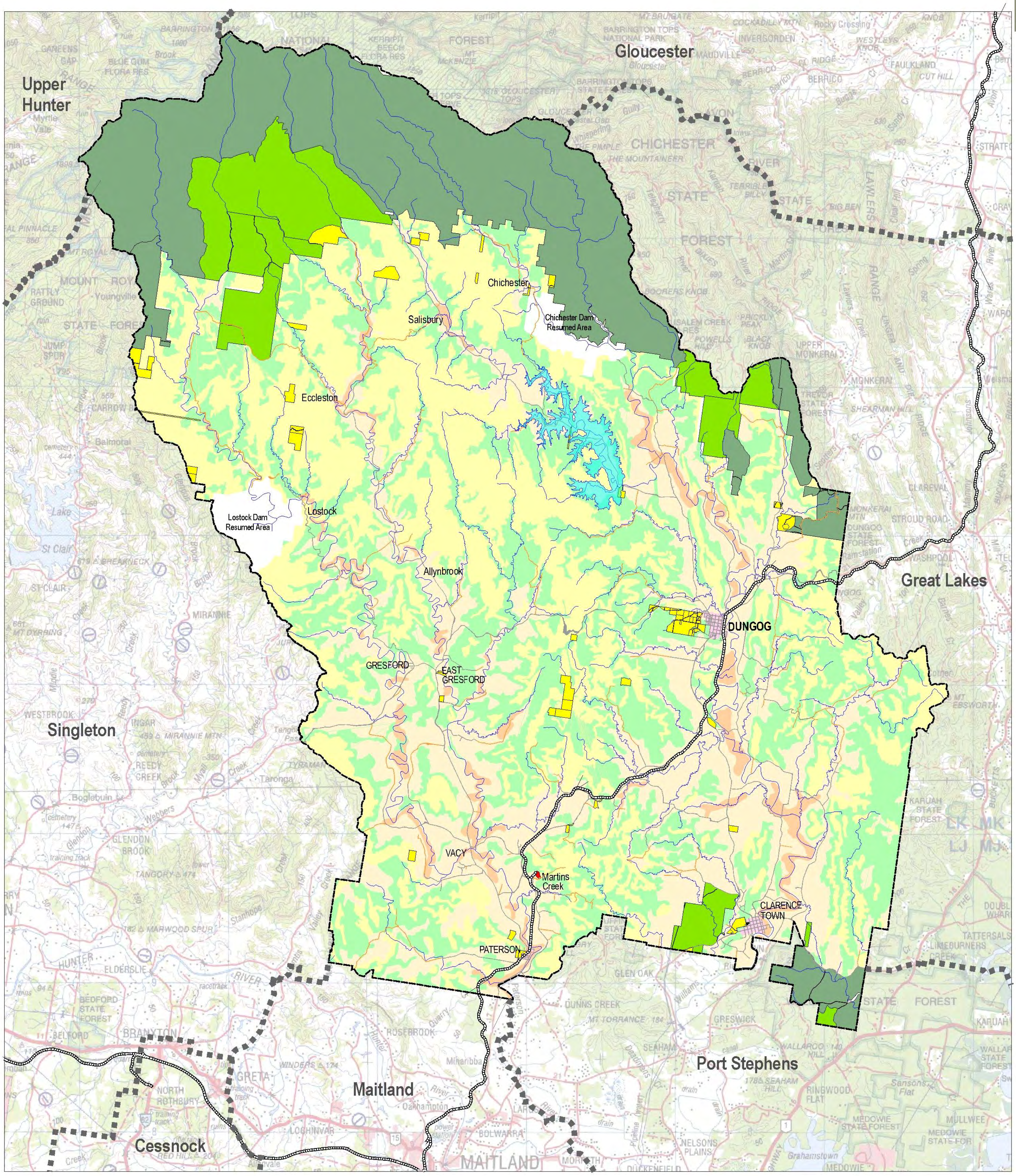
The population distribution of the Dungog LGA has been previously shown in Map 8.1, and broad land uses and tenure are shown in Map 8.2.

8.7.2 Agriculture

Agriculture is the main rural land use within the Dungog LGA and continues to be the main determinant of the landscape and character, significantly contributing to local economic activity. Most rural land is privately owned and has been extensively cleared.

Periodic targeted surveys undertaken by the ABS collect data on agricultural production for local government areas and this is then compiled and interpreted by the NSW Department of Primary Industries (DPI, 2007*a* and *b*). The DPI believes it under-represents the actual value of agriculture to the LGA. For example, the data only includes farms with more than $5,000 gross value of agricultural production per year (valued at the farm gate). Agricultural statistics are also strongly influenced by significant variations in season and market conditions; hence caution is required in interpreting changes as indicative of ongoing trends.

This section provides a summary of the information available for the LGA from surveys conducted in 2001. More recent data is currently unavailable.



DISCLAIMER:

This map has been produced to assist individuals in determining land details within Dungog Shire Council, the information contained is made in good faith but on the basis that Council or its staff are not liable (wether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of representation, statement or advice referred to above.

Source & Copyright: Dungog Shire Council (2008) LPI(2008), DNR(2008), RFS(2008), HCED(2008)

This map has been prepared for Dungog Shire Council for the purposes of the Tillegra Dam Situation Analysis and should be read in conjunction with the report.

LEGEND - LAND USE / TENURE

- Crown Land/Reserves
- NATIONAL PARK
- STATE FOREST
- MINING AND QUARRYING AREAS
- URBAN AREA

LEGEND - RURAL LAND CAPABILITY

- SUITABLE FOR GRAZING WITH NO CULTIVATION
- SUITABLE FOR GRAZING WITH OCCASIONAL CULTIVATION
- SUITABLE FOR REGULAR CULTIVATION
- OTHER
- PROPOSED TILLEGRA DAM
- SEALED ROADS
- UN-SEALED ROADS

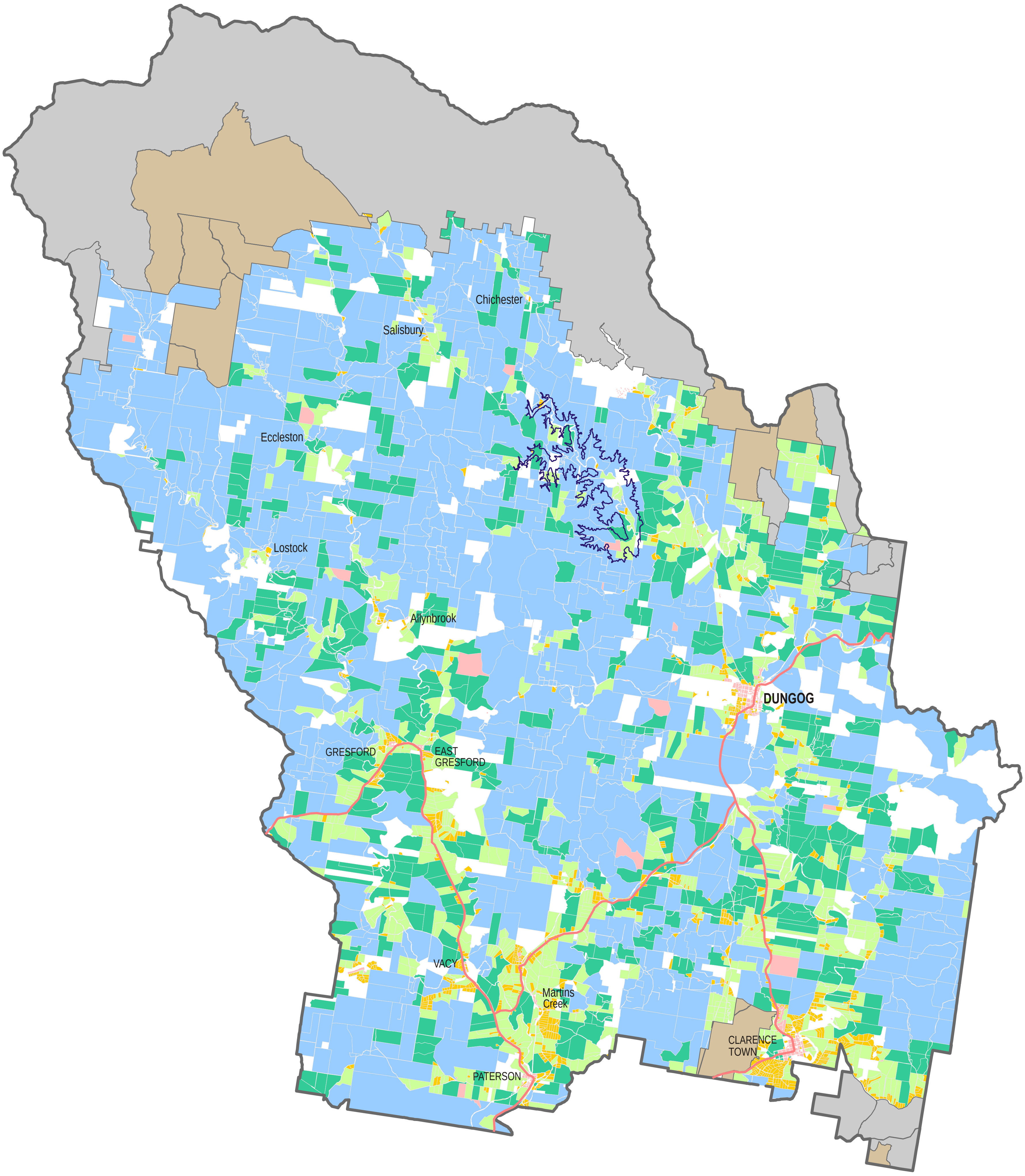
Broad Land Use & Tenure, Agricultural Land Suitability / Capability

8.7.2.1 Agricultural land area

The area of farms in the Dungog LGA that were surveyed in the ABS 2001 Agricultural Survey was 121,868 hectares, which was 54% of the total area of the LGA. By comparison in 1996-97, the total surveyed area occupied by agriculture was 123,282 hectares, implying a decrease in the area occupied by agriculture of 1,414 hectares, or around 1%. Note that to be included in the farm surveys farms must produce agricultural products with a wholesale value of over $5,000 per year.

The total number of farms within the LGA also decreased, from 417 in 1996/97 to 411 in 2001.

The following data has been sourced from the Department of Primary Industries and is based on Department of Lands Cadastral Data as at 1 March 2007. The holding analysis corresponds to lots amalgamated by owners as identified by the ‘PVPR identifier’ in the Valuer – Generals ownership data. Non–freehold land has been excluded (Crown Land, National Park and some State Forest) as shown in Map 8.3.



PROPOSED TILLEGRA DAM

SIZE DISTRIBUTION OF PROPERTY HOLDINGS IN DUNGOG SHIRE

Road data © Commonwealth of Australia (Geoscience Australia) 2006.

Land parcel, National Park, State Forest and ownership source data courtesy NSW Department of Lands, Bathurst, Australia. Crown Copyright © 2006, 2007. All rights reserved. www.lands.nsw.gov.au

Cadastral data dated March 2007.
Ownership data dated October 2006.

Analysis and map produced by the
Resource Infromation Unit,
NSW Department of Primary Industries,
ORANGE NSW 2800
8th May 2008

NSW DEPARTMENT OF
PRIMARY INDUSTRIES

A holding is defined to be a set of cadastral land parcels all associated with the same PVPR number (property owner identifier) in the Valuer-General's system. The shared boundaries between contiguous land parcels of individual properties are not shown.

Key

Roads

PRINCIPAL ROAD
SECONDARY ROAD
COUNCIL BOUNDARY
NATIONAL PARKS
STATE FORESTS

Holdings Size (ha) and Number

0-1	2000
1-10	940
10-60	681
60-120	381
120+	351

Land for which the owner cannot be linked to the cadastre is left blank (uncoloured).

Property Holdings - Size and Distribution

Table 40: Department of Primary Industries – Holding Data

Holding Size (Areas are in hectares)	Number	Area	% of LGA Holdings Area
Area < 1	2000	426	0.3
1<=Area<4	532	1332	0.9
4<=Area<10	408	2556	1.7
10<=Area<60	681	19661	13.0
60<=Area<120	381	32105	21.2
120<=Area<200	159	24952	16.5
200<=Area<400	136	36263	24.0
400<=Area<600	37	17989	11.9
600<=Area	19	16006	10.6
Totals	**4353**	**151290**	**100.0**
Totals (excl smallest category)	**2353**	**150864**	**99.7**

8.7.2.2 Key agricultural statistics 2001

Key agricultural statistics for the Dungog LGA in 2001 are included in Table 41 below. The importance of the Dungog LGA's agricultural production to the Hunter Region is shown in Table 42 following.

Table 41: Dungog LGA key agricultural statistics, 2000-2001

	Dungog LGA
Number of farms surveyed	411
Areas of agricultural land surveyed	121,868 ha
Percentage of total LGA area	54 %
Value of agricultural production *	$38.4 million
Direct agricultural employment	468
Average area per farm	297
Average $ production per farm	$93,431
Average $ production per ha	$315
Average employment by farm	1.1

Source: Department of Primary Industries, 2007*a* using data on agricultural production from 2001 ABS Agricultural Survey.

Note: * value = the gross value placed on recorded production using average wholesale prices. On-farm value-adding is not included (eg feedlots or wine making). Surveys only include farms with more than $5,000 gross value of agricultural production per year (valued at farm gate). ABS data from agricultural surveys is unverified and conservative. ABS data based on wholesale prices and excludes value adding.

Table 42: The importance of agriculture in Dungog LGA to the Hunter Region, 2001

Agricultural attribute of the Dungog LGA	Percentage of the Hunter Region	Ranked position of the 13 Hunter LGAs
Agricultural area	8%	7
Number of farms	13%	2
Agricultural value	11%	2
Agricultural employment	9%	4

Source: Department of Primary Industries, 2007*a* using data on agricultural production from 2001 ABS Agricultural Survey

Note: ABS data from agricultural surveys is unverified and conservative. ABS data based on wholesale prices and excludes value adding.

Table 41 and Table 42 show that at the Agricultural Census in 2001:

- 411 farms were surveyed. This is 13% of the number of the Hunter Region's farms, but represented 8% of the area of the Hunter's farms.
- The average area of each farm was 297 ha.
- The total value of agricultural production was $38.4 million, which was 11% of the Hunter Regions total value of agricultural production.

The types of agricultural enterprises found in the LGA and their value and number of producers are shown in Table 43 below.

Table 43: Key agricultural commodities in the Dungog LGA, 2000/ 2001

Commodity	No. of producers*	% of producers	Value ($M)	% of total value
Milk	77	14.5%	$13.16l	34.3%
Cattle and calves slaughtered	343	64.8%	$12.08	31.5%
Poultry slaughtered	22	4.2%	$10.67	27.8%
Eggs produced for human consumption	6	1.1%	$1.32	3.4%
Nurseries	4	0.8%	$0.58	1.5%
Pastures cut for hay (inc pure lucerne)	67	12.7%	$0.26	0.7%
Pasture seed	5	0.9%	%0.06	0.2%
Mandarins	5	0.9%	$0.01	0.02%
Total	**529**	**100%**	**$38.4 #**	**99.4%**

Source: DPI, 2007*b*

* Number of producers who report the commodity item. A single producer may be recorded more than once if the farm produces more than one commodity.

\# Total value of all commodities, not just those listed in this table.

Table 43 shows that in 2001, 343 of Dungog LGA's farms (65% of the total) produced cattle and calves for slaughter, while about 15% produced milk and 13% produced pasture cut for hay. However, milk production accounted for the highest dollar value, at $13.16 million (34% of the total agricultural value produced in Dungog), followed by cattle and calves for slaughter at $12.08 million, and poultry for slaughter at $10.67 million. Other remaining key commodities were significantly smaller in value, the highest being eggs produced for human consumption at $1.32 million.

8.7.2.3 Agricultural enterprise trends

Comparable data from the 1993/94, 1996/97 and 2000/01 Agricultural Censuses reveals various trends in the Dungog LGA's agricultural sector, as shown in Table 44 below. Note that data comparing key commodity trends from the 1993/4 period was not readily available, therefore only 1996/97 data has been used.

Table 44: Dungog LGA agricultural trends, 1994-2001 and 1996-2001

Key trends	% change 1993/4- 2000/1
Number of farms	1%
Area of farmland (ha)	-7%
Average farm size (ha)	-8%
Value of all agricultural products	5%
Average value/ ha	14%
Average value/ farm	5%
Number employed in agriculture	-3%
Key Commodity trends	**% change 1996/7- 2000/1**
Total value of livestock products and carcasses	0.3%
Total value of broadacre crops and hay produced	45%
Total value of horticultural products	50%

Source: DPI, 2007*a* and *b*

Table 44 shows that from 1994-2001 the number of farms in the LGA slightly increased by 1%, but at the same time the overall area of farmland decreased by 7%. This meant that the average farm size fell by 8%. During that same period, the value of all agricultural products increased by 5%. The DPI notes that '*this indicates that increased fragmentation and reduced agricultural production may be offset by an intensification of production on other properties in the LGA; this may be due in part to the rationalisation of the dairy industry, but such affects only partly relate to this reporting period'* (DPI, *2007a*, pp13-14)

It is noted that dairy deregulation has markedly reduced the payment received by farmers for fresh milk and several farmers have left the industry from within Dungog LGA. The extent of the impact of deregulation '*is not truly represented in the statistics* *as the remaining farmers have improved their productivity, resulting in approximately the same regional volume of milk production*' (DSC, 2001: p149).

During the period 1996- 2001 the value of livestock products and carcasses rose only slightly, while the value of broadacre crops, hay and horticultural products increased by approximately half. Note that broadacre crops, hay and horticulture comprised only a very small proportion of the total value of agriculture production (a combined $1.1 million compared to the livestock products and carcasses value of $37.3 million).

Table 45 below shows the change in average farm size in the Dungog LGA between 1993 and 2001.

Table 45: Change in average farm sizes within Dungog LGA, 1993/4-2000/1

Year	Average area per farm
1993/ 1994	322 ha
1996/ 1997	296 ha
2000/2001	297 ha
Percentage change 1993/4- 2000/1	-8%

Source: DPI, 2007*a*

Table 45 shows that the average farm size in the LGA has decreased overall by 8%.

Agricultural activities vary across the LGA with there being areas suitable for grazing but no cultivation, areas suitable for grazing and occasional cultivation and areas for regular cultivation. Map 13 provides an overview of land use and tenure, agricultural land suitability and capability.

Recent research undertaken by the NSW Department of Primary Industries entitled '*Beef stocking rates and farm size – Hunter Region, NSW Department of Primary Industries'* (Blackwood et. al., 2006) investigated the viable farm size for beef production in the Hunter Region. The publication suggests that a property of at least 150 ha is required to sustain a functional breeding unit (of 40 cows) on typical grazing lands in the Hunter Region, with a modest to low level of productivity and management.

This document has great relevance to the Dungog LGA's situation, particularly as 65% of farms in the Dungog LGA produced beef cattle in 2001. It could be argued that cattle production is one of the most sustainable agricultural land uses in the area. If this important industry is to be protected in the future, the planning controls for rural land and the proliferation of small scale subdivision in proximity to cattle producing farms should be reviewed.

