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16. Socio-Economic

16.1 Existing Social Environment

16.1.1 Introduction

The following section of the EIS describes:

- the social and economic values of the study area in the local and regional context;
- potential changes to the social and economic environment as a result of the construction and operation aspects of the project;
- the benefits of the project; and
- mitigation measures to ensure the social and economic values are protected and enhanced by the project.

16.1.2 Existing Social Environment

Hinze Dam is situated south west of the rural residential and bushland areas of Gilston, in the locality of Advancetown. The Hinze Dam is an asset to the entire Gold Coast City community, for water supply, flood mitigation and recreational purposes. However, any significant changes to the social environment will be experienced in the communities closest to the dam.

The following areas have been considered as the primary study area for social impact assessment:

- rural localities of Gilston and Advancetown;
- rural localities of Lower Beechmont, west of the dam, and Bonogin near the dam's southeast reach;
- suburbs of Tallai, Worongary, Highland Park and Mudgeeraba, east of the dam; and
- dam's south western reach, where the Nerang River flows to the dam, and extending through forested areas to the Numinbah State Forest.

The study area is shown in **Figure 16-1**. Characteristics of the downstream areas and the Gold Coast Local Government Area (LGA) have also been addressed.

The description of the social environment includes:

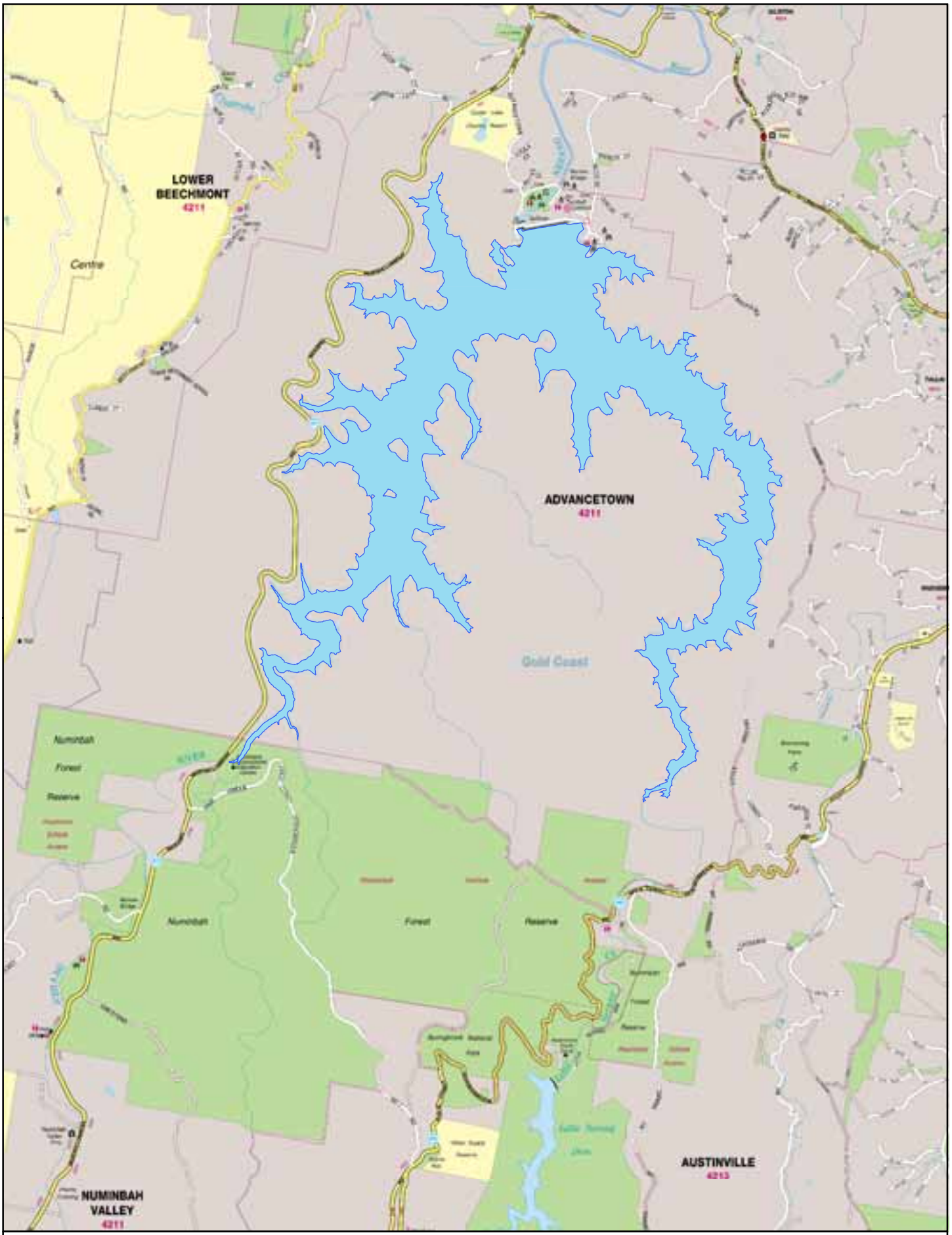
- demographic characteristics (community strengths, vulnerabilities and needs);
- social infrastructure (community, cultural, recreational and leisure facilities); and
- community values (amenity, lifestyles, access and mobility, and safety and security).

16.1.3 Gold Coast City Community Profile

Gold Coast City comprises an area of approximately 1451 km^2, and extends some 85 km from the Logan River in the north, to the New South Wales border in the south. Gold Coast is the fastest growing Local Government Area in Queensland, and in population terms, is the second largest LGA in Australia.

Gold Coast City Council (GCCC) has undertaken comprehensive analysis and reporting[1] of the City's demography from the ABS 2001 Census of Population and Housing, and this has been relied upon to describe demography at the City level, supplemented by population projections provided by GCCC.