8.7.2.4 Agricultural Employment

Agriculture is the largest sector in terms of local employment. The 2006 ABS Population and Housing Census identified that 465 people (or just over 13% of the workforce) were employed in the agriculture, forestry and fishing sector in the Dungog LGA. In comparison, the next highest sector, health care and social assistance, employed just below 10% of the workforce. From 1996 - 2006, the number of people employed in the agriculture, forestry and fishing sector decreased slightly (approximately 4%), which was the largest shift out of all employment sectors within Dungog LGA (ABS Census Time series data, 2006). It is unclear what proportion of this shift is attributable to the agricultural sub-sector alone.

Department of Primary Industries data indicates that a decline in employment directly related to agriculture occurred between 1996 and 2001, decreasing by approximately 5% (DPI, 2007*b*). The average employment per farm in 2001 was 1.1, a slight decrease from 1.2 in 1996 (DPI, 2007*a*).

8.7.2.5 Implications of agricultural sector for future planning

Agricultural land in the LGA is a vital resource which provides the basis for about 13% of the employment activity within the LGA. It is also the most prominent land use at 54% of the LGA area. At the ABS Census 2001, the value of agricultural production was $38.4 million and 468 people were directly employed in agriculture.

In '*Government News'*, May 2008, an article written by Adam Coleman and expressing the views of Ian Sinclair, Edge Consulting, states *'Australia's agricultural land is finite, with about 10% of Australia's land being arable for agriculture. In NSW 18% of food is produced on the metropolitan fringe and rural sprawl or extensive rural residential development posses a real risk to being able to produce local reliable food into the future. Food producers are continually being forced to relocate further from urban centres to areas where water is more difficult and transportation is harder to markets, which increases the cost of food to consumers'* (Coleman, 2008). Future agricultural land use depends on the capacity for efficient, sustainable production and the ability to access markets which are increasingly competitive. Pressure for rural subdivision for non agricultural purposes can result in the alienation of key resources and an increased risk of conflict between land uses. Combined with increasing land prices there is a great risk to future agricultural viability.

In Dungog LGA the spread of rural residential subdivision will be a continuing issue. Less land will be available for this purpose in the Lower Hunter due to the release of the Lower Hunter Regional Strategy, which significantly limits rural residential expansion. Buyers seeking this lifestyle are looking further afield and are moving into the southern areas of the Dungog LGA. When farmers are pressured by decreased agricultural viability, rural residential subdivision can be viewed as a financial alternative. This places further pressure on Council to provide rural residential opportunities and to service those properties. As reflected in the State Government's Rural Lands SEPP 2008, there are a number of issues to consider with regard to rural residential subdivision and it is often not considered a good, sustainable land use strategy.

Key Trends affecting agricultural land use:

- The average size of farms in the LGA reported by the ABS Survey in 2001 was 297 ha. The average farm size from 1994 - 2001 decreased by 8%.
- The best agricultural land is located along the alluvial floodplain systems of the major rivers. Most agricultural enterprises are constrained by water availability.
- The dominant agricultural industries in the LGA are dairying, beef cattle and broiler chickens.
- Dairy deregulation has had significant impacts upon the dairying industry in Dungog LGA, with a number of dairy farmers leaving the industry since deregulation was introduced. Dairying under deregulation requires a focus on energy efficiency and increased productivity.
- Although not recorded on an LGA basis, a very significant nationwide and state-wide trend in the last two decades has been the increasing significance of 'off farm' work and increasing involvement of farming partners in off farm operations. These changes are also expected to have occurred in the Dungog LGA and to be driven by a combination of increased opportunities for outside work (lower unemployment); the recognition of the benefits of diversifying income; lifestyle expectations; and the ongoing decline in real terms of trade for farm products.

There are many issues with regard to rural residential land uses which should be considered when developing land use strategies. These issues include:

- Minimum lot sizes, appropriate for subdivision but still able to support viable agriculture in the wider community, need consideration. The prevention of agricultural land fragmentation is also important.
- Appropriate zonings for rural land and limitations on the types of uses, or activities, that should be permissible in rural zones to prevent land use conflicts.
- Permanent conversion of agricultural land to other uses or its fragmentation into holdings not suitable for efficient, competitive production and the long term impacts on the potential for agricultural production and land use.
- Increasingly, agricultural production is expected to be limited by water availability. The most valuable agricultural lands are those associated with alluvial floodplains and aquifers, and protection of these lands represents a long term land use constraint.

8.7.3 Forestry

There are four areas of State Forest within the Dungog LGA, totalling 12,137 ha, of this, 7,622 ha are identified as a harvest exclusion zone where timber extraction is not permitted, resulting in a total net harvest area of 4,514 ha. The State Forests within the LGA are:

- Chichester State Forest (7,371 ha)
- Fosterton State Forest (921 ha)
- Masseys Creek State Forest (3,313 ha)
- Wallaroo State Forest (188 ha)

All State Forests comprise native (endemic) forests, except a small area of non-endemic eucalypt plantation established in the 1970's (206 ha). In addition, State

Forests have established plantations on private land through Joint Ventures (91 ha), where State Forests have the rights to the timber in return for financial incentives for the landowner.

State Forests of NSW have provided assistance to develop commercial forests for production of timber or carbon sequestration on coal mine lands in the Upper Hunter LGA. Mine lands in the Dungog LGA may provide similar opportunities, especially in buffer and rehabilitation areas, however most of the mining operations are small and nothing has been identified to date.

8.7.4 Employment land

The availability of suitable land for business, commercial and industrial uses is important for generating economic activity and employment. Generally, this land requires specific locational attributes such as good transport access, central location, and suitable services and lot sizes.

Surveys of existing business and industrial land uses within the LGA have been undertaken as part of the land use surveys. Current land uses within the LGA's towns and villages are shown in Maps 8.4 to 8.11. It should be noted these maps were developed as viewed from public roads, and so may contain inaccuracies or omissions due to the ambiguity of an existing use or property boundary, or inaccessibility from the public road network. Dungog Shire Council was consulted in an attempt to identify any inaccuracies.

At the time of writing, a review of the Transition Zone Areas around each community was being undertaken by Dungog Shire Council and draft documents had been adopted by Council and placed on public exhibition for comment. Map 7.2 identifies the Transition Zone areas.

8.7.4.1.1 Dungog Township

The Central Business District of Dungog is located in Dowling Street, in the east of the town. Most of the available business land [zoned 3(a)] is in use. There are a few flexible vacancies scattered throughout the CBD. A small but significant number of commercially zoned lots accommodate existing residential dwellings. (Map 8.4 and Map 8.5)

The Dungog CBD is expected to maintain its position as the dominant rural town in the LGA, and to be the focus of most growth services in the future. There is limited land available in or adjacent to the CBD that would be available for future commercial expansion.

The main issues for consideration with regard to business land around the Dungog CBD are as follows:

- Avoiding commercial sprawl and maintaining the benefits of a compact town centre
- Protecting heritage items and streetscape character

- Identify future business/ commercial sites as the LGA continues to grow and diversify
- Accommodating some growth via the refurbishment or adaptation of existing premises
- Creating opportunities for commercial competition and new developments such as supermarkets, specialty shops etc.
- Identifying “strategic development sites” within the CBD, that can also accommodate adequate car parking
- Promoting further ‘public domain’ improvements such as footpaths, lighting, seating etc.
- Enhancing opportunities for tourist/ day tripper services within the CBD.

8.7.4.1.2 Clarence Town

The CBD of Clarence Town is located on Grey Street. The majority of the land between the intersections of King Street and Duke Street is zoned 3(a) Business. Existing commercial uses are clustered around the Queen Street and Prince Street intersections, with the rest of the commercially zoned land currently vacant, undeveloped, or developed with residential dwellings. (Map 8.6)

The provision of commercially zoned land is generally considered adequate, and no major commercial or retail growth beyond this area is envisaged. There is potential for the provision of additional services and facilities for passing motorists or tourists and in particular the possible supply of a service station.

The main issues for consideration in the Clarence Town Business District are:

- consolidation and enhancement of the existing town centre
- maintaining historical character

8.7.4.1.3 Paterson

Paterson accommodates a number of shops and businesses along Duke Street and King Street. Almost all of the land within the township of Paterson is zoned 2(v) Village, which permits the development of commercial premises and other business uses with consent. The current Village zoning provides appropriate flexibility to respond to individual development proposals. (Map 8.7)

No major commercial or retail growth is envisaged for Paterson, although there is potential for the provision of additional services and facilities for passing motorists or tourists. In particular, there may be opportunities for growth in services and outlets similar to those in Morpeth. It is important to protect the character of the existing village centre.

Paterson is heavily constrained by view corridors, flooding, the railway line, and topography. The main issues for consideration in the Paterson Central Business area are:

- Maintenance of historic character and the possible promotion of this character for future tourist potential

- The challenges presented by the movement of trucks from Martins Creek Quarry, through the town.

8.7.4.1.4 Vacy

Vacy contains a single store and recreation club. The 2(v) Village zoning provides for commercial premises and other business uses with consent. No major changes are envisaged for Vacy, as the 2(v) zone provides sufficient flexibility to respond to commercial proposals assessed on merit. (Map 8.8)

8.7.4.1.5 Martins Creek

Martins Creek does not accommodate any existing commercial land uses. The 2(v) Village zoning allows for commercial premises and other business uses with consent. No major changes are envisaged for Martins Creek, as the 2(v) zone provides sufficient flexibility to respond to commercial proposals assessed on merit. (Map 8.9)

8.7.4.1.6 East Gresford

Commercial land uses in East Gresford are centred on the intersection of Durham Road and Park Street (which is also known as Gresford Road). Almost all of the land within the township of Gresford is zoned 2(v) Village, which permits the development of commercial premises and other business uses with consent. (Map 8.10)

There is a strong desire from local residents to maintain Gresford and East Gresford as separate villages divided by a rural corridor.

The Gresford Local Area Plan 2005 identified a potential for future residential growth within the town, and an associated need for more retail-commercial development should this be achieved.

8.7.4.1.7 Gresford

Commercial land use in Gresford is centred on the intersection of Durham and Paterson River Roads where there is one village store. Almost all of the land within the township of Gresford is zoned 2(v) Village, which permits the development of commercial premises and other business uses with consent. The Gresford Local Area Plan 2005 identified a potential for future residential growth within the town, and an associated need for more retail-commercial development. (Map 8.11)

There has been limited commercial activity in the Gresford village over past years and no major commercial or retail growth is envisaged. There could be potential for some growth in facilities for passing tourists and day trippers.

8.7.4.2 Industrial Land

8.7.4.2.1 Dungog Township

An industrial estate is located at the terminus of Common Road, to the west of Dungog. A number of smaller, isolated areas throughout the town are also zoned for industrial uses, most notably a collection of lots between the CBD and the rail line, apparently zoned due to the existence of small to medium scale factories on those sites.

The industrial-zoned lots on the northern side of Common Road are almost fully utilised. Additional land zoned for Industrial uses [4(a) Employment zone] is available on the southern side of the road, although this is currently undeveloped.

The identification of possible sites for industrial purpose within or close to the Dungog Township is a matter of urgency. Should the Tillegra Dam proposal proceed there is potential for expansion of associated business and this is expected to create local pressure.

Employment land needs to be in more than one ownership to help maintain a competitive market. If tourism, as explored in '*Tillegra Dam: Assessment of Recreation and Tourism Potential*' (Jenny Rand and Associates, 2008 – Appendix 5) was to gain momentum there is potential for associated light industries and workshops. Providing expanded opportunities for local employment also encourages the retention of young people, increases local employment and retains the spending dollar of residents.

8.7.4.2.2 Clarence Town

The 3(a) Business zone within Clarence Town allows for 'employment' uses which includes industry and does not interfere with the amenity of the neighbourhood.

There is potential for the provision of further employment lands into the future given Clarence Town's access to Raymond Terrace and the Pacific Highway, recent population growth and increasing population pressures from the Lower Hunter. This will be investigated as part of the Land Use Strategy development.

8.7.4.2.3 Paterson

A small area zoned 4(a) Employment is located to the south of the town, along Webbers Creek Road, which appears to be fully utilised. Limited demand is envisaged for the future however, it is important to maintain supply. Investigation of opportunities to either expand the existing employment area or designate new areas needs to be undertaken.

8.7.4.2.4 Gresford, East Gresford and Vacy

With the exception of a few scattered light industries such as automotive repair centres or vehicle depots within East Gresford, these towns do not contain any industrial land uses. The 2(v) Village zoning, which dominates the towns of

Gresford and Vacy allows for 'employment' uses, which include industry which does not interfere with the amenity of the neighbourhood.

No major demand for additional employment land is envisaged in any of these communities. It is important to maintain the current zoning flexibility and respond to development proposals on merit.

8.7.4.2.5 Martins Creek

With the exception of uses associated with the Martins Creek State Rail Quarry, no industrial land uses exist within Martins Creek. The 2(v) Village zoning of land in the northern section of Martins Creek allows for 'employment' uses with consent. No major demand for additional employment land is envisaged. It is important to maintain the current zoning flexibility in order to respond to development proposals on merit.

8.7.5 Tourism

Tourism is a growing industry within Dungog LGA. Tourism NSW describes Dungog as '*rich in natural assets, mountain ranges, freshwater streams, clean air and magnificent rural vistas*' and lists Barrington Tops National Park and the area's historic buildings as some of the main attractions. The Barrington Tops and surrounding wilderness areas in particular have been promoted both within NSW and interstate, and help to fuel the growth of the ecotourism sector within the LGA.

Tourism is currently a relatively small employer within the LGA, but employment opportunities are beginning to increase. Employment in the arts and recreation services has been growing at a slow but steady rate (increasing by 0.4% since 1996). The modest increase in the accommodation and food services sector (0.1%) may also be attributable to tourism.

A detailed discussion paper, examining the tourism and recreation opportunities within Dungog LGA, '*Tillegra Dam: Assessment of Recreation and Tourism Potential',* was prepared by Jenny Rand & Associates in 2008, and will inform the development strategy for the LGA. The broad findings of this document (Appendix 5) include;

- Dungog LGA holds considerable potential as a tourism destination and this could be further increased if the Tillegra Dam proposal were to proceed.
- Environmental and recreational tourism present themselves as the most accessible sectors to the Dungog LGA community given the easy access to Rivers, National and State Parks and recreation areas.
- There is the potential to expand all forms of local accommodation including caravan parks, motel style, conference, meeting and resort style, Boutique and camping.
- Consideration in all planning needs to be given to connectivity by means other than the vehicle between points of environmental beauty providing opportunities for walking and cycling.
- Local architectural heritage also provides a cornerstone to possible tourism expansion.

- Placement and design of future developments to maximise views while providing facilities in scenic locations and minimising visual impacts of development is of primary importance.
- There is an opportunity for an iconic destination point to take the place of the recently lost Barrington House.

8.7.6 Housing

This section describes the characteristics of housing in the Dungog LGA. Key issues are numbers of dwellings, dwelling occupancy rate, types of dwellings, public housing, housing affordability and growth in dwelling construction. It will also analyse the extent to which the housing market caters for demand (especially rural residential, medium density, rental accommodation, and aged persons housing).

Note: Trends in development approvals, including housing approvals, are given separately in Section 8.4.

Housing in the urban areas and on the urban fringe of those areas, within the Dungog LGA is predominantly in the form of detached dwelling units of varying sizes on varying block sizes. The urban landscape is dominated by older style cottages and there are a limited number of dwellings higher than one storey. There is little to no unit or flat dwellings with only two townhouse or terrace developments being approved across the LGA since 2002. The townships of Dungog and Clarence Town are the only two to offer unit or flat accommodation.

8.7.6.1 Dungog

Dungog Township is constrained by flooding and the communities desire to maintain rural vistas. Zoned land available for future urban expansion is currently limited. Land holding future urban potential while maintaining urban integrity, needs to be identified. There is some limited potential for infill development on larger lots or currently undeveloped lots.

It is important for Dungog to maintain its historic integrity if it is to realise its future potentials as a tourist destination and strong planning controls are essential to this process. Local rental accommodation is limited in both quantity and quality. Sewer capacity is also limited.

There are also few opportunities for rural residential purchase. Where all other communities within the LGA have undergone an LEP review to consolidate and zone the previous Transition Zones, these areas had not previously been identified for the Dungog Township. There is current investigation being undertaken on possible alternatives for the supply of rural residential lands which will be available for the Land Use Strategy. Map 8.5 highlights the existing land uses of Dungog Township

8.7.6.2 Clarence Town

Clarence Town village has considerable potential for low density residential development with a scattering of appropriately zoned lots currently vacant. There is also an opportunity for the redevelopment of existing sites given the age and quality of some existing residential dwellings.

Over past years rural residential development has attracted considerable interest given the villages access to the Lower Hunter and Raymond Terrace. From a visual land use survey it appears most of the existing opportunity for rural lifestyle lots has been realised and the transition zone review has identified considerable land around the township with this future potential in mind.

8.7.6.3 Paterson

Paterson is also highly constrained in regard to future residential potential. As part of the Transition Zone review land was identified for potential rural residential and residential opportunity. Paterson Town – Existing Land Uses 2008 Map 8.7 identifies vacant residential holdings within the Paterson Township. It should be noted that of the local communities Paterson in the 2001 – 2006 census period was one of two communities in the LGA which had experienced population growth.

As part of the Transition Zone review Dungog Shire Council has identified substantial land around Paterson Township that holds potential for rural lifestyle development. A large piece of land was also retained as a transitional zone with the view that this holds potential for future urban residential development.

8.7.6.4 Vacy

Vacy Town – Existing Land Uses Map 8.8 suggests there is little residential land available within Vacy for residential expansion. The bridge into the town is of major concern and constantly under repair. The school is also under pressure to maintain teacher numbers. In general there has been considerable concern by residents over the expansion of rural residential style development.

8.7.6.5 Martins Creek

The residents of Martins Creek use Vacy or Paterson for day to day supplies. The Quarry places considerable pressure on the current village. There appears to be little residential vacancy, however, the demand is low and this not considered of major importance in future planning. Map 8.9 highlights the existing land uses of Martins Creek.

As part of the Transition Zone review Dungog Shire Council has identified land around Martins Creek that holds the potential for rural lifestyle development, and the possible expansion of the urban centre.

8.7.6.6 East Gresford and Gresford

There is a small amount of residential land available in the villages of East Gresford and Gresford however future demand is expected to be small. Residents have expressed a strong desire for these villages to maintain their individual identity. There is possible future demand from people working in the Singleton and Upper Hunter Areas for residential dwellings however this is most likely to be in the rural residential areas rather then the villages themselves. Map 8.10 and Map 8.11 highlight the existing land uses of East Gresford and Gresford, respectively.

There is a trend especially around the Gresford and East Gresford areas of vacant ownership, and there appears to be a higher demand in these communities for rural enterprise and home based businesses, current zonings allow for this use.

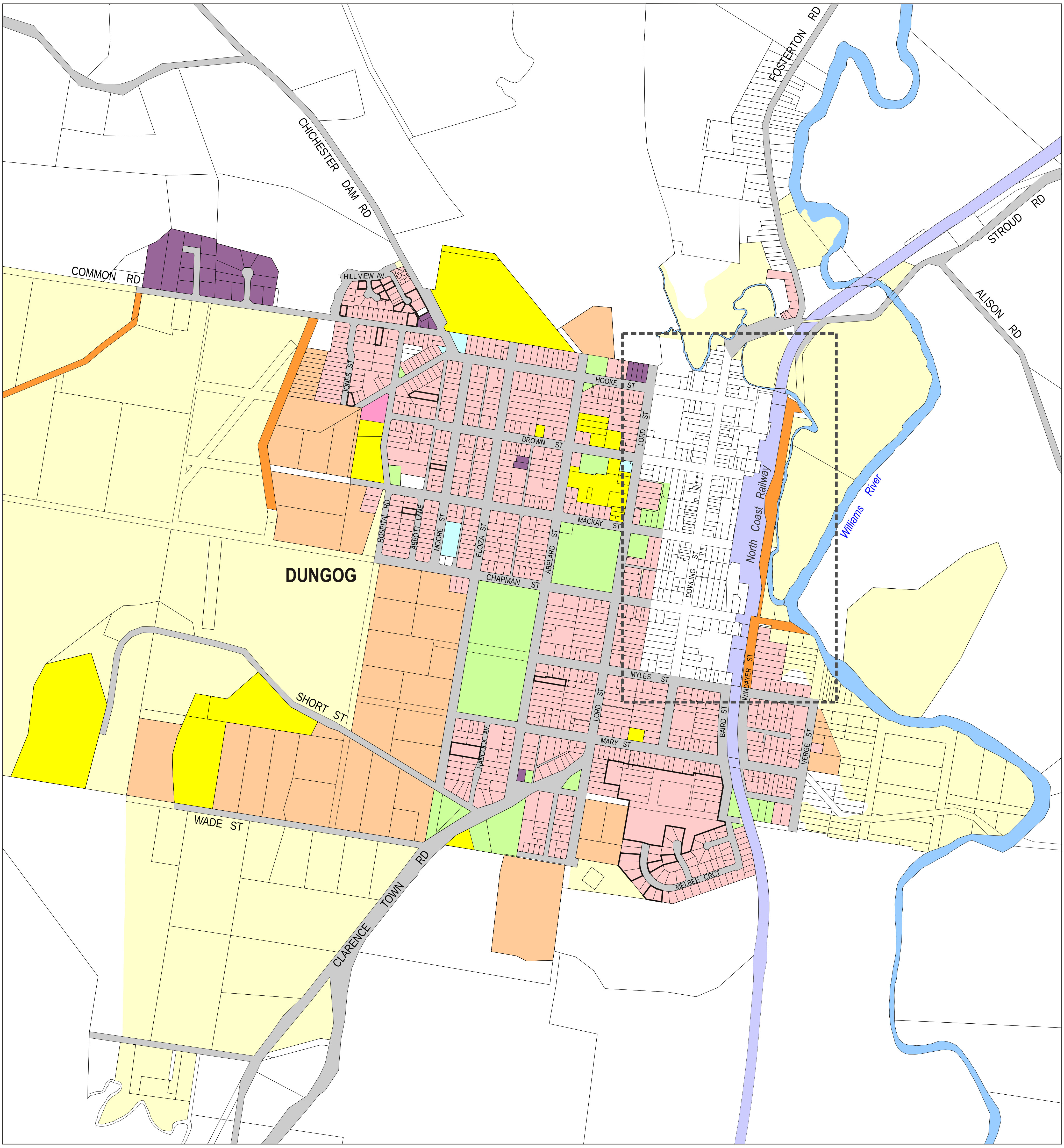
As part of the Transition Zone review Dungog Shire Council has identified substantial land around Gresford, East Gresford and Vacy townships for potential rural lifestyle development and urban expansion.

8.7.6.7 Housing Data Summary

Information available from the 2006 Census shows that the Dungog LGA had a total of 3,607 private dwellings, with over 95% of those dwellings separate houses.

In the Dungog LGA, about 15% of private dwellings were unoccupied. This proportion of unoccupied dwellings is slightly higher than the Hunter Region's rate of approximately 11%, possibly reflecting demographic trends, lower demand for housing, and absentee ownership (weekend retreats).

Data on housing tenure in the Dungog LGA for 2006 showed about 42% of occupied private dwellings were fully owned, 34% were being purchased, and 17% were rented. This represents a significantly higher proportion of occupied fully owned private dwellings than the Hunter Region, and a similar proportion of dwellings being purchased to the regional average.



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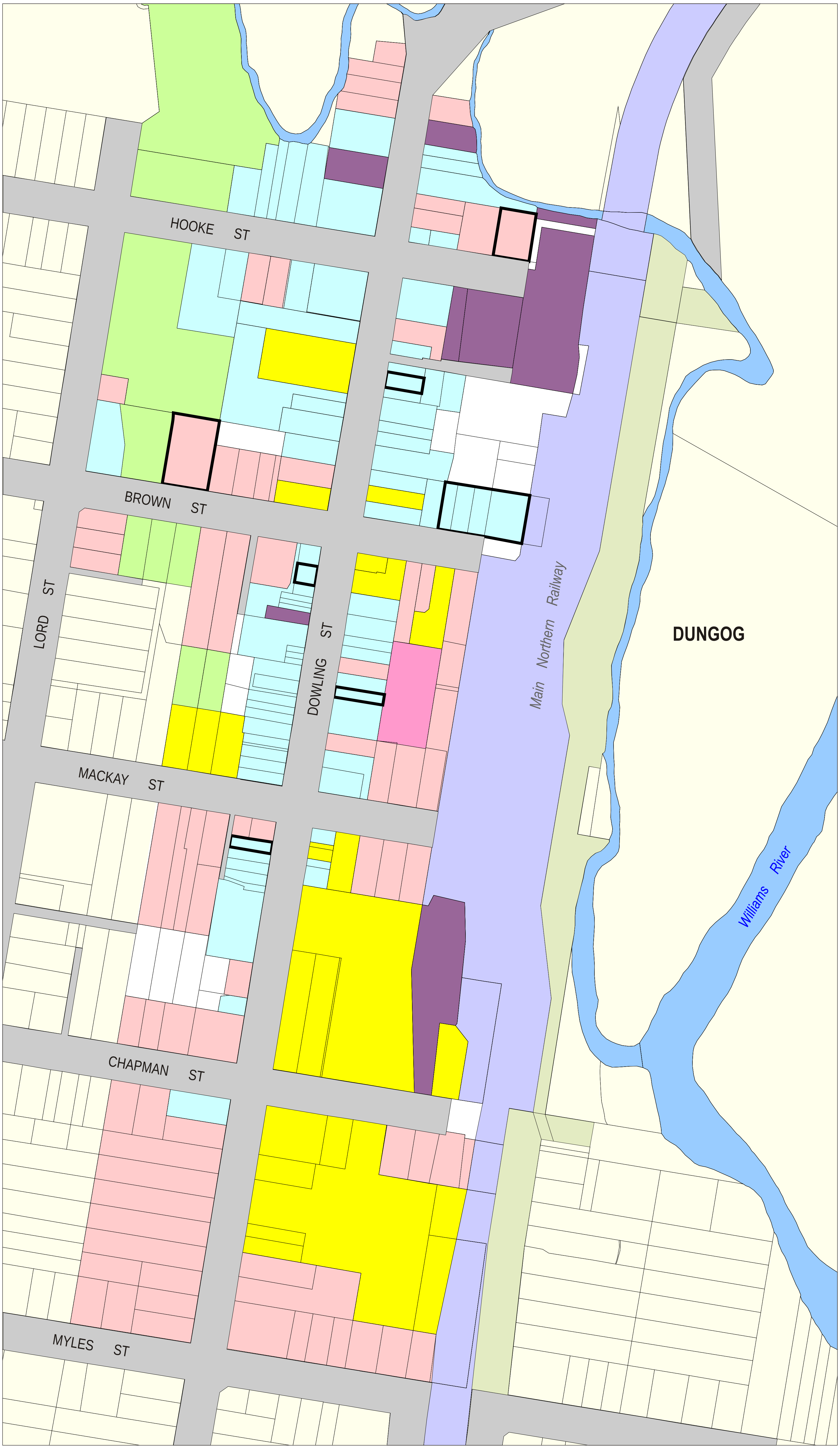
LEGEND

- see Fig. 15 enlargement
- Road - sealed
- Road - unsealed
- Residential - Low density
- Residential - Medium density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Industrial
- Industrial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)

Dungog Town - Existing Land Uses 2008



LEGEND

- Residential - Low density
- Residential - Medium density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Industrial
- Industrial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)
- Road - sealed
- Road - unsealed
- see next Fig "b" Dungog Town

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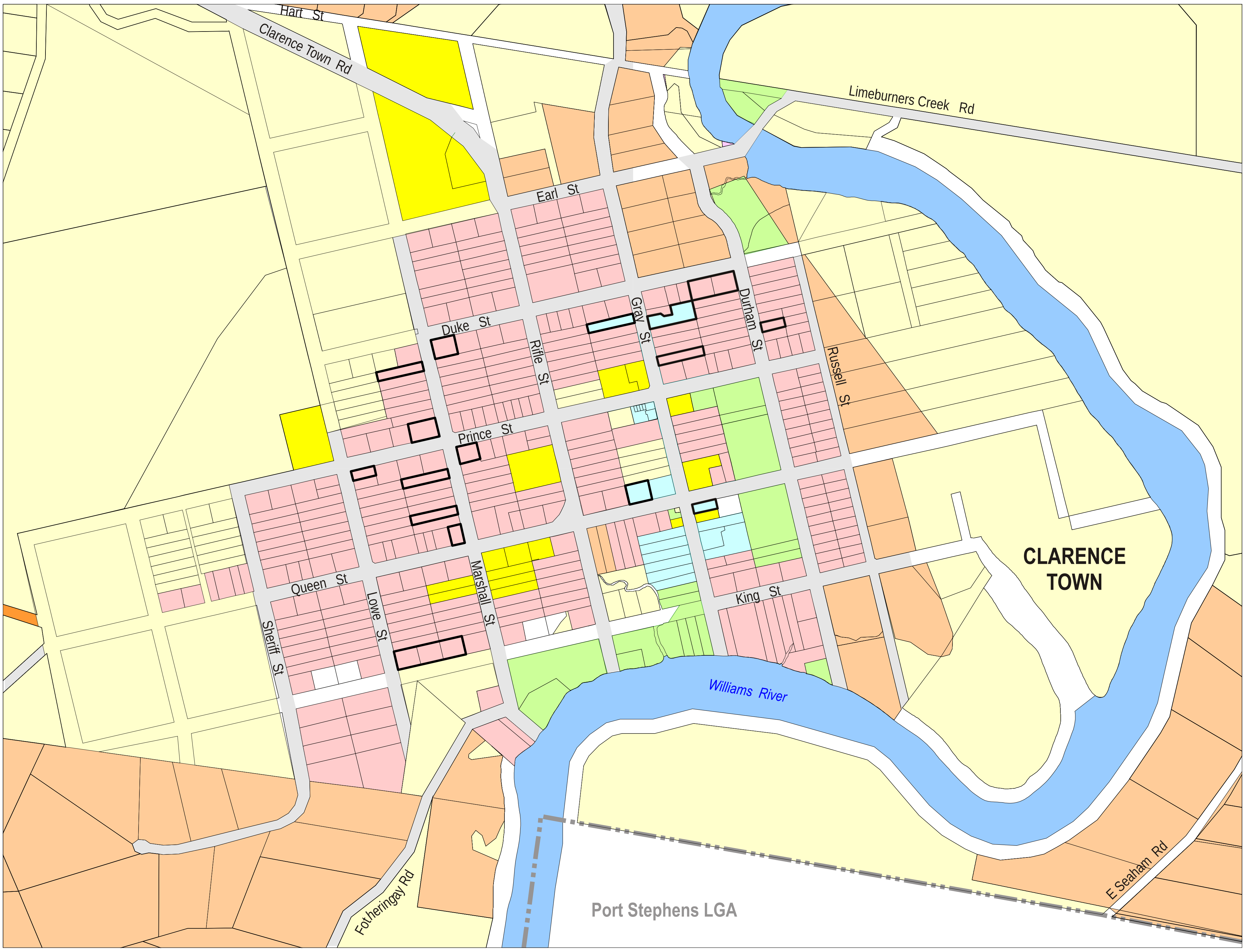
Dungog CBD - Existing Land Uses 2008



LEGEND

- Residential - Low density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)
- Road - sealed
- Road - unsealed

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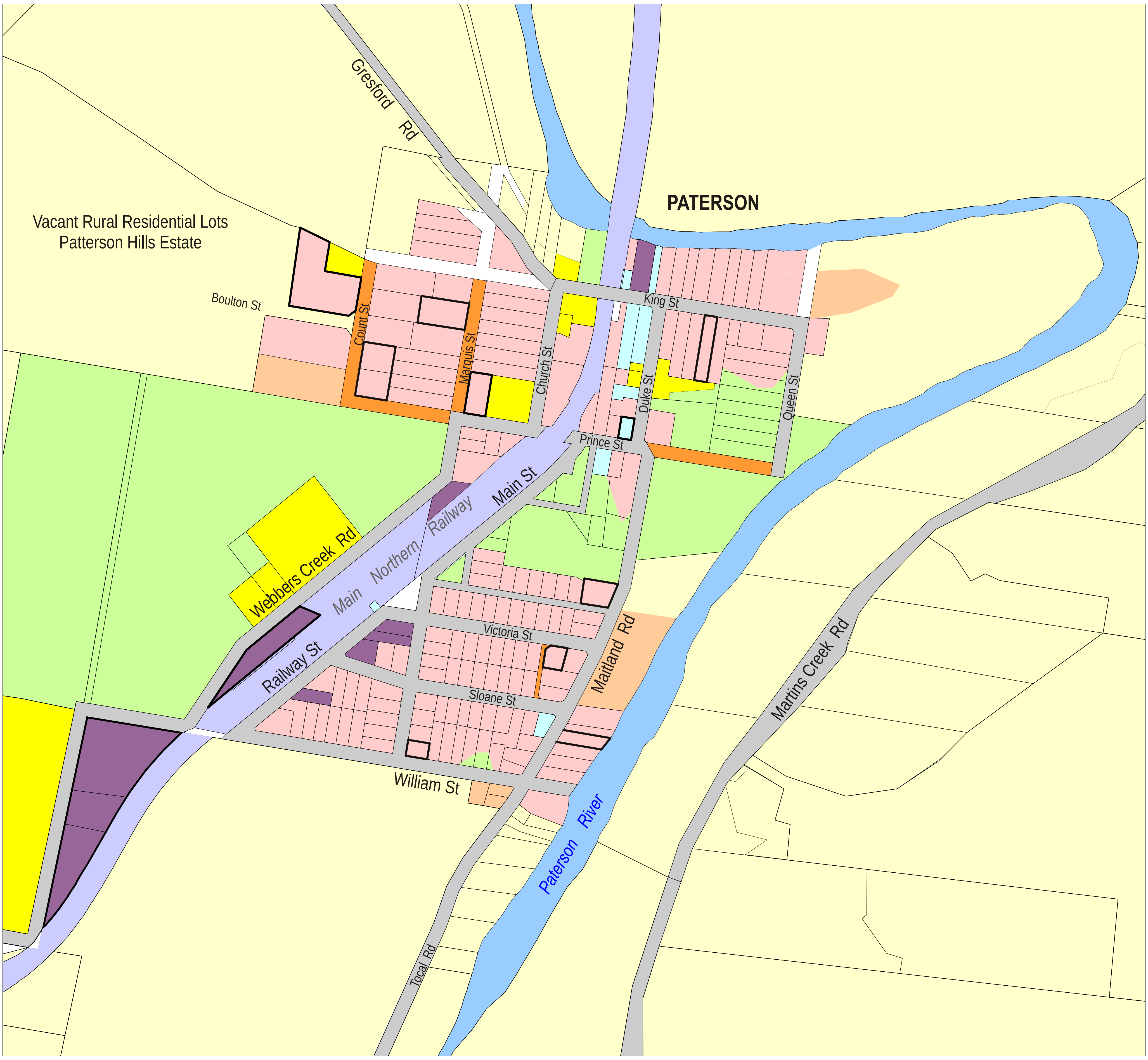
Clarence Town - Existing Land Uses 2008



LEGEND

- Residential - Low density
- Residential - Medium density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Industrial
- Industrial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)
- Road - sealed
- Road - unsealed

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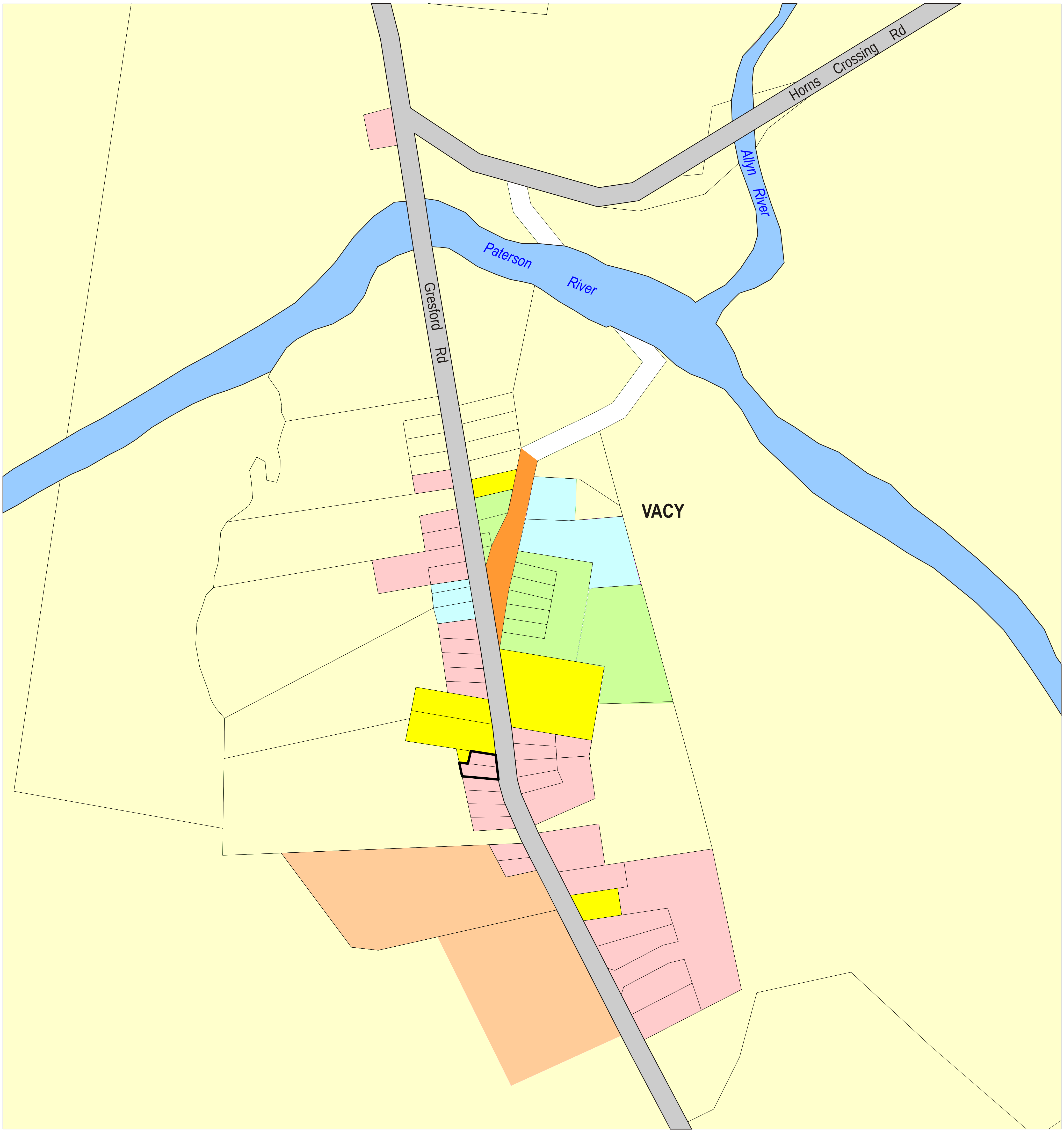
Paterson Town - Existing Land Uses 2008