[1] Gold Coast City Council (2003a) "Our Community" a Social Profile of Gold Coast City at www.goldcoast.qld.gov.au/t_standard2.aspx?pid=4125 accessed 22 February 2007



N

0 0.5 1 2

Kilometres

Scale - 1:60,000

Projection: MGA Zone 56

Figure 16-1

Study Area

Hinze Dam Stage 3 EIS

The Gold Coast LGA population was projected[2] to reach more than half a million people by December 2006. The population is expected to grow by an average of 2.4% per year between 2001 and 2026 (compared with SEQ's rate of 1.7%), for a population in 2021 of 683 568 residents. Gold Coast also has a strong tourism base - around 11% of people in the city on Census night 2001 were visitors. Large increases in population are expected in the hinterland area, including an additional 30 000 residents in the Guanaba-Currumbin Valley

Around 20% of the City's population (approximately 100 000 people) are aged from 10 to 24 years, and by 2021, this is expected to reach around 122 000 people. Notwithstanding the large number of young people, the population in Gold Coast City is ageing in line with national and international trends, due to the progression of the baby boomers into the senior years, declining birth rates and increasing life expectancies. Gold Coast had a slightly larger proportion of residents aged 55 years and over (23.9%) than the Queensland average (21.2%) in 2001. It is projected[3] that the proportion of people aged 55 and over will increase from 23.9% of the population in 2001 to 31.7% in 2021.

Gold Coast has the largest range of dwelling types (very high to very low density) of any city in Queensland. The City's population shows high mobility – only 37.9% of people were counted at the same address in 1996 and 2001, compared to the Queensland average of 45.8%. Gold Coast City also shows high levels of residents born overseas (at 9.1%, compared to 7.4% for Queensland.) Commensurate with high mobility among residents, rapid growth and the range of available housing options, the City has a high proportion (34.7%) of renting households.

Analysis of the demographic characteristics indicates:

- strong, sustained population growth and increasing residential development – requiring additional infrastructure to meet water supply needs and also flood mitigation is maximised to protect areas downstream of the dam;
- diversity in age and household profile require recreational values which meet the needs of children, families, individuals and the aged; and
- high population growth, high mobility and cultural diversity resulting in a low level of flood awareness in the City (indicated in research conducted for GCCC[4]).

16.1.4 Study Area Community Profile

Demographic data was analysed based upon collection district data, where the collection districts overlapped this data was split between the relevant suburb areas of the catchment. In some circumstances data was unavailable at the collection district level, and where this occurred Statistical Local Area (SLA) data was applied proportionally to collection districts and then applied appropriately to aggregated suburb data. The following profile compares demographic characteristics in the primary study area to the GCCC LGA and Queensland averages[5].

Population

The primary study area includes the localities and suburbs of Advancetown, Lower Beechmont, Gilston, Tallai, Mudgeeraba, Worongary, Highland Park, and Bonogin. There was an estimated 38 212 persons living in the study area in 2006, 18.2% more persons than in 2001, with an average annual growth of 3.4%. This rate of growth was in

[2] Gold Coast City Council (2006) Population Projections to 2026, prepared for the Priority Infrastructure Plan, by Planning Information Forecasting Unit, DLGPSR.

[3] *Ibid.*

[4] Nerang River Flood Mitigation Options Project (2003b) market research

[5] Population data was only available at the collection district level for 2001. Statistical Local Area population data for the years 1996 to 2006 was used in top-down analysis to estimate the populations at the collection district level based on the proportion of collection districts that populated each Statistical Local Area of the catchment in 2001. SLA population projection data was used in the same way to calculate collection district 2016 projections. Mobility data was available at the Statistical Local Area (SLA) level for 2001, not at the collection district level. The data was used in top down analysis to estimate the collection district proportion of persons counted at the same residence in 1996-2001.

line with the Gold Coast City average annual growth of 3.3% and well above the Queensland level of 2.2% growth recorded per annum over the same five year period.

The most significant population growth was recorded in the suburbs of Lower Beechmont and Advancetown, which experienced average annual growth of 7.1% and 7.0% respectively. Bonogin, Gilston and Mudgeeraba also recorded growth rates higher than the Gold Coast average. In contrast, Worongary recorded the lowest average annual growth of 1.4% for the five year period.

According to the Queensland Department of Local Government and Planning Sport and Recreation (DLGPSR), the study area population is projected to grow to 52 300 persons by the year 2016, with Mudgeeraba as the major population centre, accounting for 38% of the total projected population. The study area's projected rate of population growth for 2006-2016 is approximately 37%, which is a slightly higher rate of growth than that expected for Gold Coast City as a whole (see **Table 16-1**).

Table 16-1 Catchment Population - Time Series and Projection

Location	1996	2001	2006	Average annual Growth 2001-06	2016
Advancetown	866	1272	1786	7.0%	2894
Bonogin	2720	3,698	4679	4.8%	7181
Gilston	341	456	575	4.7%	847
Highland Park	4 396	4876	5626	2.9%	7046
Lower Beechmont	461	796	1123	7.1%	1894
Mudgeeraba	8 688	11067	13 481	4.0%	19 892
Tallai	3 575	3892	4214	1.6%	4 892
Worongary	5 740	6267	6729	1.4%	7 250
Study Area	26 788	32 322	38 212	3.4%	52 300
Gold Coast City	363 943	432 588	507 880	3.3%	677 899
Queensland	3 338 690	3 628 946	4 053 444	2.2%	5 027 679

Source: ABS 2003, 2003, 2006; projected population data from Department of Local Government and Planning (DLGP).