LEGEND

- Residential - Low density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)
- Road - sealed
- Road - unsealed

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Vacy Town - Existing Land Uses 2008

LEGEND

- Residential - Low density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)
- Road - sealed
- Road - unsealed

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Martins Creek Town - Existing Land Uses 2008

Residential - Low density	Special Uses
Residential - Vacant	Open Space / Recreation
	General Rural (incl. Environmental)
Commercial	
Commercial - Vacant	Road - sealed
	Road - unsealed
Industrial	
Industrial - Vacant	

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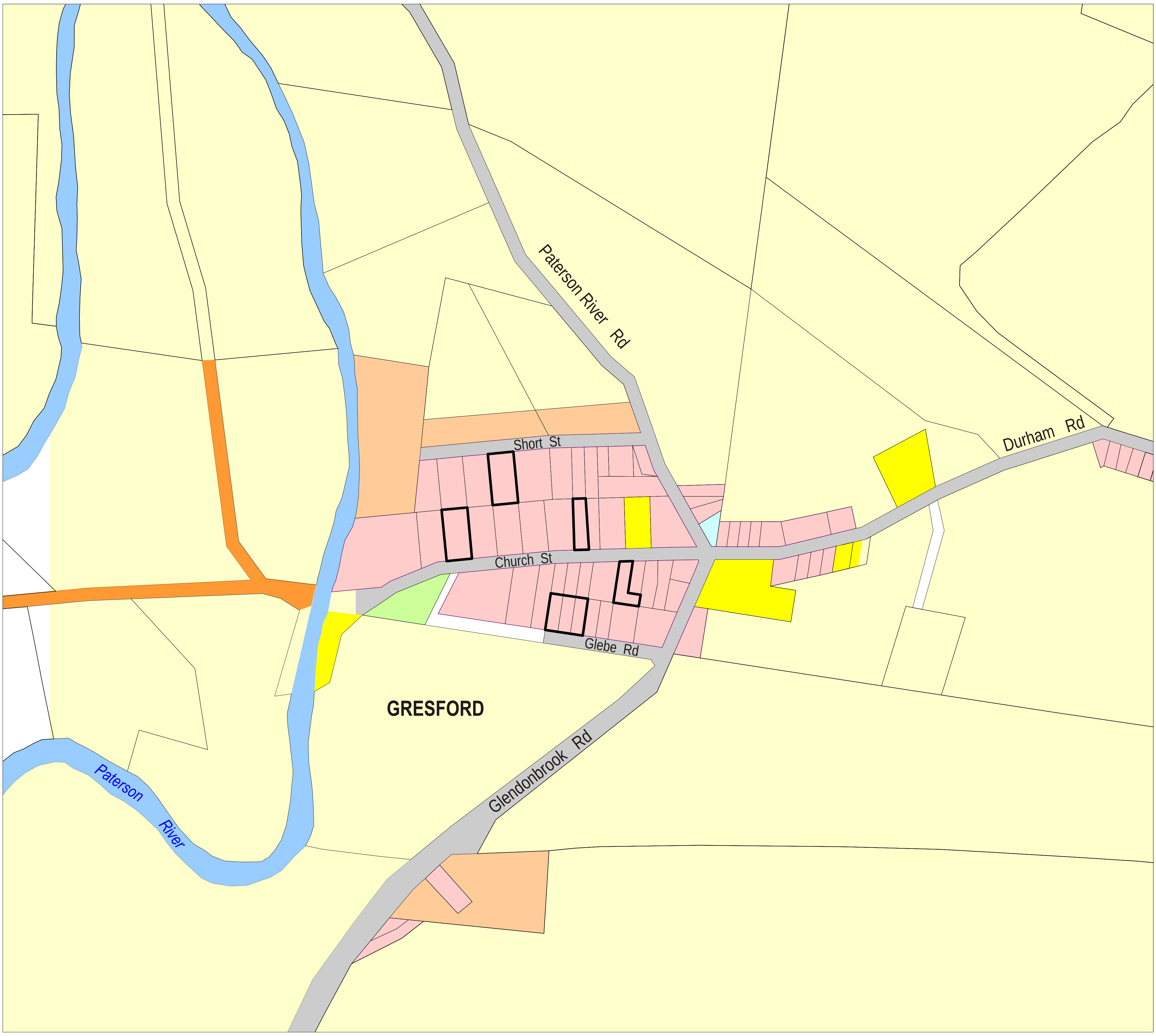
East Gresford Town - Existing Land Uses 2008



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LEGEND

- Residential - Low density
- Residential - Vacant
- Commercial
- Commercial - Vacant
- Rural small holdings
- Rural small holdings - Vacant
- Special Uses
- Open Space / Recreation
- General Rural (incl. Environmental)
- Road - sealed
- Road - unsealed

Gresford Town - Existing Land Uses 2008

8.7.6.8 Dwelling Occupancy Rate

The dwelling occupancy rate describes the average number of people per household. Table 46 below shows the occupancy rates for Dungog from 1996 to 2006.

Table 46: Dwelling occupancy rate, 1996 – 2006

	Dwelling occupancy rate
1996	2.8
2001	2.6
2006	2.6
Change 1996- 2006	-0.2

Source: ABS Time series data

Table 46 shows a slight decline in the dwelling occupancy rate between 1996 and 2006. This is consistent with declining dwelling occupancy rates in the Region, State, and the rest of Australia. Dungog's 2006 occupancy rate of 2.6 is equal to the Hunter Region's (2.6) and slightly lower than the NSW rate of 2.7. The occupancy rate is important in estimating future housing needs.

8.7.6.9 Type of Occupied Private Dwelling

Table 47 below shows the type of occupied private dwellings in the Dungog LGA compared to the other regions and NSW.

Table 47: Structure of occupied private dwellings, 2006

	Dungog LGA		Lower Hunter Sub-Region	Hunter Region	NSW
	Number	% of total dwellings	% of total dwellings	% of total dwellings	% of total dwellings
Separate house	2,918	95.4%	83.1%	83.3%	69.7%
Semi-detached, row or terrace, townhouse	59	1.9%	7.7%	7.4%	9.8%
Flat, unit or apartment	32	1.0%	7.8%	7.7%	19.0%
Other dwelling	45	1.5%	1.3%	1.6%	1.4%
Not stated	5	0.2%	0.1%	0.1%	0.1%
Total	**3,059**	**100%**	**100%**	**100%**	**100%**

Source: ABS 2006 Census

Table 47 shows that over 95% of the Dungog LGA's 3,059 dwellings in 2006 were a separate house a higher figure to that for the Lower Hunter Planning Region's and the Hunter's 83%; and significantly more than the NSW figure of 70% (which would be heavily influenced by the number of medium density dwellings in metropolitan

8.7.6.10 Tenure of Occupied Private Dwellings

Table 48 below shows the tenure of occupied private dwellings in the Dungog LGA.

Table 48: Tenure type of occupied private dwellings, 2006

	Dungog LGA		Lower Hunter Sub-Region	Hunter Region	NSW
	Number	% of total dwellings	% of total dwellings	% of total dwellings	%of total dwellings
Fully owned	1,290	42.2%	35.6%	36.4%	33.2%
Being purchased	1,036	33.9%	31.9%	31.1%	30.2%
Rented	511	16.7%	25.9%	25.8%	28.4%
Other tenure type	35	1.1%	0.9%	0.9%	0.8%
Not stated	187	6.1%	5.7%	5.7%	7.4%
Total	**3,059**	**100%**	**100%**	**100%**	**100%**

Source: ABS 2006 Census

Table 48 shows that there is a significant difference in the tenure of occupied private dwellings between the LGA and other regions. Dungog LGA has a significantly higher proportion of fully owned dwellings at 42%, with the Lower Hunter Planning Region and the Hunter Region at approximately 36%, and NSW at 33%. Dungog LGA had a significantly lower proportion of rented dwellings, at about 17%, compared to 26% and 28% for the Hunter and NSW. The proportion of homes being purchased was similar across all regions.

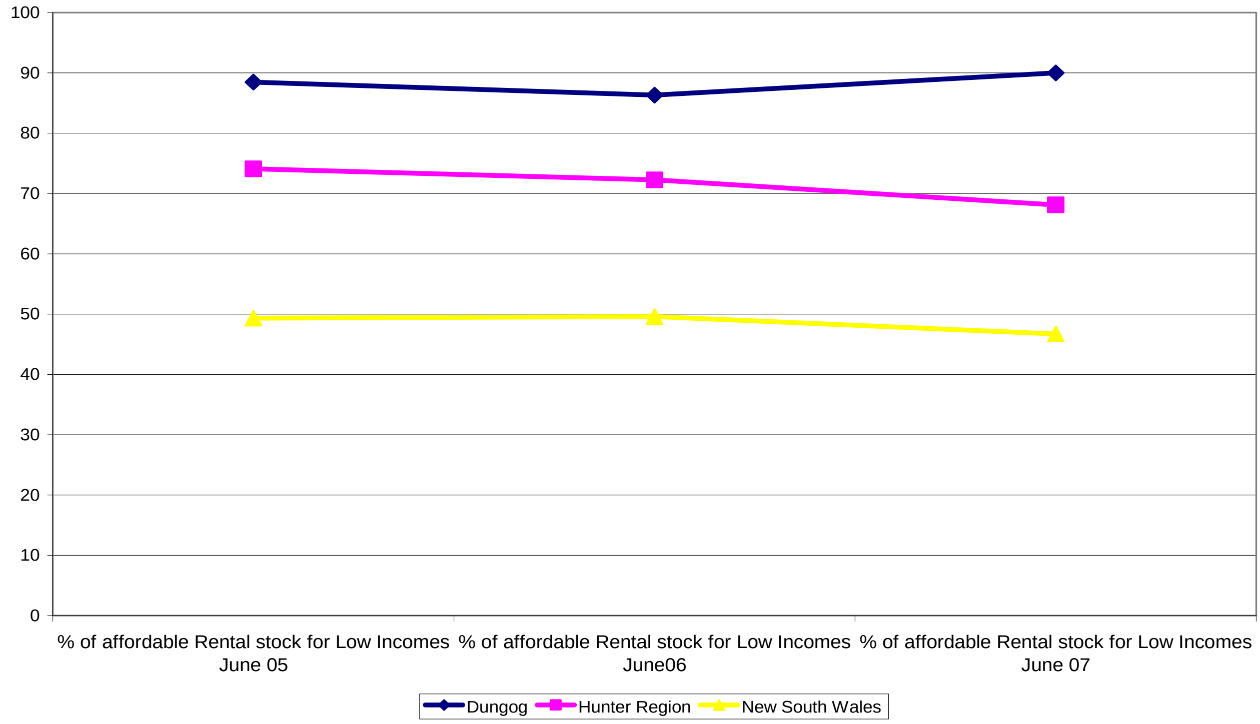
8.7.6.11 Public Housing and Housing Affordability

According to the ABS Census, 36 dwellings were rented from the Department of Housing within the Dungog LGA, and 3 dwellings were rented under a housing cooperative, community or church group, in 2006. This is a slight increase from 2001 (31 Department of Housing dwellings) and 1996 (34 dwellings). Note that data on housing cooperative rentals is not available before 2006. Public housing (estimated at 39 dwellings) accounts for approximately 1.3% of the total dwelling stock within Dungog LGA. This is lower than the Hunter Region (4.7%) and NSW (4.4%).

In addition, information from the Office of Community Housing indicates that 8 aged care units are currently being managed for low income earners within Dungog, by the Dungog Shire Council. It is not known if these dwellings have been accounted for in the ABS statistics.

Median rental prices in Dungog LGA have increased only slightly between 2005 and 2007, from $150 to $160, or approximately 6% (Centre for Affordable Housing). In comparison, rental prices in the Hunter and NSW have risen by around 12%. In the period from December 2005 to December 2006, house purchase prices in Dungog have risen by about 8%, while prices in the Hunter and NSW have risen by 3% and 0.5% respectively.

Figure 13 below shows data obtained from the Centre for Affordable Housing on rental housing affordability for low income earners between 2005 and 2007.



Note: Rental affordability indices for low incomes earners have been calculated at 50% -80% of Census household income. Average weekly earnings are used to index the household incomes. The income benchmarks are different for Greater Metro and Rest of NSW. Average Weekly Earnings (AWE) is used to index the household incomes. A dwelling is counted as affordable if the rent charged is no more than 30% of the household income. % of affordable rent is reported only where 30 or more bonds are lodged. Source: Centre for Affordable Housing, Local Government Housing Kit Database.

Figure 13: Percentage of housing rental stock that is affordable for low income earners, 2005- 2007

Note: Rental affordability indices for low incomes earners have been calculated at 50% -80% of Census household income. Average weekly earnings are used to index the household incomes. The income benchmarks are different for Greater Metro and Rest of NSW. Average Weekly Earnings (AWE) is used to index the household incomes. A dwelling is counted as affordable if the rent charged is no more than 30% of the household income. % of affordable rent is reported only where 30 or more bonds are lodged. Source: Centre for Affordable Housing, Local Government Housing Kit Database.

Figure 13 above shows that a high proportion of dwellings available for rent in the Dungog LGA were affordable to low income earners (approximately 90%). This figure has stayed relatively stable since 2005. In comparison, in 2007 both the Hunter Region and NSW had significantly lower levels of affordability (at 68% and 47% respectively), and both of these regions have experienced a slight decline in affordability since 2005. With regard to very low income earners, Dungog LGA has experienced a decrease in rental affordability (-8%) but a slight increase in affordability for moderate income earners (up 1% to 100%).

Figure 14 below shows data obtained from the Centre for Affordable Housing on purchasing affordability for low income earners, between 2005 and 2007.

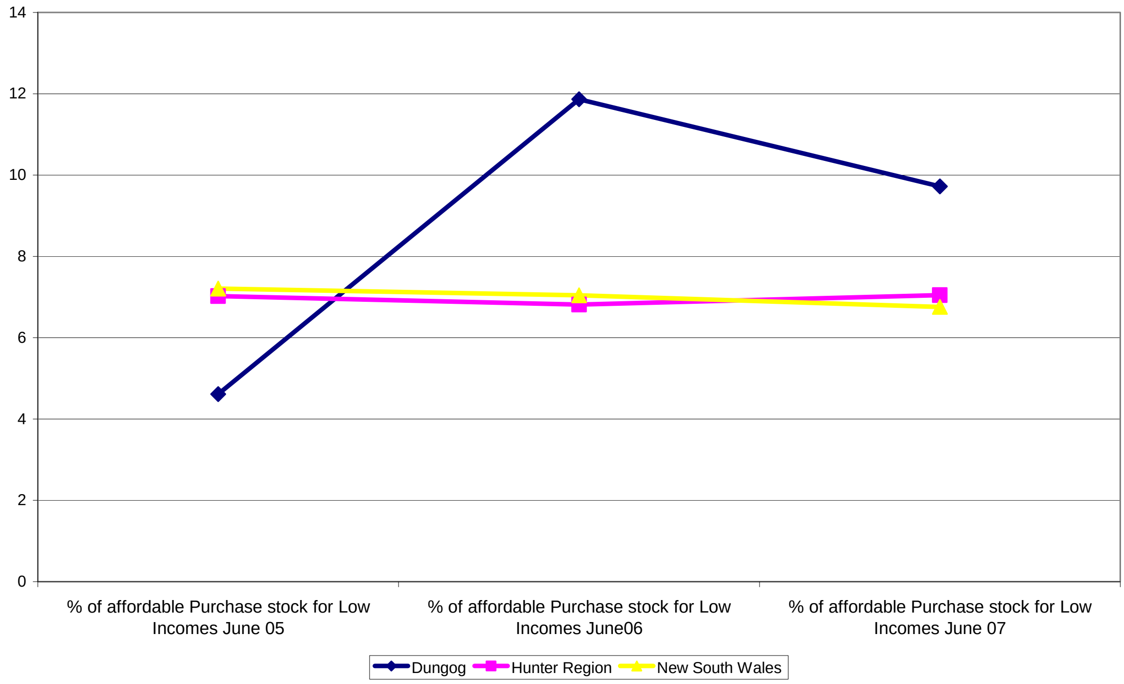


Figure 14: Percentage of housing purchase stock that is affordable for low income earners, 2005- 2007

Figure 14 shows that housing purchase affordability for low income earners is generally very low throughout all regions. However, Dungog LGA has a slightly higher rate of purchase affordability (10%) than the Hunter Region or NSW (both at 7%). Purchase affordability in Dungog LGA experienced a sharp increase from between 2005 and 2006, rising from 5% to 12%, and then dipped between 2006 and 2007 to the current rate of 10%. Throughout this period, purchase affordability throughout NSW and the Hunter has remained fairly steady. From 2005 - 2007 housing purchase affordability for very low income earners in Dungog LGA has remained steady at around 1%, while affordability for moderate income earners has increased (from 35% to 43%). The Hunter and NSW follow similar trends.

The Centre for Housing Affordability also provides data on the number of households in housing stress, defined as '*households incurring housing costs above 30% of their household income*'. Data for 2006 indicates that 35% of low income households in Dungog LGA are in rental stress, while 61% are in home purchase stress. The Hunter Region and NSW are experiencing similar proportions of households under purchasing stress (58% and 64%), but are experiencing far higher rates of rental stress than Dungog LGA (at 57% and 60% respectively).

These figures indicate that there is insufficient affordable rental and purchase housing available to meet demand. The majority of people in stress are single person households, with the largest proportion being people aged under 25 followed by aged pensioners, people with disabilities, unemployed and single parents.

The Department of Housing is expected to provide background information relating to issues of concern and the housing market in Dungog LGA as part of the agency consultation process. Some of this advice may include the promotion of housing choices and affordable housing through LEP provisions. Future LEP's may also need to provide appropriate opportunities for medium density development and smaller allotment and dwelling sizes. In the Hunter Valley generally, the groups of need that the Department of Housing anticipates will grow include youth, aged pensioners and frail aged. The types of housing these groups require include adaptable housing, dwellings with one or two bedrooms, larger dwellings for extended families and appropriate support services. For some groups this means accessible and adaptable housing located close to services and facilities.

8.7.6.12 Housing Provision and Demand issues

As family sizes decline, it is likely that a higher growth rate for smaller sized dwellings will occur. This trend is evident at the regional level but there is no data available for the Dungog LGA to indicate the present position.