Age Distribution and Cultural Diversity

Age

The study area has a young population, recording an average age of 33.3 years in 2001, which was well below the Gold Coast City and Queensland median ages of 38.0 and 36.0 years respectively. Within the study area, the highest average age was recorded in the suburb of Advancetown (37.3 years), while the lowest was recorded in Mudgeeraba (32.2 years).

The study area recorded a higher proportion of persons aged 20 years and below (32.6%) than Gold Coast City (24.9%) and the Queensland (27.9%) averages. This is indicative of the higher percentage of couples with children households. The suburb with the highest proportion of persons aged 20 years and below was Mudgeeraba with 33.8%, while Advancetown recorded the lowest proportion of 24.2%.

In 2001, 11.6% of the study area's population was over the age of 60 years. Gold Coast City (19.3%) and Queensland (16.4%) have a considerably higher proportion of persons aged 60 years or older by comparison. The percentages of people less than 20 years and over 60 years, and average ages, are shown in **Table 16-2**.

Table 16-2 Age Distribution

Location	% residents <20 years	% residents >60 years	Average Age
Advancetown	24.2%	14.9%	37.3
Bonogin	32.6%	10.1%	33.4
Gilston	31.3%	13.9%	34.7
Highland Park	32.6%	12.3%	33.1
Lower Beechmont	30.5%	11.6%	34.3
Mudgeeraba	33.8%	10.5%	32.2
Tallai	31.9%	15.7%	36.0
Worongary	33.2%	10.5%	32.7
Study Area	32.6%	11.6%	33.3
Gold Coast (C)	24.9%	19.3%	38.0
Queensland	27.9%	16.4%	36.0

Source: ABS 2003

Cultural Diversity

Within the study area, at the ABS 2001 Census, 72.3% of the population were Australian born. This was higher than the Gold Coast City average (69.1%) but lower than the Queensland proportion of Australian born persons (77.7%) The percentage of the population that speak a language other than English (LOTE) at home was 6.2% within the study area. This was well below the Gold Coast City (8.1%) and Queensland (7.1%) levels.

Compared to Gold Coast City and Queensland, the study area had a relatively low Indigenous population (0.9% of total persons). Advancetown and Highland Park recorded Indigenous populations of 1.5% of total population. This was above the Gold Coast City proportion of Indigenous people (1.1%), however, was well below the Queensland proportion (3.1%).

Percentages of broad cultural groups are shown in **Table 16-3**, illustrating a degree of cultural homogeneity in the population.

Table 16-3 Cultural Diversity

Location	% Australian Born	% Indigenous Persons	% speaking LOTE at home
Advancetown	73.7%	1.5%	6.0%
Bonogin	75.9%	0.3%	4.3%
Gilston	78.2%	0.2%	7.1%
Highland Park	71.4%	1.5%	8.0%
Lower Beechmont	72.9%	0.0%	7.3%
Mudgeeraba	70.8%	1.0%	6.3%
Tallai	70.9%	0.5%	5.6%
Worongary	74.6%	1.4%	6.1%
Study Area	72.3%	0.9%	6.2%
Gold Coast (C)	69.1%	1.1%	8.1%
Queensland	77.7%	3.1%	7.1%

Source: ABS 2003

Household Structure and Population Stability

Structure

The proportion of households occupied by couple families with children within the study area (50.6%) was above the Gold Coast City (40.2%) and Queensland (44.7%) levels, with the greatest proportions recorded in Bonogin (58.1%), Tallai (53.1%) and Worongary (52.4%).

The proportion of households identified as couple families without children within the study area (33.0%) was below the Gold Coast City (40.5%) and Queensland (37.4%) levels with the greatest proportions recorded in Gilston (39.9%), Advancetown (37.4%) and Lower Beechmont (36.6%). Mudgeeraba (18.5%) and Highland Park (17.3%) had a higher proportion of one parent families than the Queensland proportion of 16.0%. Bonogin recorded the lowest proportion of households represented by one parent families (8.1%). **Table 16-4** details the household structure in the study area as compared to Gold coast and Queensland averages, and illustrates the popularity of the area to families with children.

Table 16-4 Household Structure

Location	Couple family with children		Couple family without children		One parent family		Other families	
	No.	%	No.	%	No.	%	No.	%
Advancetown	139	47.6%	110	37.4%	41	14.1%	3	1.0%
Bonogin	613	58.1%	349	33.0%	86	8.1%	8	0.7%
Gilston	61	48.4%	50	39.9%	15	11.7%	0	0.0%
Highland Park	675	48.7%	459	33.1%	240	17.3%	12	0.8%
Lower Beechmont	105	46.3%	83	36.6%	33	14.5%	6	2.6%
Mudgeeraba	1514	47.8%	1025	32.3%	586	18.5%	44	1.4%
Tallai	558	53.1%	365	34.7%	122	11.6%	6	0.6%
Worongary	932	52.4%	560	31.4%	274	15.4%	15	0.8%
Study Area	4598	50.6%	2999	33.0%	1 396	15.4%	93	1.0%
Gold Coast (C)	44 069	40.2%	44 398	40.5%	19 288	17.6%	1815	1.7%
Queensland	417 806	44.7%	349 697	37.4%	149 858	16.0%	16 567	1.8%

Source: ABS 2003

Population Stability

In 2001, the study area recorded 45.0% of the resident population as having the same address as in 1996. This was above the Gold Coast City average of 39.2%, but was below the Queensland proportion of 47.8%. This is indicative of a more settled, stable population than in many areas of the Gold Coast, and also of high percentages of home ownership. The proportion of residents that remained at the same address over the five year period was highest for Tallai (51.1%) and Worongary (50.2%), while a lower proportion of residents remained at the same address in Lower Beechmont (34.7%), Gilston (36.7%) and Advancetown (38.7%). **Table 16-5** shows the percentages of people counted at the same address in 1996 and 2001.

Table 16-5 Proportion of Population Counted at Same Address 1996-2001

Location	% Counted same address 96-01
Advancetown	38.7%
Bonogin	41.7%
Gilston	36.7%
Highland Park	43.2%
Lower Beechmont	34.7%
Mudgeeraba	43.6%
Tallai	51.1%
Worongary	50.2%
Study Area	45.0%
Gold Coast (C)	39.2%
Queensland	47.8%

Source: ABS 2003

Dwelling Tenure

In the study area, 34.1% of households owned their own home, which was slightly above the Gold Coast City proportion of 33.3%. The lowest proportion of home ownership was in Mudgeeraba (28.4%), while the highest proportion of home ownership was in Gilston (39.6%).

Within the study area 37.6% of households were purchasing their own home, which was well above the Gold Coast City and Queensland proportions of 22.2% and 25.2%, respectively. The suburbs with the greatest proportion of households purchasing homes were Bonogin (50.2%), Lower Beechmont (47.4%), and Worongary (45.6%).

The proportion of houses rented within the study area was 19.7%, well below the Gold Coast City (34.7%) and Queensland (30.1%) proportions.

The average household size in the study area was 2.9 persons, which was above the Gold Coast and Queensland averages. The highest average household size was recorded in Bonogin and Gilston at 3.2 persons, whilst Lower Beechmont recorded the lowest at 2.5 persons in 2001. **Table 16-6** outlines dwelling tenure in the study area.

Table 16-6 Housing Tenure

Location	% Households fully owning home	% Households purchasing home	% Households renting	% Households renting (Housing Authority)	Persons per household
Advancetown	38.9%	21.0%	20.8%	0.0%	2.8
Bonogin	35.1%	50.2%	7.6%	0.0%	3.2
Gilston	39.6%	29.7%	23.3%	0.0%	3.2
Highland Park	29.9%	40.3%	23.4%	1.5%	2.9
Lower Beechmont	30.6%	47.4%	13.2%	0.0%	2.5
Mudgeeraba	28.4%	27.9%	38.6%	1.8%	2.9
Tallai	38.0%	38.9%	14.9%	2.0%	3.1
Worongary	32.4%	45.6%	15.8%	3.2%	3.0
Study Area	34.1%	37.6%	19.7%	1.1%	2.9
Gold Coast (C)	33.3%	22.2%	34.7%	2.5%	2.5
Queensland	36.6%	25.2%	30.1%	3.5%	2.6

Note: Other types of families were not reported in this table.
Source: ABS 2003

Labour Force and Employment

Labour Force Participation

The study area recorded an unemployment rate of 8.2% in 2001, below the Gold Coast City (9.7%) unemployment rate and in line with the Queensland unemployment rate.

The suburbs of Tallai, Worongary, Gilston, and Bonogin recorded unemployment rates below both the Gold Coast City and Queensland levels. Lower Beechmont recorded the highest unemployment within the study area, at 11.4%. This is likely to be influenced by its more remote location and the lack of local employment options; however the unemployment rate had dropped to 3.6% in 2006.

The labour force participation rate for the study area (69.0%) was well above the Gold Coast City (61.1%) and Queensland (63.1%) levels in 2001. Labour force participation was highest in Worongary (71.8%), Gilston (71.4%) and Bonogin (71.2%), while Advancetown recorded the lowest participation rate of 60.8%. This may be a reflection of the higher median age of Advancetown. **Table 16-7** outlines key features of labour market participation in 2001.

Table 16-7 Labour Force and Employment 2001

Location	Total employment (% labour force)	Unemployment rate (% labour force)	Participation rate (% of population > 15 years)
Advancetown	91.5%	8.5%	60.8%
Bonogin	92.6%	7.4%	71.2%
Gilston	93.6%	6.4%	71.4%
Highland Park	91.3%	8.7%	68.8%
Lower Beechmont	88.6%	11.4%	67.2%
Mudgeeraba	90.5%	9.5%	69.0%
Tallai	94.1%	5.9%	65.4%
Worongary	93.1%	6.9%	71.8%
Study Area	91.8%	8.2%	69.0%
Gold Coast (C)	90.3%	9.7%	61.1%
Queensland	91.8%	8.2%	63.1%

Source: ABS 2003

Unlike most population data which relies on the latest available Census data, recent data on the labour force and employment are available through the Department of Employment and Workplace Relations (DEWR). The study area's labour force grew 5.4% to 21 026 persons in the year ended September 2006. Labour force growth in the study area was above both the Gold Coast City (5.1%) and Queensland (3.4%) averages for the year. All suburbs within the study area recorded similar growth over the period.

Employment in the study area also grew at a faster rate than the Gold Coast City (5.6%) and Queensland (3.6%) averages, increasing 5.8% to 20 429 employed persons (DEWR 2006). Employment growth was strongest in the suburb of Lower Beechmont (6.4%) and weakest in the suburbs of Highland Park, Mudgeeraba and Worongary (5.6%). The unemployment rate in the study area averaged 0.4 percentage points lower during the year ended September 2006 compared to the previous year, at 2.8%. By comparison, Gold Coast City's unemployment rate averaged 4.4% for the year while Queensland averaged 4.9%. The lowest unemployment rate was recorded in the suburb of Tallai (2.1%), while Highland Park recorded the highest unemployment rate of 3.7%. This is outlined in **Table 16-8**.