An important consideration in the provision of housing and future land use planning is the proportion of demand in rural areas relative to urban areas, and the provision of medium density housing.

8.7.6.13 Future Dwelling Demand

Future dwelling demand is principally based on predicted population change and household size. The number of dwellings required is determined by dividing the predicted population growth by the expected household size. Over the next 20 years, the LGA population is expected to increase. The NSW government predicts a population increase of about 947 people by 2026, while the HVRF suggests an increase of 449 people in the same time period. Based on the current dwelling occupancy, this amounts to an increase in demand of between 20- 30 dwellings per year.

It is important to note that dwelling demand will also be affected by unknown factors that have not been taken into account in the projections. These include distribution of demand within the LGA; establishment of significant new employers; external economic and market forces; changes to commuting patterns and transport costs; suitability of existing housing stock to meet market demands; and changes in dwelling occupancy rates. Local Area Plans prepared for each of the main towns in 2004/2005 suggest that Gresford, Martins Creek, Vacy, Paterson and Clarence Town are all experiencing pressure for the release of additional residential and/ or rural residential lots. The extent to which this represents a long term trend requires further consideration.

Provision for the following housing types also requires further consideration:

- **Aged persons accommodation**: There is expected to be a substantial increase in the aged population over the next 10 to 20 years, both in absolute numbers and as a proportion of the total population. Based on the 2006 Census data and the NSW Government projections, the trends indicate that within Dungog LGA the population aged over 65 years will increase from 15.6% of in 2006 to 32% in 2031. This has potential impacts on the provision of housing, and may need to be taken into account in framing land use provisions.

- **Rural small holdings**: In particular, it is important to identify potential demand for this type of development, and the localities where this is most likely to occur. Council is currently undertaking planning work that will change current transition zones into more definable zones. On completion of this work the amount of land available for rural small holdings will be more easily identified.

8.7.7 Access and Transport

This section provides a description of the existing transport infrastructure in the LGA including; the road network, rail network, airports; cycle and pedestrian links. It also includes a summary of transport access issues for people living within the LGA.

8.7.7.1 Road Network

The main, regional roads located within the Dungog LGA are listed below:

- Main Road No. 101 connects Maitland to Stroud
- Main Road No. 128 connects Gresford to Mt Thorley
- Main Road No. 301 connects Raymond Terrace to Wirragula
- Main Road No. 7764 connects Dungog to East Gresford
- Main Road No. 7778 connects East Gresford to Vacy

The NSW Roads and Traffic Authority (RTA) provide data on Average Annual Daily Traffic (AADT) volumes for selected classified roads, unclassified roads, town and city streets. The data indicates that, generally, there has been growth in traffic volume on most of the main roads in the LGA. Information from the Council indicates a need for further funding and support from state and commonwealth departments to maintain and improve the regional road network in Dungog LGA.

Improving local roads has been identified as a Council priority. A significant proportion of the Council road network is rundown and requires upgrade or reconstruction. As the Council's current rate revenue base is not sufficient to adequately maintain the LGA's extensive road network, the council has adopted a policy prioritising roads to be maintained by the Council (Policy No. C3:18, *Provision of Rural Roads Services*).

It is important to consider the many impacts on the road network when identifying areas for future population growth and development. Opportunities to recover some of the costs of road upgrading and maintenance from developments should be examined. It is equally important not to spread development areas too widely, and to focus growth in 'clusters or corridors' which have the capacity to accommodate and service growth.

8.7.7.2 Rail Network

There is a single rail line in the Dungog LGA known as the North Coast line, which generally follows the path of Tocal Road and Dungog Road south of Dungog, and Stroud- Dungog Road and The Bucketts Way north of Dungog. This line is serviced by both City Rail and Country Link trains (Brisbane, Casino and Grafton XPT). City Rail services terminate at Dungog and provide services southwards towards Newcastle, stopping at Wirragulla, Wallarobba, Hilldale, Martins Creek and Paterson. These services occur approximately 5 times per day in each direction, and 3 times per day during weekends. Country Link provides services northwards (towards Gloucester and Wauchope), and services southwards (towards Maitland and Broadmeadow) 3 times a day, stopping at Dungog station.

While Dungog and some of the LGA's southern localities have relatively good access to train services, rail services are not easily accessible to many of the townships outside of those listed above, particularly in the areas located to the north and west of Dungog (e.g. Gresford, Carrabolla etc).There are no connecting bus services between these towns and outlying areas (except school buses). In general the people of Dungog are very reliant on private motor vehicles.

From a sustainability perspective increasing petrol prices and poor road conditions makes high trip numbers and an increase in vehicle movements expensive in financial, environmental and human terms. Providing land use strategies that support the minimisation of car movements need to be considered.

8.7.7.3 Bus Services

There are no public bus services in the LGA and residents are reliant on accessing school services which generally accept regular passengers providing there is sufficient capacity in the bus. A number of coach services, including one based in Dungog, provide chartered bus services to destinations throughout the region.

8.7.7.4 Airports

Dungog LGA does not accommodate any publicly accessible airports. The nearest airport is Newcastle, located at Williamtown, approximately a 1 hour drive from Dungog Township. Some bus companies provide shuttle services between Newcastle airport and Newcastle train station, where rail connections can be made.

8.7.7.5 Cycling and Pedestrian Access

There are no dedicated cycling paths within Dungog LGA, except for an unsealed walk-way along Durham Road between the settlements of Gresford and East Gresford which is poorly utilised by cyclists. Cyclists generally rely on the road system, with many roads unsuitable due to being narrow, having unformed road verges and high vehicle speeds.

Stretches of formed footpaths exist in some of the main towns within the LGA, particularly Dungog, although pedestrians generally rely on the grassed road verge or the road network in most areas. The provision of appropriate pedestrian and cyclist access has been identified as an issue of concern in the town's LAPs, particularly in the towns of Martins Creek and Paterson. Here the towns are bisected by the rail line, and in Paterson's case, by the Paterson River.

Safe access across rivers and rail lines is considered as a priority in land use strategies.

8.7.7.6 Community Transport

Community transport plays an important role in Dungog by offering access to services, facilities and social functions for groups in the community that are considered transport disadvantaged. People in this category include seniors without access to private transport, and people with disabilities or other special needs.

A Community Transport Service operates from Dungog and provides commuters with a variety of transport options. These include weekly bus trips from Dungog to centres such as Maitland or Raymond Terrace; trips within the town of Dungog from residential areas to the CBD for shopping purposes; and occasional outings within and outside Dungog town for people with special needs. Outside the town of Dungog, clients may be provided transport in volunteer's cars from their home to special appointments within Dungog or even Maitland, though this is mainly restricted to people attending medical appointments.

8.7.8 Utility Services

8.7.8.1 Water Supply

Reticulated water supply is provided to approximately 2,500 households in the urban areas of Dungog, Clarence Town, Gresford and Paterson, via a number of reservoirs, pumping stations and water mains. A new reservoir is currently being constructed at Paterson (DSC, 2007). Mapping of water infrastructure can be viewed on Map 8.12 to Map 8.16.

8.7.8.2 Sewerage Treatment Plants

The Dungog Sewerage Scheme currently provides sewerage services for 1,050 households within the township of Dungog, utilising a sewerage treatment plant on Alison Road, east of Dungog. An additional treatment plant is also proposed at Clarence Town, and is currently in the final design phases (DSC, 2007). All other areas utilise septic systems.

The availability of a sewerage scheme is a major issue when considering the expansion of residential areas in Paterson, Vacy and Gresford. Mapping of Sewer Infrastructure available can be viewed on Map 8.12 to Map 8.16.

8.7.8.3 Stormwater

An Urban Stormwater Management Plan was prepared for Dungog LGA in 2000 (Hunter Water Australia Strategic Services, 2000). This plan is concerned with the urban stormwater catchments within the LGA, particularly around the towns of Dungog, Clarence Town, Paterson, Martins Creek, Gresford and East Gresford. The plan aims to identify stormwater issues and achieve an overall improvement in the management of the stormwater system by recommending an action plan to the Council for implementing a stormwater improvement strategy. This plan has been adopted by the Council.

8.7.8.4 Onsite Waste Water Disposal

Approximately 70% of the LGA's households utilise on-site wastewater management systems such as septic tanks for disposal of sewage. The Council's State of the

Environment Report 2004 (DSC, 2004*b*) identifies on-site waste water disposal as a significant pressure on waterway health, with issues of concern such as the small size of some township allotments and their proximity to nearby waterways being highlighted.

Developments involving the installation of septic systems require development consent from the Council, as well as an ongoing approval to operate the system. Council provides a number of information documents to residents in order to minimise environmental hazards associated with onsite waste water disposal.

Given the pressures on waterway health involved with on-site wastewater disposal, consideration needs to be given to issues such as;

- size of town allotments
- proximity of allotments to waterways
- ongoing maintenance of privately owned systems

8.7.8.5 Solid Waste

The Council provides a weekly mobile garbage bin collection service to all properties within the LGA that access or are adjacent to tarred roads, and some gravel roads. A fortnightly recycling collection service is also provided to domestic and commercial customers, as well as an annual bulky waste collection service.

The Council operates one licensed landfill, located within Dungog. This landfill accepts most solid waste including green waste, asbestos and waste oils.

8.7.8.6 Bushfire Services

Bushfire services within the LGA are provided by the Rural Fire Service of NSW, and are controlled from the Dungog Operations Centre. Funding for the Rural Fire Service is provided by the Council, the NSW State Government and the Insurance Industry through their Fire Service Levy. All bushfire equipment that is acquired is the property of the Council (DSC, 2007)

Bushfire services cover the whole LGA and no details are currently available on the adequacy of the existing services and potential land use implications.

8.7.8.7 Energy

Country Energy is the main distributor of electricity within the Dungog LGA. Advice from Country Energy indicates that approximately 2,740 Mwh of energy is consumed monthly from the Dungog sub station. Major upgrade works are currently underway within some areas.

Reticulated gas is not available within the LGA, although there is a reliance on bottled Liquid Petroleum Gas for domestic purposes (DSC, 2004*b*). Council has adopted policies aimed at reducing energy reliance including the state-wide BASIX SEPP, the Dungog Shire Bicycle Plan and the Dungog Shire Rural Strategy 2003.

8.7.8.8 Telecommunications

DSL and Cable broadband internet services are available in some areas of the Dungog LGA, depending on the capabilities of the local telephone exchange and its distance from the end user. Dial-up internet is available to all residents who have access to a landline, though dial-up access can be slower and less reliable than broadband. Anecdotal evidence suggests broadband and mobile phone coverage is limited and maps available from the Telstra website show large areas of the LGA can only access mobile coverage via an external antenna or satellite. Satellite broadband may also be prohibitively expensive.

Telecommunications raise a number of issues for residents as society becomes increasingly reliant on the internet to access important services and information. In particular, rural-based businesses can be adversely affected by poor access to telecommunications.

Mobile telephone coverage is generally centred on the main towns, particularly around the southern portion of the LGA. Mobile coverage is less extensive, or completely unavailable, in the more remote areas of the LGA, particularly in areas north and west of Allynbrook and Salisbury. Mobile satellite coverage is available in all areas of the LGA.

Dungog LGA is increasingly becoming an area where residents are establishing home based businesses or operating a home office. All opportunities to increase reliability and speed of broadband, and mobile phone access should be investigated.

8.7.9 Community and Social Infrastructure

8.7.9.1 Educational Facilities

There are a number of primary schools located throughout Dungog LGA, as shown in Table 49 below. Dungog High School provides the only secondary education within the LGA, with school buses providing transport to the school from outlying areas. Students may also access secondary schools outside of the area via the rail network, and students from Clarence Town can access a school bus providing transport to schools in Raymond Terrace. Dungog High School has grown substantially over the past years and as a result it currently has the second largest number of demountable buildings in the state.

There are currently no tertiary or community-based adult education facilities within the LGA. Students can access facilities in areas such as Maitland (via the rail network) and Raymond Terrace (by private vehicle).

Table 49: Educational Facilities in the Dungog LGA 2008

Education facility	
Primary Schools	Dungog Public School
	Martins Creek Public School
	Gresford Public School
	Paterson Public School
	Vacy Public School
	Clarence Town Public School
	Glen William Public School
	St Joseph's Primary School
Secondary Schools	Dungog High School

8.7.9.2 Health Services

Health services in the LGA are administered by the Hunter New England Area Health Service (HNEAHS). For administrative purposes, the Dungog LGA is included within the Lower Hunter Cluster. Geographical service clusters used by the HNEAHS are based on communities of interest. The Lower Hunter Cluster includes all of Dungog LGA plus Singleton, Maitland and Cessnock LGAs.

The HNEAHS '*Strategic Directions 2006-2010 Area Healthcare Services Plan 2006'* (HNEAHS, 2006) and its companion document '*HNE Health- Introducing the Area, the People, the Health Services November 2006'* (HNHEAS, 2006*b*) describe the features of each service cluster in its area of operations and outlines strategic directions for health service development and delivery leading up to 2010. Key health facilities currently provided within the LGA are a Community Hospital at Dungog and Community Health Services at Gresford and Clarence Town. Patients requiring higher level services not provided at the existing facilities are managed at a rural referral hospital outside the area.

Some key strategic issues identified by HNEAHS as affecting health service provision are:

- Demographic changes, especially the ageing population base and decline in rural areas
- Changes in health care needs, with growth in demand for community based care
- Transport provision and access to specialist services and larger centres
- Availability of GPs and access to GP services

Additional healthcare services (outside of the HNEAHS system) available throughout the LGA include a small number of General Practitioner services; an Ambulance station located in Dungog; community nurses; and chemist facilities located in some areas. *Dungog Shire Council's Community Plan 2004-2009* (DSC, 2004) details additional facilities available within the LGA.

8.7.9.3 Community Services and Cultural Facilities

A range of community services exist within the LGA including aged care, disability services and children's services. There are a range of ownership and management models associated with these services. Some premises are owned by Council and managed by 355(b) committee's, but Council does not directly manage any operating services. In general services are managed by independent Incorporated Management Committees or are privately owned.

There is one community based Aged Care Facility (Lara) in Dungog with 63 beds. Originally developed to have low care, high care and dementia care facilities the centre now mainly operates to support high care and dementia care residents. The majority of residents are over 85. As a result of the introduction of government funded in-home support services, enabling more people to stay in independent accommodation, aged care facilities are experiencing an increase in the number of high need and older residents. This pattern is increasing throughout the State.

The Dungog and District Neighbour Care housed in the grounds of Dungog Hospital provides a range of in home care services to people with special needs, including Community Transport, Meals on Wheels, Neighbour Aide, Respite for Carers, Community Aged Care Packages, social/peer support, domestic assistance, centre based day care and linen services. Other community groups providing support include the Dungog Shire Palliative Care Volunteers Inc, Hunter Valley Home and Community Care and Hunter Integrated Care.

Lara also has 13 self care units. No structured care program is provided to these units but the above funded services provide support to residents where needed. There are no other aged care facilities in Dungog LGA. Other services available in nearby LGAs include a hostel in Stroud, aged care attached to Gloucester Hospital and services in Maitland and Raymond Terrace.

Council is the caretaker of 20 self care units (Allison Road) in Dungog. Senior Citizen centres providing social activities and support operate from Dungog, Gresford, Paterson and Clarence Town.

There are four preschools in the LGA being Dungog, Clarence Town, Gresford and Paterson. Family Day Care operates a program within the LGA providing flexible home based childcare including full and part time options for under 5 year olds. There is limited availability in regard to before and afterschool care, overnight and weekend care, emergency relief care and disability support for families with additional needs. There is one privately owned Long Day Care Centre in Dungog providing 46 places and operating from 6.30 am to 6.30 pm. A further Long Day Care Centre has development approved in Clarence Town, however, at this stage this development has not proceeded.

There are Community Halls in all towns throughout the LGA, including Clarence Town, Dungog, Paterson, Gresford, Vacy and Martin Creek. A variety of self managed community activities operate from these venues and they provide an important community focus for events.

There are a number of active social groups including the Lions Club, Country Women's Association, Australian Red Cross, Scouts and Probus Club.

A public library is located in Dungog, and forms part of the Newcastle Joint Library Service. Library users are able to access books and special interest volumes can be ordered from Newcastle on a regular basis. The library also provides a limited service to residents of Paterson through a Library Deposit Station.

Statistics predict there will be a steady increase in the number of people aged over 65 in the LGA up to 2031, when over 30% of the population will be aged over 65. There is a further need for village-type senior's accommodation that provides easy access to support services, in order to encourage independent living.

It is predicted there will be a reduction in the number of children aged under 15. By 2021 it is expected the number of people aged under 15 years will reduce from 22% in 2006 to 14%.

The availability of site specific community services is dependent on population thresholds and this needs consideration when planning for increased populations. In an area where population densities are hard to achieve, innovative community service models need exploration.

The cost of the development and maintenance of community and recreation facilities causes an ongoing financial strain on local government and this strain requires minimisation.

8.7.9.4 Recreation Facilities

A number of active recreation facilities exist within the Dungog LGA, primarily comprising sporting venues such as football ovals and netball courts. There are swimming pools in Dungog and Clarence Town. The Dungog Community Profile 2005 (DSC, 2004) provides details on the availability of sporting facilities within the LGA. Other avenues of recreation include various community groups, Scout groups, historical museums, Country Women's Associations and Schools of Art (community halls) which are located throughout the LGA.

There are many passive recreation venues, parks and gardens, mainly within the main towns and villages. There is wide scope for outdoor recreation, with natural areas such as the Barrington Tops and Uffington Forest National Parks, and Chichester State Forest comprising a significant proportion of the LGA.

The availability, maintenance, and management of community and recreational facilities is becoming increasingly costly for local government. When planning for community and recreational facilities for future multipurpose use, population growth and catchments need to be major considerations.

8.8 Biodiversity and Natural Ecosystems

8.8.1 General Description of Characteristics

The Dungog LGA is wholly encompassed within the North Coast Biogeographic Region identified in *The Bioregions of New South Wales- their biodiversity, conservation and history* (NPWS, 2003). This Bioregion is shown in Map 3.3.

Bioregions provide a broad framework for assessing and planning biodiversity. A bioregion is a relatively large area of land characterised by broad, landscape scale natural features and environmental processes that influence the function of entire ecosystems (NPWS, 2003). Generally, the North Coast bioregion is described as having the following physical characteristics:

- Sub humid to temperate climate with warm summers and no dry season
- Hilly landscape with some deep valleys
- Diverse geology with Devonian, Carboniferous and Permian age bedrocks forming part of the New England fold belt. Small areas of granitic intrusion and basalt eruption

The bioregion contains relatively diverse biodiversity, with vegetation types including rainforests, moist forests and dry forests. The North Coast contains a large number of threatened species listed under various pieces of legislation. A reasonably high proportion of the region (19%) was under conservation management in 2003 (NPWS, 2003).

8.8.2 Review of Plans, Studies and Knowledge

Much of the environmental data available for the Dungog LGA is at the regional scale, or is primarily focussed on national parks/ reserves, or particular river catchments. The Hunter Central Coast Regional Environmental Management Strategy is currently undertaking a regional vegetation mapping project, which includes the Dungog LGA. Once complete, this will provide mapping of the LGA for vegetation cover and structure at an accuracy of approximately 1:25,000 scale. A Classification Scheme is currently being prepared to inform this mapping work, subsequent vegetation surveys and mapping would then be prepared.