Table 16-8 Labour Force 2006

Location	Labour Force		Employed Persons		Unemployment Rate	
	Year End Sep 2006	Annual % Growth	Year Ended Sep 2006	Annual % Growth	Year End Sep 2006	Year End Sep 2005
Advancetown	751	5.4%	732	5.9%	2.6%	3.1%
Bonogin	2497	5.4%	2440	5.9%	2.3%	2.7%
Gilston	308	5.4%	300	5.7%	2.5%	2.7%
Highland Park	3186	5.4%	3067	5.6%	3.7%	3.9%
Lower Beechmont	512	5.4%	493	6.4%	3.6%	4.5%
Mudgeeraba	7147	5.4%	6936	5.9%	2.9%	3.4%
Tallai	2345	5.4%	2295	5.6%	2.1%	2.3%
Worongary	4280	5.4%	4166	5.6%	2.7%	2.8%
Study Area	21 026	5.4%	20429	5.8%	2.8%	3.2%
Gold Coast (C)	248 220	5.1%	237 304	5.6%	4.4%	4.9%
Queensland	2 105 858	3.4%	2 002 082	3.6%	4.9%	5.1%

Source: ABS 2003, DEWR 2006

Employment by Occupation

Compared to the Gold Coast City average, the study area had a relatively higher proportion of persons employed in the occupations of:

- professionals (14.7% compared to 13.7%);
- tradespersons & related workers (14.5% compared to 13.5%); and
- advanced clerical & service workers (4.8% compared to 4.3%).

Conversely, the study area had a lower proportion of persons employed relative to Gold Coast City in the occupations of:

- intermediate clerical, sales & service workers (16.8% compared to 17.9%);
- associate professionals (12.8% compared to 13.6%); and
- labourers & related workers (7.7% compared to 8.2%).

When compared to Queensland, the study area had a higher proportion of persons employed in the occupations of:

- elementary clerical, sales & service workers (12.5% compared to 10.1%);
- tradespersons & related workers (14.5% compared to 12.8%); and
- advanced clerical & service workers (4.8% compared to 3.5%).

When compared to Queensland, there were lower proportions of persons employed in the occupations of:

- labourers & related workers (7.7% compared to 9.7%);
- intermediate production & transport workers (7.1% compared to 8.5%); and
- professionals (14.7% compared to 16.0%).

Coupled with higher labour force participation, lower employment and higher average household incomes, this is evidence of a reasonably well-resourced community and a diverse workforce. Within the study area the structure of employment varies considerably by suburb, as shown in the **Table 16-9**.

Table 16-9 Employment by Occupation, 2001

Location	Management & Administration	Professionals	Associate Professionals	Trades & Related	Advanced Clerical & Service	Intermediate Clerical, Sales & Services	Intermediate Production & Transport	Elementary clerical, sales and Services	Labourers and Related Workers	Other
Advancetown	11.9%	16.9%	14.4%	11.9%	5.1%	13.6%	8.8%	9.7%	7.4%	0.4%
Bonogin	7.9%	18.6%	13.2%	14.1%	4.9%	15.8%	5.8%	11.3%	7.1%	1.5%
Gilston	10.4%	12.6%	14.0%	12.2%	4.5%	16.7%	7.2%	9.9%	9.0%	3.6%
Highland Park	6.7%	11.4%	13.3%	14.5%	4.7%	17.5%	8.2%	13.0%	9.1%	1.9%
Lower Beechmont	5.9%	21.7%	9.6%	17.1%	7.1%	16.8%	5.3%	7.8%	5.9%	2.8%
Mudgeeraba	6.9%	15.2%	12.7%	13.8%	4.4%	18.2%	6.6%	13.4%	6.9%	2.0%
Tallai	9.3%	16.8%	13.5%	13.2%	6.0%	14.4%	6.7%	11.8%	6.9%	1.5%
Worongary	5.9%	12.0%	11.7%	16.9%	4.8%	16.8%	8.1%	12.9%	8.9%	2.1%
Study Area	7.3%	14.7%	12.8%	14.5%	4.8%	16.8%	7.1%	12.5%	7.7%	1.9%
Gold Coast (C)	7.1%	13.7%	13.6%	13.5%	4.3%	17.9%	6.9%	12.6%	8.2%	2.2%
Queensland	8.5%	16.0%	12.0%	12.8%	3.5%	16.9%	8.5%	10.1%	9.7%	2.0%

Source: ABS 2003

Household Income

Income Ranges

The study area recorded an average weekly household income of $960.93 in 2001. **Table 16-10** lists the weekly household income for the areas surrounding the dam. This was above the Gold Coast City ($844.61) and Queensland ($885.25) average weekly household incomes. Within the study area, the average weekly household income was highest in Bonogin ($1 113.52) and lowest in Lower Beechmont ($812.55).

The bottom 20% of income earners in the study area had an average weekly household income of $147.50. This was above the Gold Coast City and Queensland levels of $117.33 and $118.26, respectively.

The top 20% of income earners in the study area had an average weekly household income of $1 892.00. This was above the Gold Coast City and Queensland levels of $1 778.12 and $1 851.01, respectively.

Table 16-10 Weekly Household Income

Location	Average weekly household income	Average weekly household income, bottom 20% households	Average weekly household income, top 20% households
Advancetown	$857.62	$110.42	$1805.37
Bonogin	$1113.52	$161.37	$2045.09
Gilston	$987.05	$169.26	$1840.21
Highland Park	$920.10	$157.17	$1755.08
Lower Beechmont	$812.55	$119.83	$1659.93
Mudgeeraba	$914.37	$138.40	$1825.43
Tallai	$1040.34	$150.32	$2011.55
Worongary	$992.78	$162.68	$1913.99
Study Area	$960.93	$147.50	$1892.00
Gold Coast (C)	$844.61	$117.33	$1778.12
Queensland	$885.25	$118.26	$1851.01

Source: ABS 2003

Income by Occupation

Table 16-11 outlines average weekly incomes for individuals by occupation. The average weekly individual income in the study area was $603.67 in 2001. In contrast to average weekly household income, this was below the Gold Coast City ($613.39) and Queensland ($635.96) averages, reflective of a higher proportion of two (or more) income households in the study area. Within the study area, the average weekly individual income was highest in the suburb of Tallai ($630.41) and lowest in the suburb of Highland Park ($581.13).

Breaking income down by occupation shows that managers & administrators ($881.71) and professionals ($846.12) were the highest paid occupations in the study area in 2001, while elementary clerical, sales & service workers ($359.75) and labourers & related workers ($429.17) were the lowest paid.

When compared to Gold Coast City, the occupation of intermediate production & transport workers ($583.09 compared to $559.59) had a considerably higher average income, while the occupations of managers & administrators ($881.71 compared to $939.55) and advanced clerical & service workers ($524.11 compared to $575.02) had a lower average income.

- **Table 16-11 Average Individual Income by Occupation, 2001**

	Managers & Administrators	Professionals	Associate Professionals	Tradespersons & Related Workers	Advanced Clerical & Service Workers	Intermediate Clerical, Sales & Service Workers	Intermediate Production & Transport Workers	Elementary Clerical, Sales & Service Workers	Labourers & Related Workers	Average for suburb
Advancetown	$865.79	$827.65	$691.67	$637.50	$503.70	$477.94	$586.36	$374.49	$413.24	$628.07
Bonogin	$869.78	$832.24	$684.91	$635.98	$524.71	$488.32	$572.33	$366.33	$423.39	$618.10
Gilston	$856.82	$803.57	$710.34	$594.23	$500.00	$483.33	$550.00	$335.71	$413.16	$588.44
Highland Park	$861.35	$807.14	$698.76	$614.38	$512.76	$485.81	$564.53	$362.68	$428.76	$581.13
Lower Beechmont	$852.78	$807.97	$663.79	$630.56	$525.00	$498.08	$571.88	$369.57	$455.00	$620.26
Mudgeeraba	$876.83	$843.90	$689.32	$631.46	$523.22	$486.45	$562.01	$363.16	$425.08	$600.18
Tallai	$910.71	$883.51	$693.32	$629.03	$530.22	$479.71	$617.13	$351.78	$435.51	$630.41
Worongary	$902.30	$877.75	$693.39	$627.38	$535.55	$486.08	$619.25	$351.44	$436.49	$597.43
Study Area	$881.71	$846.12	$691.47	$627.93	$524.11	$485.78	$583.09	$359.75	$429.17	$603.67
Gold Coast (C)	$939.55	$840.86	$726.12	$622.35	$575.02	$502.63	$559.59	$373.49	$437.62	$613.39
Queensland	$882.52	$892.18	$738.97	$639.64	$581.68	$509.15	$628.10	$350.59	$423.07	$635.96

Source: ABS 2003

Implications of Local Area Demography

The characteristics of the study area and implications are:

- population growth is strong (growth rates higher than the already high Gold Coast averages occur in Lower Beechmont, Advancetown, Bonogin, Gilston and Mudgeeraba) indicating the attractiveness of the area as a place to live;
- the area has a young population in comparison to the Gold Coast average, with high percentages of children and young people reflecting the high proportion of 'couple with children households'. The dam and its environs would contribute strongly to the environmental values enjoyed by the population, including the uniqueness of the recreation, open space and environmental aspects;
- home ownership in the suburbs immediately within the dam environs is higher than the Gold Coast average, and the population's stability is higher than average, indicating a high degree of attachment to homes and the local area; and
- Home ownership in the area immediately within the dam environs is higher than the Gold Coast average which indicating a high degree of attachment to the local area.

16.1.5 Neighbourhoods near Hinze Dam

In the immediate environs of the dam wall (1 km) there are several roads providing access to around 60 rural residential properties within a pleasant bushland setting. These include Mottee Court (approximately 500 metres north), and Advancetown Road and Toula Court.

The closest residents to the east of the dam wall (and saddle dam) are along Duncan Road (approximately 500 metres east), and residents along Prender Court, Gilston Road, Red Oak Drive and The Panorama are the next closest. Many residents along these roads are within walking distance of the dam and its recreational areas, may be

able to see the dam, and are within the area where they may experience the impacts of the dam construction (such as noise, traffic disruption and changed access to the dam) on a daily lives.

Housing stock is a mixture of older style detached housing constructed of timber or weatherboard through to newer, larger houses of constructed of brick, and large, higher priced housing of varied construction and architecture. Some homes enjoy views to the dam whilst many enjoy views to the surrounding bushland and ranges.

The household profile in the area is primarily couple and family households representing an area of low density housing popular with families seeking a more relaxed, semi-rural lifestyle.

16.1.6 Upstream and Downstream Communities

The Nerang River originates in the McPherson Ranges, and flows north through the Natural Bridge and Numinbah Valley before entering Hinze Dam. This area contains large areas of natural forests and National Parks with a variety of rural land uses also undertaken with the area. Rural residential style development and a village area within Numinbah Valley also comprise part of this area. Further south, rural land uses and dwellings are located along Nerang-Murwillumbah Road, and the town of Murwillumbah is located some 50 kilometres south of the dam's south western reach, in New South Wales.

There are a few private residential properties adjacent to the most extreme south eastern reach where Little Nerang Creek flows to the dam, on the Gold Coast-Springbrook Road whilst the small township of Springbrook is located on Little Nerang Creek's western branch.

Downstream of the dam, the Nerang River flows through the Nerang urban area, which is a popular hinterland centre comprising a range of residential types as well as community and commercial infrastructure. The river then flows easterly towards the coast, meandering through Benowa, between the canal suburbs of Bundall and Broadbeach Waters, and through Surfers Paradise, to enter the sea at the Broadwater. These coastal suburbs are highly urbanised, with increasing proportions of medium density housing in beachside suburbs and increasing high density housing on the coastal strip.