The availability and adequacy of important information on planning for biodiversity within the LGA is summarised in Table 50 below.

Table 50: Availability of biodiversity information in Dungog LGA

Type of information	Availability and sources
Native vegetation cover	A range of sources covering some specific areas, particularly the Williams River catchment (addressed by Williams River Total Catchment Management Committee, former Department of Urban Affairs and Planning, Healthy Rivers Commission of NSW etc), and the Clarence Town area (Biodiversity study prepared by ERM). Other more regional data is available from the NPWS Eastern Bushland database (1996). Additional data at 1:25,000 scale is expected from HCCREMS by mid-late 2009.
Pre-1750 vegetation communities	Not currently available
Extant vegetation communities	Not currently available
Regionally significant vegetation	Not currently available
Distribution of endangered ecological communities (TSC Act)	Distribution of some communities identified from site-specific studies. No specific LGA-wide information is available.
Distribution of threatened ecological communities (EPBC Act)	Broad distribution maps for some communities available on DEH website.
Significant species	Information on distribution is available on the DECC Wildlife Atlas.

8.8.3 EPBC Act Matters of National Environmental Significance

The *Commonwealth Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) identifies matters of national environmental significance. Actions affecting these matters may require referral or approval to the Commonwealth Minister for the Environment, and are separate to approval processes under NSW legislation. Matters of national environmental significance should be taken into account when considering future land use planning options within the Dungog LGA. Development proponents have a legislative responsibility to assess the significance of impacts on matters of national environmental significance. Within the Dungog LGA, these matters comprise world heritage properties, national heritage places, Ramsar wetlands, migratory species and Commonwealth-listed threatened species and threatened ecological species.

Information provided by the Commonwealth Department of the Environment, Water, Heritage and the Arts identifies matters of national environmental significance occurring within the Dungog LGA or affected by actions within the LGA as follows:

- The Barrington Tops National Park in the northern part of the LGA forms part of the World Heritage listed Central Eastern Rainforest Reserves.
- The Hunter Estuary Wetlands and Myall Lakes are listed as wetlands of international significance.
- The listed threatened ecological community White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland occurred naturally throughout wide areas within the LGA. The current distribution is not known.
- About 14 fauna species and up to 12 flora species are listed as threatened under the EPBC Act, and have potential to occur within the LGA. Note that

further investigation is required to determine which of these potential species actually occur and their likely distribution.

- Up to 13 listed migratory bird species may occur.

Land and water use proposals should take into account potential impacts upon the listed protected matters.

8.8.4 TSC Act and FM Act – Threatened Species and Endangered Ecological Communities

The *Threatened Species Conservation Act 1995* and the *Fisheries Management Act 1994* list threatened species and endangered ecological communities in NSW. The significance of impacts on these species must be considered by Councils in determining development applications made under the *Environmental Planning and Assessment Act, 1979*.

Within the Dungog LGA, there are currently 49 fauna and 8 flora species listed as threatened under the TSC Act. There are currently no threatened species listed under the FM Act occurring within the Dungog LGA.

In addition there are a number of Key Threatening Processes listed under the TSC and FM Acts which should be recognised in the Strategy and draft LEP. Maps, showing the location of threatened species sightings within the Dungog LGA, can be found at http://wildlifeatlas.nationalparks.nsw.gov.au.

8.8.5 Protected Conservation Areas

Currently within the Dungog LGA, national parks, state conservation areas and nature reserves comprise a total area of approximately 37,458 ha, around 16% of the LGA's total area. These protected areas, located entirely or partly within the LGA, are listed in Table 51 below.

Table 51: Protected conservation areas in the Dungog LGA managed by the NPWS

National Park, State Conservation Area or Nature Reserve	Area (ha)
Barrington Tops National Park	31,607
Columbey National Park	779
Black Bulga State Conservation Area	1,034
Monkerai Nature Reserve	860
Wallaroo National Park	1,677
Killarney Nature Reserve	435
Uffington Forest	333.86
Mount Royal National Park	1,065

Source: NPWS

8.9 Climate, land and water

8.9.1 Climate

Dungog LGA has a temperate climate with rainfall dominant in summer. Intensity is generally higher because of thunderstorm activity. Climatic conditions vary across the LGA, and are influenced by a range of different factors such as topography, aspect, strong relief contrasts, and particularly the orogenic effects of the Gloucester Tops Plateau (Henderson, 2000 in DSC, 2001).

Average annual rainfall within the LGA varies considerably, with a maximum annual average of about 1,500 mm. Within the LGA the Bureau of Meteorology has records for weather stations at Paterson, Lostock Dam and Chichester Dam. These weather stations show average rainfalls of 916 mm, 950 mm and 1,311 mm respectively. Generally, the lowest annual rainfall occurs in the central valley around Dungog where the influences of the coast and the highlands are absent (HCRCMA, n.d.)

Due to the variable climatic influences within the LGA, average temperatures vary across the region. Average temperatures at the Dungog climatic station range from 3.6°C in July to 29°C in December (DSC, 2001). Average monthly temperatures for Paterson, Lostock Dam and Chichester Dam are shown in Figure 15 below. Average monthly relative humidity, for Dungog ranges from 81% (9.00 am) in June to 42% (3.00 pm) during September.

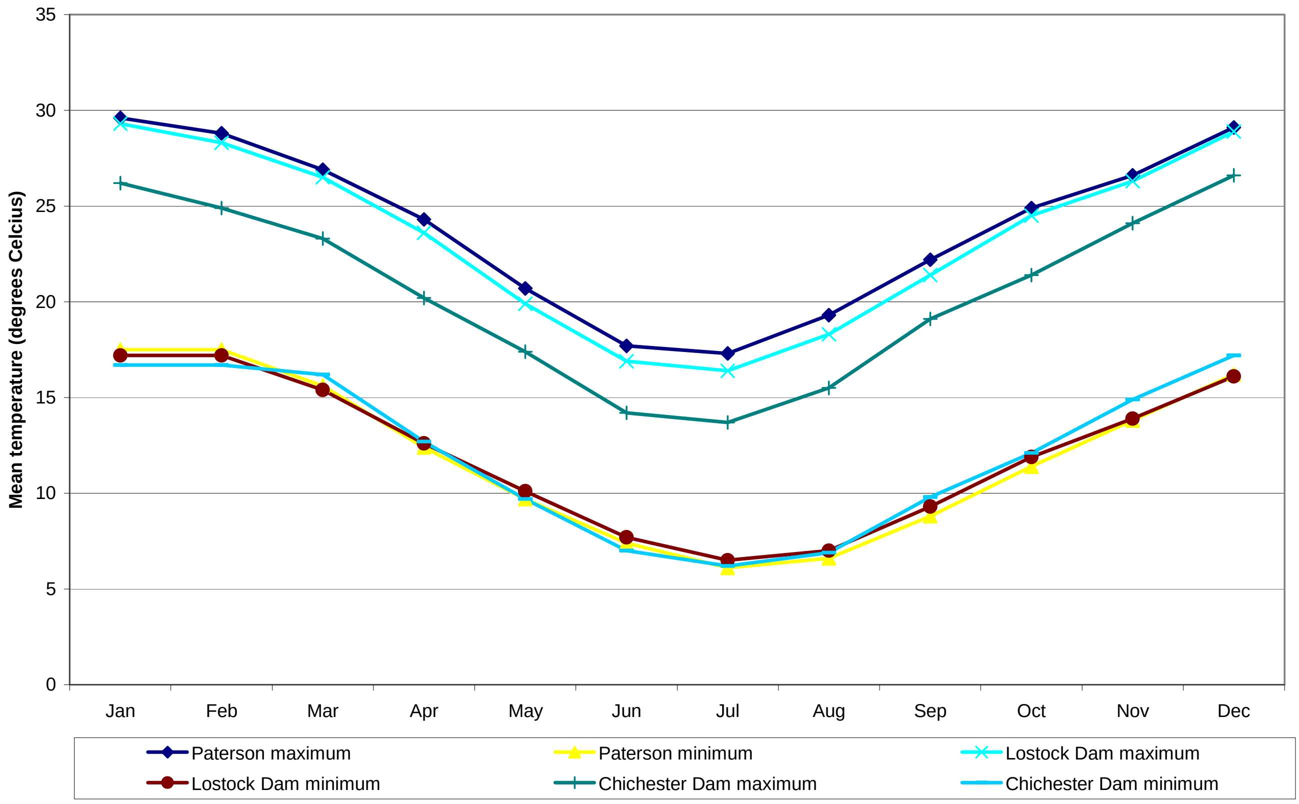


Figure 15: Average temperatures within Dungog LGA

8.9.1.1 Climate Change

There have been a number of studies evaluating the potential impacts of climate change in NSW. On a broad scale, it is predicted climate change could lead to variations in mean temperatures, increases in extreme weather events (droughts, severe storms), changes in rainfall patterns and variations in wind speed. The south east of Australia is expected to become hotter and dryer, particularly inland, and consequently varied impacts across many fields are projected.

Climate change has potentially significant implications for water supply and agriculture and rural land use generally. The CSIRO has recently produced a document outlining the potential impacts of climate change in the Hunter-Central Rivers Catchment and the flow on implications for land use (CSIRO, 2007). Modelling indicates that the most likely climate change scenario is that by 2070 the region may become 0.7° - -6.4°C warmer, with a rainfall change of -40% - +20%, depending on the location. However, the CSIRO predicts that impacts are more likely to be felt through extreme weather events, with an increase in hot days, bushfires, droughts and intense storms (CSIRO, 2007).

Important climate change related issues identified by Hennessy and Jones (1999) are:

- Catchment scale impacts (e.g. water flows, disturbance events such as fire, drought and flood, and flora and fauna distribution)
- Primary industry impacts (e.g. thermal stress, climate seasonality, and water availability and quality)
- Urban and industrial impacts (e.g. power generation, water supply and rural settlements)

Water supply has been identified as a key issue. Most water related thresholds are associated with climate variability and extremes, and/or involve several factors such as extreme flow rates (droughts and floods and irrigation supply (stream flow, water storage and groundwater supply). Under a climate change scenario, lower flows are predicted within the Catchment's rivers, resulting in a reduction in water quality, and lower availability for irrigation purposes (CSIRO, 2007).

Activities with the highest sensitivity to change were identified by Jones and Hennessy (1999) as:

- Urban infrastructure
- Cropping
- Wine
- River management
- Forests and biodiversity
- Inland water supply
- Dairying
- Grazing
- Dry land/irrigation salinity

Of relevance to the Dungog LGA is a study on climate change probabilities and their potential impacts on the dairy industry in nearby Muswellbrook (Hennessy & Jones, 2000). Specifically, this study identified an increase in risk of heat stress for dairy cows under a climate change regime, and a subsequent loss in milk yield of up to 6% of potential production by 2070. These findings have implications for future dairy management in the Hunter, as heat stress management techniques (the use of sprinklers, planting of shade trees and provision of shade sheds) have the potential to mitigate these losses.

It is expected that climate change will have potentially significant implications for other forms of agriculture, the natural environment, water supply and general rural land use in the Hunter region. Changing temperatures and rainfall patterns may influence the suitability of areas for particular agricultural practices, for example, natural rangelands used for grazing may decrease in forage quality to the detriment of animal production (CSIRO, 2001). The establishment of alternative industries suited to the changing climate may become more feasible. Climate change is likely to drive changes in the distribution of some native plant and animal species, driving some species out of the region or enabling invaders (eg. weeds, vertebrate pests) to move in (CSIRO, 2007).

Additional regionally specific studies, on the impacts of climate change and the potential for adaptation to these changes is desirable, as exemplified by the CSIRO study on dairy cows. Identification of climate change issues may be useful when planning for infrastructure (e.g. dams and stormwater systems), planning for agriculture (e.g. temperature, rainfall, river flow and irrigation water availability), or planning for natural systems management (e.g. conservation of newly vulnerable ecosystems and hazard reduction burning times). The identification of specific adaptation techniques may offset many of the potentially detrimental impacts of climate change.

8.9.2 Geology and Landscape

A comprehensive report on the *Geology of the Camberwell, Dungog and Bulahdelah 1:100,000 Sheets* (Roberts, Engel and Chapman, 1991) examines the geological aspects of the LGA. More detailed studies of small areas within the LGA have been undertaken by the Geological Survey Branch of the NSW Department of Primary Industries, and in university studies.

The Dungog LGA falls within what is termed the north eastern mountain sub-region. Generally, the LGA is situated at the southern end of the New England Fold Belt and consists mainly of the southern extension of the Tamworth Belt or zone. The Tamworth Belt within this region contains sedimentary rocks of the Devonian and Carboniferous age; is intruded by Early Permian granitiods; and overlain by Tertiary Basalt (DSC, 2001). The geology of the Dungog area is extremely complex owing to the diverse rock types and to the structural complexity of the area (Roberts, *et al*, 1991).

In a topographical sense, the LGA varies from mountainous, rugged terrain in the north (Barrington Top Ranges), through undulating country, to alluvial flats in the south. The western border of the LGA is defined by the Mount Royal Range, and the Moonibung Range in the far south. To the east, the Black Bulga Range and Iron Stone Mountain define the border (DSC, 2001). The LGA is dominated by three river valleys (the Williams, Allyn and Paterson) which further influence the topography of the area.

8.9.3 Soils, Land Capability and Land Degradation

Regional soil landscape mapping has been undertaken for much of the LGA, and is available in *Soil Landscapes of the Dungog 1:100,000 sheet (2000) and Newcastle 1:100,000 sheet* (held by the Department of Land and Water Conservation). The soils within Dungog were reviewed in the *Dungog Shire Wide Local Environmental Study* (2003). The Study notes that the Dungog LGA comprises an extremely wide variety of soil types, reflecting the variations in the underlying rock types, particularly in the dissected country of high relief.

The 2003 Local Environmental Study provides detailed descriptions of soil landscapes within 5 km of the major towns within the LGA. Generally, these soils have frequent occurrences of high level acidity and low fertility. The soil landscapes in the hilly areas are generally highly erodible, and there are several locations where soil conditions are highly unsuitable for cultivation and development.

The ability of a landscape to sustain land use is a function of physical characteristics and biological features. This is generally referred to as land capability, and includes steepness, rockiness, soil depth, soil nutrients, drainage, and vegetation cover.

Rural land capability is shown for the LGA in Map 8.2, and may be used to provide a basis for broad strategic assessment of agricultural potential and limits to development. The map should not be used for considering land units below 40 ha. Additional, general rural land capability and suitable land management recommendations are provided in the LES for the LGA's major towns (DSC, 2003).

The major forms of land degradation in the Dungog LGA are sheet, rill and gully erosion; mass movement; wind erosion; dry land salinity; scalding; induced soil acidity and structural decline (DSC, 2003). The complex geology of the landscape means that the land is often unstable, particularly in the steep hills and mountainous regions, resulting in regular mass movements that cause serious environmental hazards for the LGA. This level of land instability and degradation has significant implications for future land use planning, particularly in steeply sloping areas.

Land capability for urban development requires additional considerations. Capability statements are included within the soil landscape reports prepared for the LGA (see above) which may be of sufficient accuracy and detail for the planning of small scale, low value, and low impact developments. Further land capability statements are provided in the 2003 LES (DSC, 2003). However, detailed planning at the local level and more intensive capability assessments should be prepared for more intensive developments. This assessment may include the preparation of a site-specific geotechnical assessment.

Land instability and degradation has significant implications for future landuse planning, particularly in steeply sloping areas.

Land capability for urban development may be of sufficient accuracy and detail for the planning of small scale, low value, and low impact developments however detailed planning at local level and more intensive capability assessments should be prepared for larger developments.

8.9.4 Hydrology, Water Availability and Quality

Surface and groundwater resources are extremely important in sustaining natural landscapes, urban development and agricultural production within the LGA. As a consequence, availability of water resources and water quality are important factors in affecting future land use. Urban water supplies are considered in the infrastructure section of the report.

The Dungog LGA contains two major river sub-catchments, the Williams River catchment and the Paterson/ Allyn catchment, both of which feed into the Hunter River system. The LES (2003) describes the hydrology of the Dungog LGA in detail. Some of the general characteristics of the water resources of the LGA are as follows:

- The Williams and Paterson catchment areas are contained within a watershed divided into 2 drainage areas by ridges and crest line. These areas are controlled by climate and land systems, and are particularly influenced in the upper reaches of the catchments by strong relief.
- The Paterson River has a catchment area of 277 km^2. Lostock Dam is located on the river near the locality of Mount Rivers and has a storage capacity of 20,000 ML and a spillway capacity of 247,000 MML/day. This dam is principally used for irrigation and urban supply.
- The Williams and Chichester Rivers drain a catchment of approximately 131,200 ha, and provides potable water supply for much of the Lower Hunter region, including Newcastle. The Williams river catchment extends beyond the boundaries of the Dungog LGA into Port Stephens. Because of its value as a natural resource, countless studies have been undertaken to maintain water quality. Under the provisions of the *Clean Waters regulation 1972*, administered by the *Protection of the Environment Operations Act 1997*, the Williams has been classified as a Class P- Protected River, limiting the level of physical and chemical pollutants that may be discharged into the river. The Williams River Total Catchment Committee was formed in 1990 as a sub-committee of the Hunter River Catchment Trust, and developed the Williams River TCM Strategy and Williams River Catchment REP to guide the implementation of strategies and actions within the catchment.

Water resource issues have been considered extensively in recent years as part of the NSW Government water reform process, and the implementation of water sharing plans under the *Water Management Act 2000*. In addition, broad issues of river and catchment health were considered by the Healthy Rivers Commission in its final report on the independent inquiry into the Williams River System (1996) and the Hunter River (2002).

The *State of the Rivers and Estuaries Report* for the Williams River Catchment (within the Williams River Catchment Regional Environmental Study 1996, (updated by the Williams River Total Catchment Committee, 1998) provides an overview of the catchment condition, and summarises available information on characteristics including stream flow, water quality, channel structure, riparian vegetation, wetlands and aquatic biota.

Issues affecting the condition of the Williams River include:

- The effects of land clearing, and the subsequent reduction in range of ecosystems and diversity on remaining land.
- The loss of native vegetation, hampered by bank erosion, weed infestation, and predation by rabbits.
- A reduction in water quality and the health of the aquatic environment, stemming from changes in water quantity, quality and river flow, and increased levels of nutrients, sediments and pollution.
- Impacts of adjoining land uses, which may increase stormwater runoff and reduce the ability of the riparian vegetation to act as a sediment buffer.

Some additional, regional-scale impacts identified in the State of the Rivers report for the broader Hunter Catchment include:

- Reduced frequency of medium flows and freshes along the Hunter River due to water extraction.
- Changed stream flow patterns as a result of flow regulation.
- Higher periods of low and zero flow in unregulated streams as a result of water extraction.
- Most nutrients in the river originate from diffuse sources.
- Discharge from effluent treatment systems which may lead to groundwater contamination.

Water plans are developed under the *Water Management Act 2000* by the NSW Department of Natural Resources. Currently, water plans are in place for regulated sections of the Hunter River (downstream of Glenbawn Dam) and Wybong Creek. A macro scale water sharing plan is being completed for unregulated streams and groundwater, and primarily deals with annual water extraction and river flow volumes. This *Draft Hunter Unregulated and Alluvial Water Sources Water Sharing Plan* was on public exhibition in 2008, and contains report cards on the health and attributes of each of the rivers that feed the Hunter, including the Williams and Paterson/Allyn Rivers. Water entitlements will be regulated by this plan which has the potential to significantly affect land use opportunities within the LGA over the long term by limiting areas where water entitlements will be available and affecting water prices. This draft plan identifies important regional water related issues and its provisions could potentially be linked to land use planning provisions.

8.9.5 Flooding

The LGA is significantly flood affected. The LAPs prepared for the towns within the LGA identify flooding as an issue, particularly those in proximity to the Paterson and Allyn Rivers. The 2003 LES notes that '*the Paterson River has the potential to flood from a number of source,s but dominantly from high intensity rainfalls over the catchment'*. Flooding does affect the villages of Paterson and Vacy. The Williams

River can also cause flooding, and affects the towns of Dungog and Clarence Town. The largest flood events in the LGA were in the upper catchment of the Paterson River in 1978, and in the Williams River in 1893, causing severe damage in Paterson and Clarence Town.

A number of flood studies related to the Paterson River have been undertaken, including the *Paterson River Flood Study* (WBM, 1997) and the *Paterson River Floodplain Management Study and Plan* (Brewsher Consulting Pty Ltd, in DSC LES, 2003). These studies identified practical measures to minimise the impacts of floods on development within the Paterson River Valley. The *Williams River Catchment Regional Environmental Planning Strategy* also makes reference to flooding, noting that development on the floodplain should be avoided whenever possible but when permitted should be limited to appropriate uses that are compatible with periodic inundation by floodwaters.

In June 2008, the Williams River Flood Study was in final draft and adoption was anticipated to be before December 2008.

State planning advice on the management of flood prone land is provided in the *Floodplain Development Manual: the Management of Flood Liable Land* (DIPNR, 2005). This document implements a 'performance based' approach to the determination of response to flood hazard, and primarily focuses on risk management. Within Dungog LGA there is generally adequate information available to determine hazards associated with flooding and future development impacts, especially in urban areas.

Although comprehensive LGA flood mapping information is not available Map 8.12 to Map 8.18 illustrate the flooding constraints and in some instances the relationship between infrastructure and flooding in the following areas: Infrastructure and Flooding in Dungog (Map 8.12), Clarence Town (Map 8.13), Paterson (Map 8.14), Gresford (Map 8.15), Vacy and Martins Creek (Map 8.16). Flooding only for Paterson River South (Map 8.17) and Paterson River North (Map 8.18).

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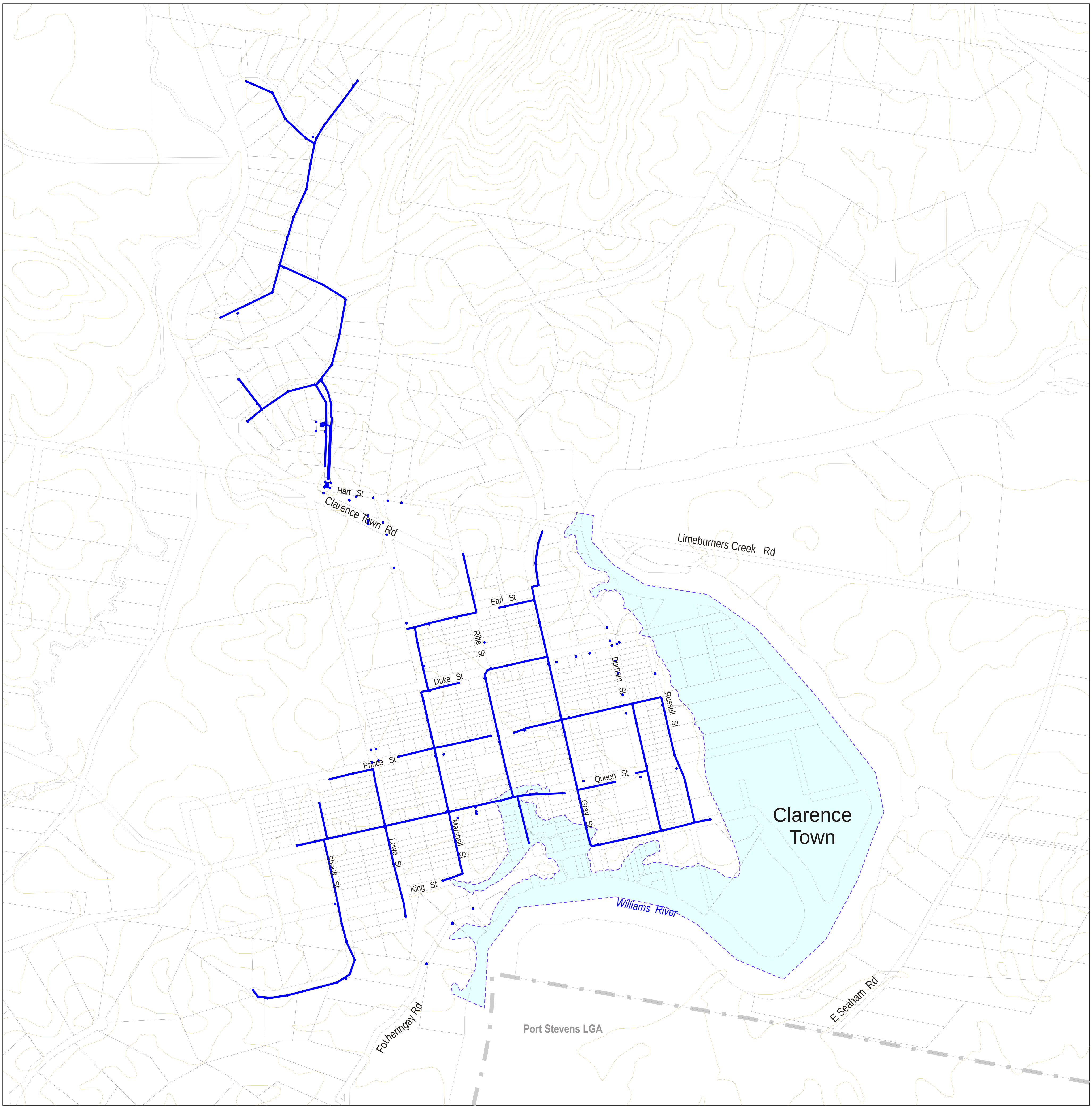
LEGEND

- WATER - INFRASTRUCTURE
- SEWER - INFRASTRUCTURE
- WILLIAM RIVER FLOODING
- 10 m - CONTOURS

Infrastructure & Flooding - Dungog



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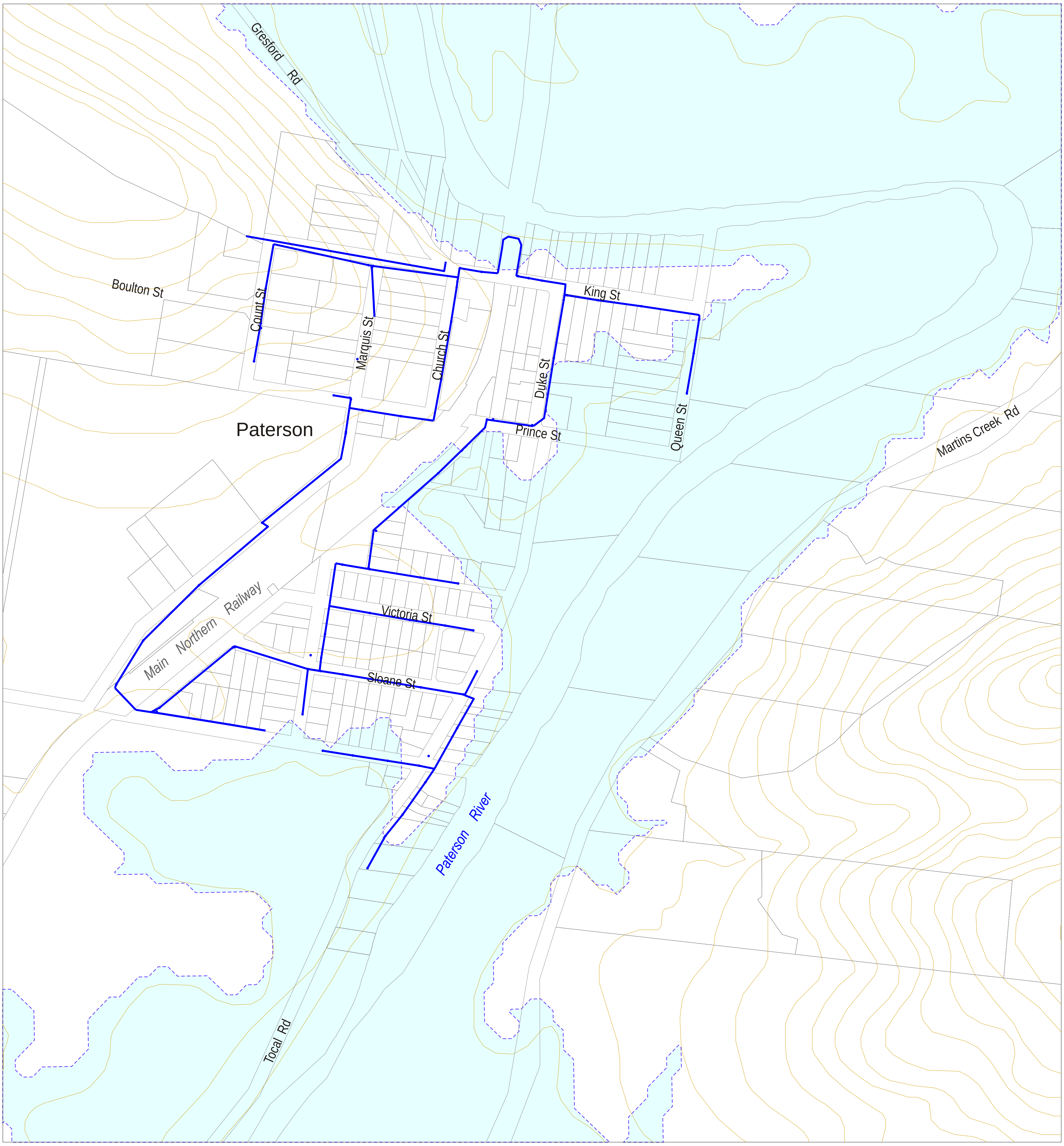
LEGEND

- WATER - INFRASTRUCTURE
- WILLIAM RIVER FLOODING
- 10 m - CONTOURS

Infrastructure & Flooding - Clarence Town



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LEGEND

WATER - INFRASTRUCTURE

PATERSON RIVER FLOODING - 1 in 200 Year ARI

10 m - CONTOURS

Infrastructure & Flooding - Paterson

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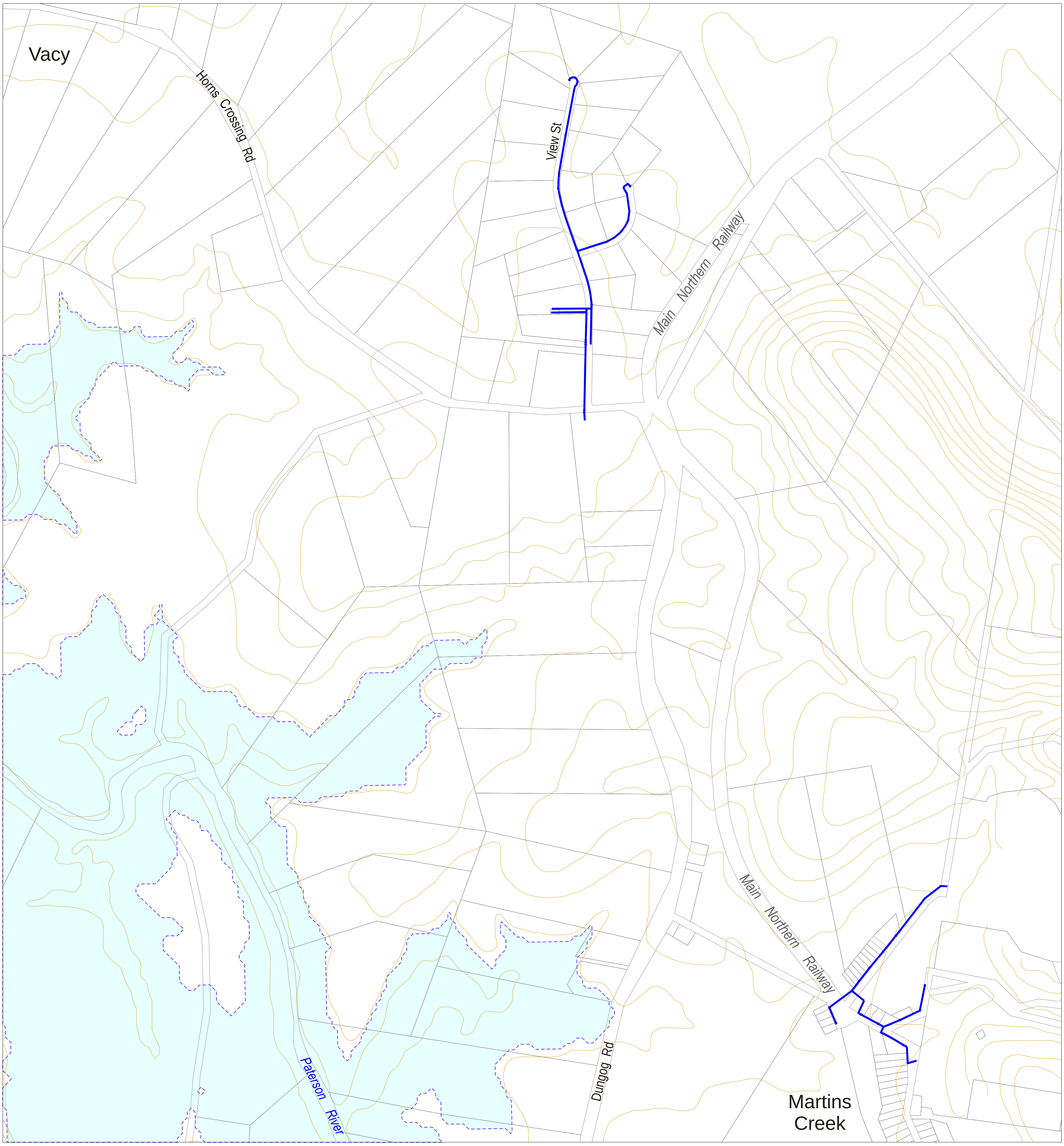
LEGEND

WATER - INFRASTRUCTURE

WILLIAM RIVER FLOODING

10 m - CONTOURS

Infrastructure - Gresford



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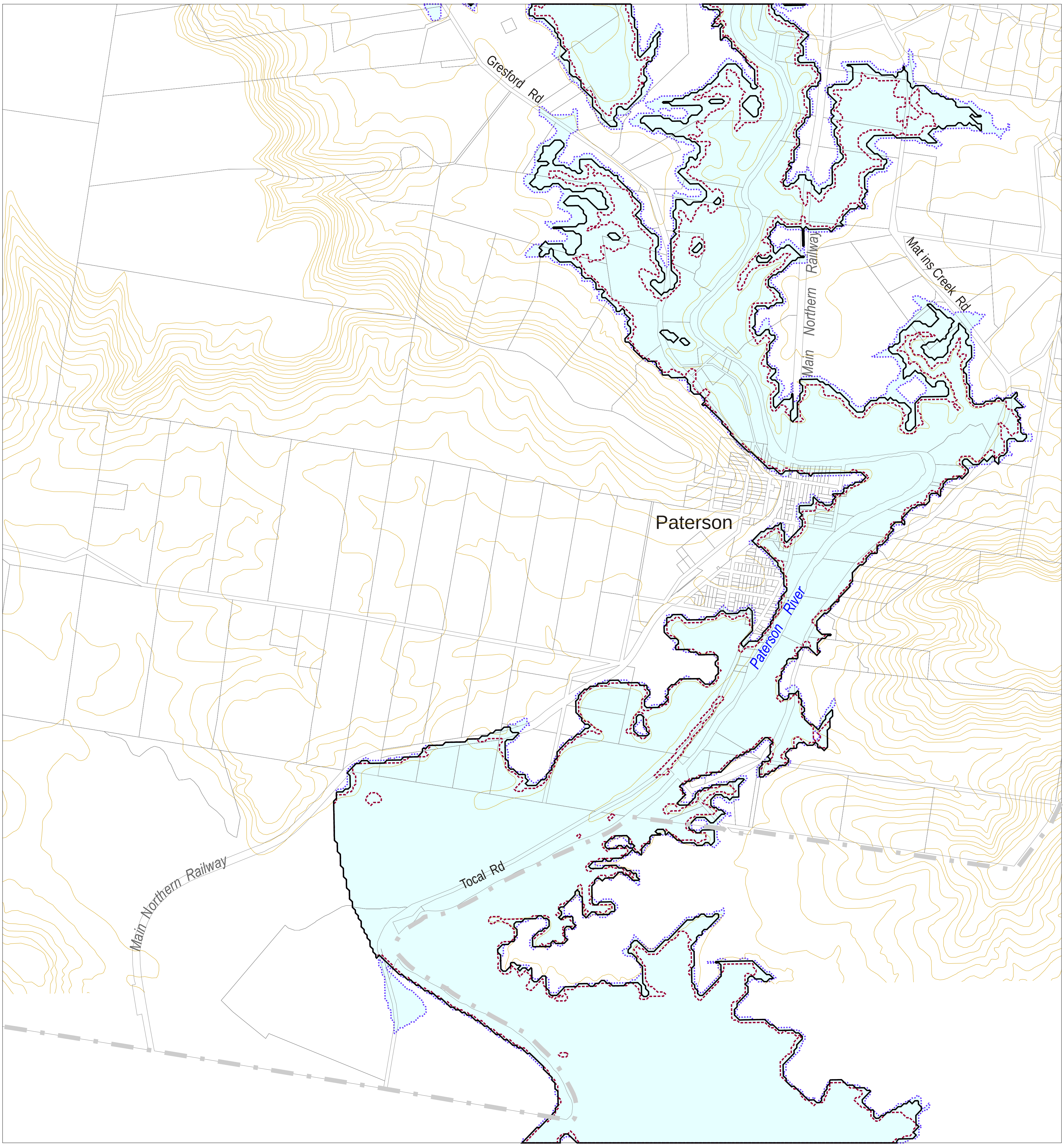
LEGEND