16.1.7 Local Social Infrastructure

Social infrastructure includes community, educational, recreational cultural and health facilities and services. Social infrastructure supports quality of life and achievement, enables community participation and helps build social capital and community belonging. Community facilities and services are provided through a combination of Council, Government, community and private resources.

The following description focuses on community facilities in the localities closest to the dam, and includes recreational infrastructure associated with the dam.

Education and Child Care Facilities

State primary schools are located throughout the local suburbs, including (with enrolments at January 2007):

- Gilston State School (501 students);
- Beechmont State School (190 students);
- Worongary State School (984 students);
- Springbrook State School (45 Students);
- Mudgeeraba State School (794 students);
- Mudgeeraba Creek State School (803 students);
- William Duncan Primary School at Highland Park (769 students); and
- Numinbah Valley School (16 students).

There are two private schools in the study area. These are St Brigit's Catholic Primary School, at Nerang with an enrolment of 447 students and Somerset College, Mudgeeraba (a pre-school to Year 12 school) with an enrolment of 1,174 students.

Special schools for students with disabilities are located at Mudgeeraba, Mudgeeraba Creek, Highland Park (William Duncan) and Worongary.

The nearest secondary schools are located at Nerang, Robina, Merrimac and Varsity Lakes. The closest Gold Coast TAFE campuses are located in Southport (Ridgeway Street) and Ashmore (Corner Heeb Street and Benowa Road).

The Numinbah Valley Environmental Education Centre is operated by the Queensland Department of Education, Training and the Arts and is located at Nerang-Murwillumbah Road, Numinbah Valley, at the southern extent of the dam, on the Nerang River. This Centre provides environmental education and a valuable outdoor learning environment for young people across the Gold Coast and wider areas and is an important community asset. Other environmental educational centres are located to the north at Jacob's Well and Toohey's Forest, whilst outdoor education centres re located at Maroon (near Boonah) and Tallebudgera.

Child care centres are located in Mudgeeraba, Nerang, Bonogin, Tallai, Beechmont, Worongary and Highland Park.

The healthy enrolment numbers at the majority of schools and the wide distribution of childcare centres are reflective of the number of 'couples with children' households in the area, and the strong population growth.

Community and Cultural Facilities

The area has good access to community and cultural facilities including three community halls (e.g. Gilston Community Hall, located at 469 Gilston Road an old style rural hall (**Figure 16-1**) which is available for hire for parties, weddings, community events and social activities).

- **Figure 16-2 Gilston Public Hall, Gilston Road**

Two community centres (Nerang Bicentennial Centre, Nerang Police Citizens Youth Club, Gold Coast City Council's major administration centre, a small library is located in Mudgeeraba, and a larger library at Nerang; a retirement village (independent housing for seniors) on Gilston Road in Gilston; the Mudgeeraba Nursing Centre and Kalwun Respite Centre. Services in Nerang include the Nerang Nursing Centre, Meals on Wheels, St Luke's Nursing Service and Nerang Community Respite Centre. The Earle Haven Retirement Village (Orchid House) is also located in Nerang. Services in Southport and Broadbeach include Shepherd Community Services Day Respite Centre and Meals on Wheels, Blue Care Centre Based Day Respite Centre, St. Luke's Community Care and Respite Centre, and Gold Coast and District Meals on Wheels.

Also included is the Gold Coast Hinterland Heritage Museum located at Mudgeeraba, and the Mudgeeraba Troop – 14th Light Horse Regiment Museum located at Worongary. There are also several churches including the Church of the Good Shepherd, Gold Coast Christian Family, Uniting Church, St Benedict's and Christian City Church and a cemetery in Mudgeeraba.

Health, Police and Emergency Services

The area has good access to a wide range of health, police and emergency services including:

- Gold Coast Hospital incorporating two campuses, located at Southport and Robina; private hospitals at Tugun, Benowa, and Currumbin and community health centres at Nerang, Mudgeeraba, Bundall and Palm Beach;
- Police stations at Nerang and Mudgeeraba, Surfers Paradise and Broadbeach;
- Several rural fire brigades including Lower Beechmont, Gilston-Advancetown, Mudgeeraba and Springbrook brigades;
- Fire stations at Beenleigh, Helensvale, Surfers Paradise, and Burleigh;
- Queensland Fire & Rescue Service Gold Coast South Area Office in Worongary; and
- A local Ambulance Station at Mudgeeraba and Canungra (to the north west) and Southport (to the east).

Downstream Community and Cultural Facilities

As expected in a highly urbanised area, the residents downstream of the dam have good access to a wide range of community, recreational and cultural facilities, including some with regional and state significance.

These include arts, community, sports, educational, recreation, retirement and health centres.

16.1.8 Recreation and Leisure

Hinze Dam

Hinze Dam is a regional recreational attraction. Public visitation to the area is increasing each year, and is currently in the vicinity of 500 000 visitors annually[6]. The current recreation infrastructure provided at Hinze Dam includes:

- four main park areas, including several picnic areas, with 15 shelter sheds and 20 wood and electric barbecues;
- two sets of playground equipment (**Figure 16-3**);
- multi-purpose recreation trails – walking and mountain biking;
- horse trails;
- toilet facilities;
- kiosk facilities; and
- four boat ramps.

The dam and its reserve accommodate a range of land-based activities (Picnicking and other passive recreation, walking, mountain biking, and bird watching) and water-based activities (canoeing, sailing, kayaking, rowing, fishing and dragon boating).

Fishing is an important activity associated with the dam, which is 'home' to the Hinze Dam Fishing Club, and is a regular spot for other fishing groups in South East Queensland.