- WATER - INFRASTRUCTURE
- PATERSON RIVER FLOODING - 1 in 200 Year ARI
- 10 m - CONTOURS

Infrastructure & Flooding - Vacy and Martins Creek



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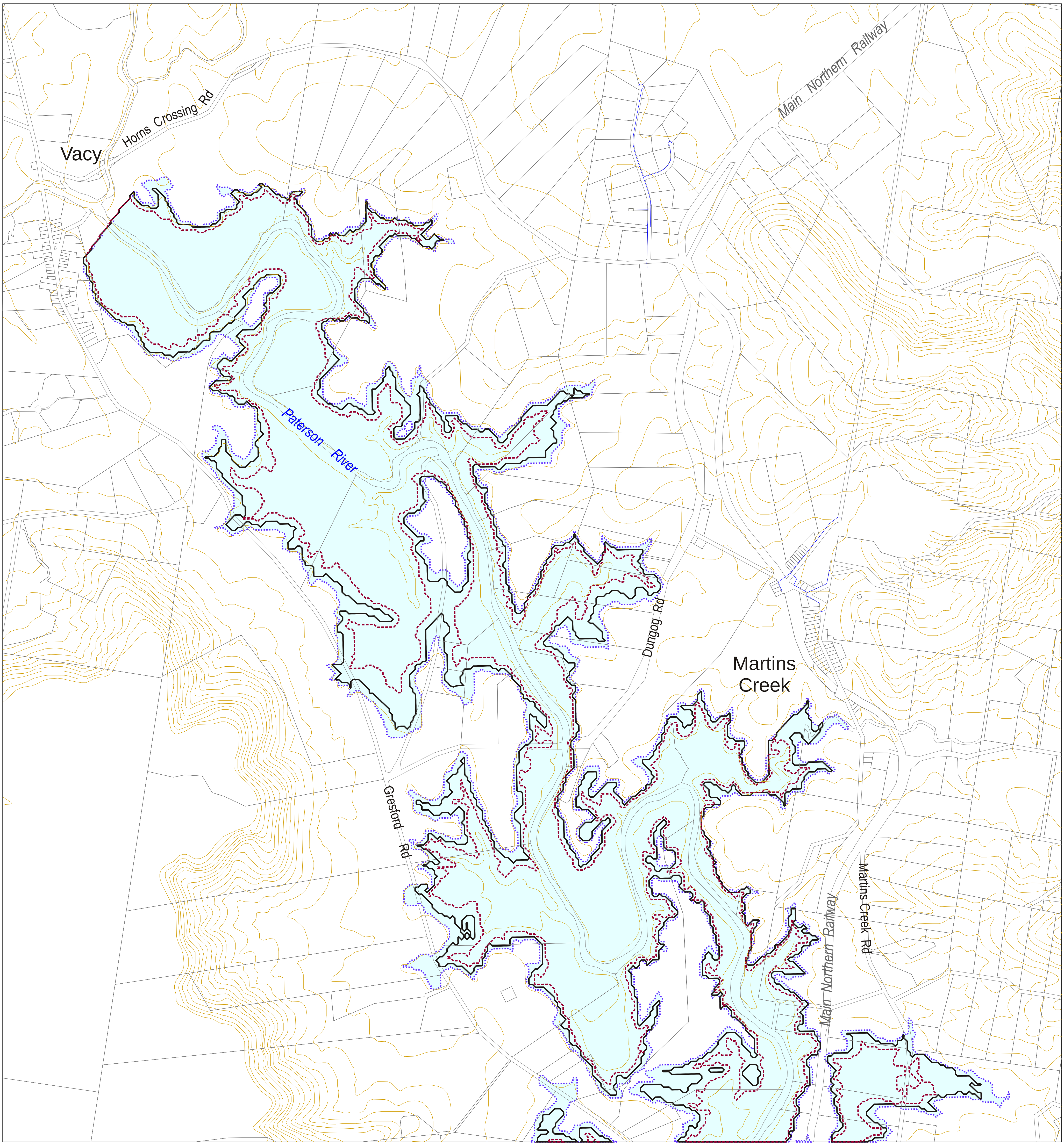
LEGEND - Average Return Interval

- PATERSON RIVER - 100 Year ARI FLOOD
- PATERSON RIVER - 200 Year ARI FLOOD
- PATERSON RIVER - 20 Year ARI FLOOD
- 10 m - CONTOURS

Flooding - Paterson River (south)



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LEGEND - Average Return Interval

- PATERSON RIVER - 100 Year ARI FLOOD
- PATERSON RIVER - 200 Year ARI FLOOD
- PATERSON RIVER - 20 Year ARI FLOOD
- 10 m - CONTOURS

Flooding - Paterson River (north)

8.9.6 Bushfire

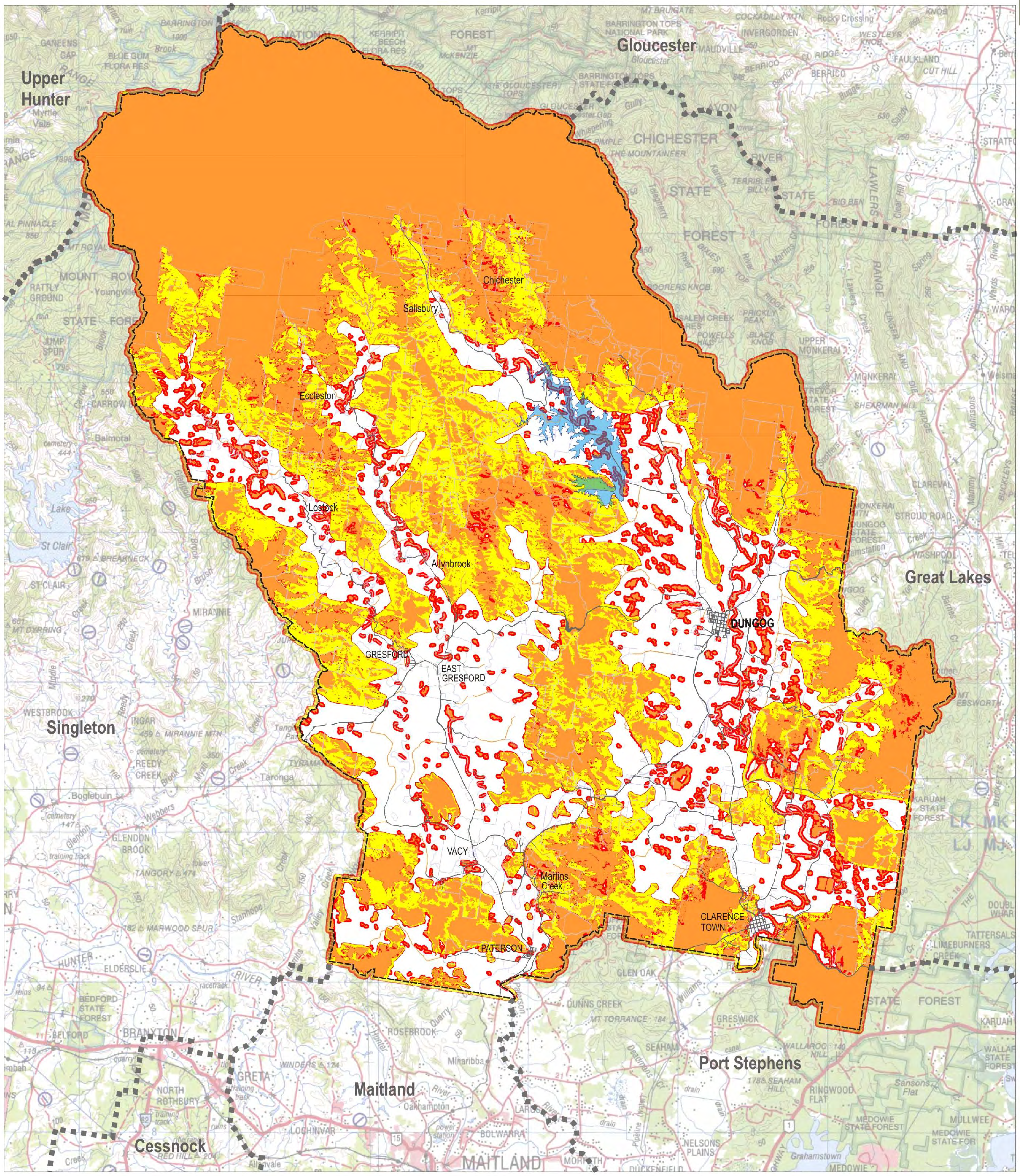
Bushfire management in NSW has changed significantly in recent years. With the introduction of the *Planning for Bushfire Protection* document and related legislative change it is now under an integrated and consistent management regime throughout NSW. As part of that process, state-wide mapping led to significant areas of land within the LGA being identified as bushfire prone. The location of bushfire prone land is important as, without vegetation modification, it often imposes a significant constraint on the location of future settlement. In this respect, while existing residential areas are relatively isolated from bushfire prone land, a number of rural residential areas have significant exposure. Should future residential land be located in proximity to these residential areas, bushfire is unlikely to be a significant constraint to future development. Bushfire is, however, an issue in the location of rural and rural residential dwellings throughout much of the area.

Bush Fire Prone Areas shown in Map 8.19 illustrates vegetation category one and two lands and the bushfire buffer zones needed.

8.9.7 Contaminated Land

The Council has compiled information on known contaminated sites. The *Dungog Shire Council Supplementary State of the Environment Report 2006-2007* (DSC, 2007*b*) lists a total of 95 potentially contaminated sites within the Council's Contaminated Land Database. Contaminated sites include service stations, waste depots, sewerage treatment works, and intensive agricultural industries.

Contaminated Land Map 8.20 identifies the current contaminated sites.



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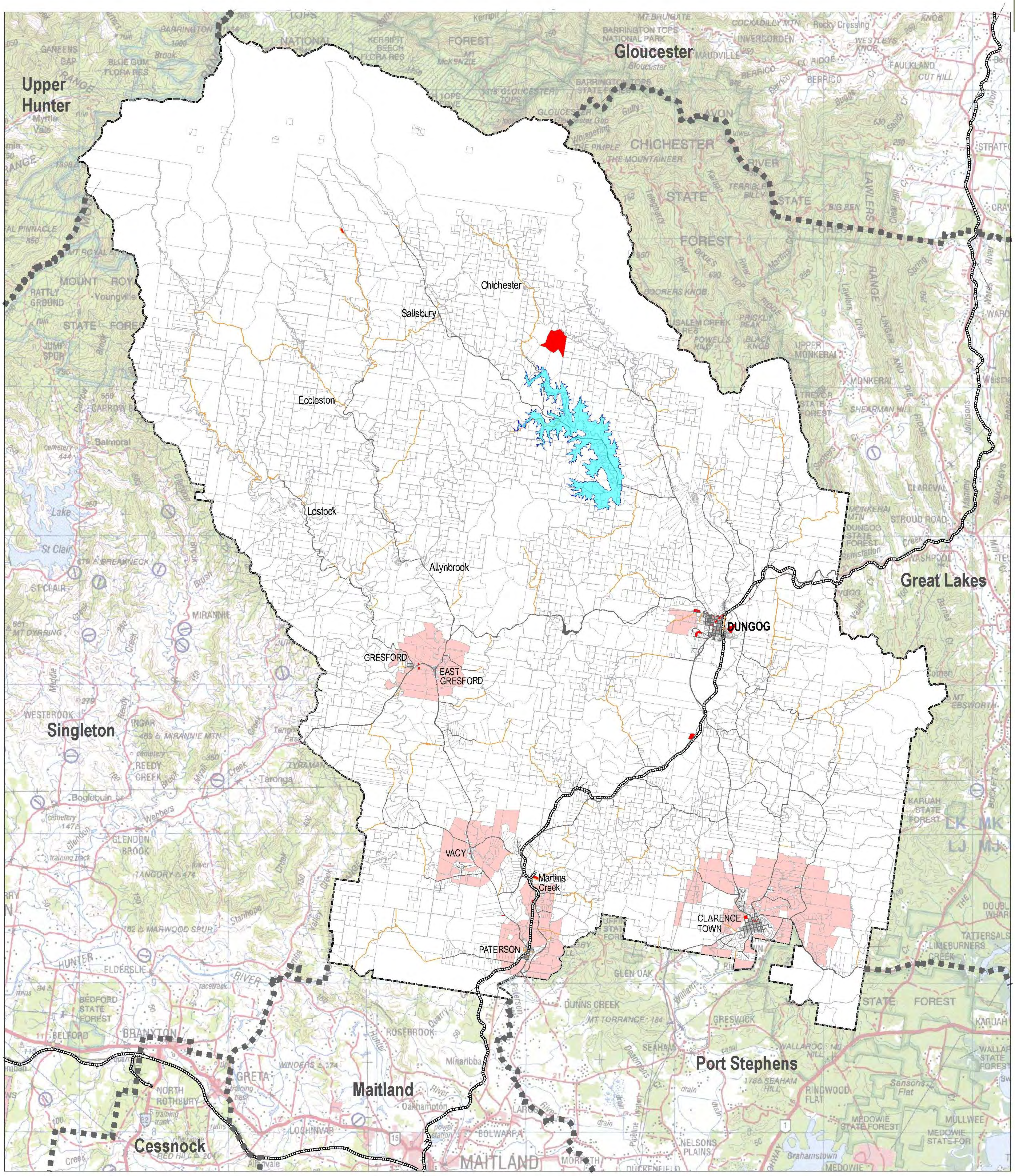
LEGEND

- BUSH FIRE PRONE VEGETATION - CATEGORY 1
- BUSH FIRE PRONE VEGETATION - CATEGORY 2
- BUSH FIRE PRONE VEGETATION BUFFER - 100 & 30m
- DUNGOG LEP 2006 - TRANSITION ZONE
- PROPOSED TILLEGRA DAM
- SEALED ROADS
- UN-SEALED ROADS

Bush Fire Prone Areas



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Contaminated Land

8.10 Design Issues

8.10.1 European Heritage

An important feature within the LGA is the prominence of historic built, natural and cultural heritage. The need to conserve the LGA's heritage is important for a number of reasons; it displays strong examples of early Australian architecture, it is generally attractive and well preserved, it maintains a historic ambience to the urban and rural landscape and it has the potential to attract tourism and contribute to economic growth.

There are a significant number of heritage items listed in the various heritage registers applicable to the LGA, as shown in Table 52 below (note that properties can be listed on more than one register.)

The maintenance and protection of built, natural and cultural heritage is important to residents and the boarder community and should be strongly supported in land use strategies. In particular when considering the expansion of urban centres it will be important to preserve and enhance not only the built form but streetscape, and natural vistas.

Table 52: Number of listed heritage items within the Dungog LGA

Instrument	Heritage item	Heritage Conservation Area
Dungog Local Environmental Plan 2006	148	5
Hunter Regional Environmental Plan 1989 (Heritage)	26	-
NSW State Heritage Register	19	-
Register of the National Estate	22	-
EPBC Act Matters of National Environmental Significance (Heritage)	1	-
Historic Heritage Information Management System (HHIMS)*	42	-

*HHIMS is managed by the Department of Environment and Climate Change, and is generally concerned with post-European contact heritage items located in national parks and reserves.

Note: Many heritage items are listed within the schedules of the LEP or within an identified heritage conservation area in the LEP and are subject to regulatory provisions. Although the registers have not been cross referenced it is most likely that heritage items listed on the Hunter, NSW or national heritage lists are also on the Local Environmental Plan.

8.10.2 Indigenous Heritage

There is considerable archaeological evidence throughout the area of long term Aboriginal occupation of the landscape. The area has a variety of evidence including camp sites, burials, middens and scarred trees. There are historic and cultural areas and landscapes in addition to archaeological sites. The area falls within the lands of the Mindaribba, Worimi and Karuah people, and Aboriginal groups in the LGA maintain ongoing connections to the land.

The location of sites is recorded on a database maintained by the Department of Environment and Climate Change, the Aboriginal Heritage Information System (AHIMS), and is subject to confidentiality policies to protect sites. The current number of sites recorded within AHIMS for Dungog is 32, as listed in Table 53 below. The relatively small number of sites listed may indicate destruction of sites through agricultural pursuits, natural processes of erosion and deposition of land, bushfires or other means, while many other sites may not yet have been detected (DSC, 2001). Many more sites may be known by the Aboriginal community but not formally identified. The *Dungog Shire Council Supplementary State of the Environment Report 2006-2007* discusses the pressures on the maintenance of heritage items, including Aboriginal items.

Table 53: Aboriginal archaeological site features recorded in the Dungog LGA

Aboriginal site feature	Number recorded
Open camp site	7
Isolated find	4
Burial	3
Bora/ ceremonial	1
Stone arrangement	1
Midden	2
Scarred tree	6
Carved tree	1
Rock engraving	1
Axe grinding groove	2

Source: Department of Environment and Climate Change, 2008, AHIMS Search Report # 21847

Note: A site may accommodate more than one type of feature

No systematic LGA wide survey or evaluation of Aboriginal heritage has been undertaken, however based on evidence elsewhere in the Hunter Valley, it is reasonable to assume that the entire landscape contains extensive evidence of Aboriginal occupation. Systematic surveys undertaken elsewhere, especially for mining projects demonstrate the large number of sites, especially along and near creek lines.

Aboriginal heritage in NSW is protected under the NSW National Parks and Wildlife Act 1974. From a land use planning point of view, future development needs to be sensitive to indigenous heritage, and to ensure that appropriate investigations are undertaken in the early stages of development projects, and prior to any landscape disturbance such as urban development.

8.10.3 Air Quality

No data is currently available in regard to air quality in the Dungog LGA. However anecdotal evidence suggests that air quality is generally considered to be very good due to the lack of major pollutant sources within the area, such as coal-fired electricity plants. It is noted that only 3 complaints with regard to air pollution were received by the Council in 2006/2007. The *Dungog Shire Council Supplementary State* *of the Environment Report 2006-2007* lists the following, relatively minor, sources of air pollution within the LGA:

- Vehicle emissions
- Localised rural burning
- Use of domestic wood heaters in cooler months
- Some agricultural activities (e.g. fertiliser application, poultry raising)
- Landfills

Extensive reliance on private motor vehicles within the LGA is a contributor towards air pollution on a local and global scale by the release of greenhouse gases, thereby contributing to global warming, and a number of other pollutants which affect the health of the environment and people at the local level.

Air quality is closely related to climatic conditions and land use and development related activities. Poor air quality has the potential for environmental health and other impacts. An important way of minimising pollution associated with dust and odour is to separate land uses, and to ensure appropriate buffers between residential use and potential generators such as wastewater treatment plants, abattoirs, coal mines, and intensive agricultural uses.

8.10.4 Acoustic Environment

There are few sources of noise pollution which may significantly affect amenity within the LGA. The LGA mainly comprises rural development that generates relatively low levels of noise. Few major roads pass through the LGA, though the rail corridor has the potential to generate offensive noise if located close to incompatible development. Industrial areas within the LGA are generally isolated, including the light industrial area at the terminus of Common Road, Dungog.

The most effective way of avoiding/ reducing noise pollution through land use planning is to ensure the separation of incompatible land uses, and through assessment of development proposals. In general, noise is not a significant issue because of the existing separation of uses, except in localised cases in proximity to specific developments.

8.10.5 Landscape Issues

The LGA includes many scenic landscapes, which need to be considered in the formulation of land use planning controls. Local Area Plans prepared for major towns and villages within the LGA identify the need to protect areas of high visual significance as a key issue. The LAPs provide descriptions of the main areas of high scenic value within the catchment of each town.

8.11 Planning Administration

This section briefly identifies the issues relating to administration of land use planning within the LGA which should be considered in the formulation of draft LEP provisions. Important matters which need to be considered that affect implementation of land use strategies and plans in the Dungog LGA are:

- The implementation of regional strategies
- Updating GIS mapping prepared for the strategy to inform future planning
- Future review and change to the Standard LEP by the Department of Planning