[6] Hinze Dam Alliance (December 2006) Recreation Issues Paper

Figure 16-3 Playground Equipment Waterfront Park

Sporting and recreation clubs and groups which use the dam include the Gold Coast Mountain Bike Club, Queensland Rogaine and Bigaine clubs, Queensland Canoeing, Burleigh Fire Dragons (a dragon boating club), and Rowing Queensland. The dam is a popular site for regional sporting events. Camping is generally not permitted but may be approved for organisations such as Scouts, or for specific events such as the annual fishing competition.

A recent survey of current users of the dam[7] indicated that the lakeside park area and the northern boat ramp located are the most popular recreation areas for visitors, followed by the Western Boat Ramp and Koala Park.

Other Local Recreational Infrastructure

The area's rural nature, accessibility and land availability support a range of recreational facilities including Boomerang Farm Golf Club in Mudgeeraba, Worongary Pony Club and Showground, Grand Golf Club at Gilston, and the Tallai Country Golf Club. The area is well supplied with golfing, equestrian and walking facilities, and has access to other sporting facilities in Nerang and other urban/coastal sporting complexes and centres.

Parks are located in Worongary (Lawrence Hinde Park), Mudgeeraba (Hinterland Regional Park, Lions Park, Campbell Duncan Park and Firth Park), Bonogin (Davenport Park), and Tallai (Sid Bigg Park). The Numinbah Forest Reserve and Rosins Lookout Conservation Park also represent valued natural attractions for low impact uses such as walking and nature watching. Generally, the study area has very good access to space for informal and nature based recreation activities.

Businesses near Hinze Dam

The Dam Tasty Cafe is located adjacent to the dam wall and is a privately owned business operating on a lease from GCCC. The lease for the cafe will expire in September 2007 in accordance with the existing lease conditions. This business incorporates indoor and outdoor café facilities, a commercial kitchen and a kiosk providing information related to public use of the dam. The cafe services the large volumes of tourists who visit the dam, and also locals who use it as a meeting place and coffee shop at quieter times. The owners estimate the cafe had approximately 26 000 customers in the second half of 2006[8].

The Cedar Lake Country Resort is located to the northwest of the dam wall. This is a resort on 35 hectares of land accessed from the Nerang-Murwillumbah Road offering accommodation, a restaurant and bar, heated outdoor pool,

[7] Hinze Dam Alliance (2006) Recreation Issues Paper, p. 6

8 Pers. Comm. Dam Tasty Café proprietor January 2007

a lake for boating and fishing, equestrian facilities, tennis facilities and horse-riding, bushwalking and cycling trails. Whilst Cedar Lake is a tourism facility, its sporting and hospitality facilities are also used by residents and visitors from the Gold Coast area.

In addition to businesses that have facilities located in the vicinity of the dam there are a number of businesses that use the facilities of the dam. These include companies that operate adventure activities for school groups, fishing charters, and tour companies that visit the dam and use the picnic facilities.

16.1.9 Property Values and Housing Prices and Rent

The median property price in the study area was $380 000 for the year ended September 2006 with prices growing at an average annual rate of 11.9% over the past five years in the study area (median price growth was strongest in Tallai, which experienced an average annual growth in prices of 16.7%).

There is significant variation in prices across suburbs within the study area with sale prices in Advancetown ranging from $500 000 to $1 600 000 and in Gilston from $600 000 to $1 400 000[9]. Bonogin recorded the highest median price for the year ended September at $492 000, while Lower Beechmont recorded the lowest median price at $317,500. Median property prices are shown in **Table 16-12**.

Table 16-12 Median Property Prices

Location	Year Ended September						Avg. Ann. % Change (2001-2006)
	2001	2002	2003	2004	2005	2006	
Advancetown	N/a[10]	N/a	N/a	N/a	N/a	N/a	N/a
Bonogin	$250 000	N/a	$360 500	$476,250	$500 000	$492 000	14.5%
Gilston	N/a	N/a	N/a	$384 000	N/a	N/a	N/a
Highland Park	N/a	N/a	N/a	$320 000	$320 000	$340 000	N/a
Lower Beechmont	N/a	N/a	N/a	$292 500	$279 500	$317 500	N/a
Mudgeeraba	$185 000	N/a	$265 000	$345 000	$350 000	$381 500	15.6%
Tallai	$190 000	$225 000	$305 000	$379 000	$377 000	$411 000	16.7%
Worongary	$240 000	N/a	$230 000	$302 500	$312 000	$338 000	7.1%
Study Area	$216 250	$225 000	$290 125	$357 036	$356 417	$380 000	11.9%

Source: REIQ 2002, 2003, 2004, 2005, 2006.

16.1.10 Community Values

Community values as represented in Gold Coast City Council's Corporate Plan[11] include:

- a safe community (ensuring that the City is a safe place to live and visit);
- community capacity building (develop the skills, networks and understanding necessary for a sustainable City);
- cultural development (enhancing quality of life through the fostering of the arts, creative activities, expression and community interaction); and
- community health and individual well-being (maintaining and improving community health and equitable access to services).

[9] http://www.domain.com.au/Public/SearchResults.aspx?mode=buy&state=QLD&areas=Gold+Coast+ %26+Hinterland&sub=Gilston accessed 20 March 2007

[10] N/a represent suburbs with insufficient sales data in a particular period

[11] Strategic priorities identified through consultation and research as documented in Gold Coast City Council's Corporate Plan 2005-2009 (p. 15).

Council established a Community Advisory Committee (CAC) to provide a representative forum considering aspects of the project. The role of the Committee is to facilitate effective and appropriate community and stakeholder input into project, and to provide recommendations to Council on technical and policy issues related to the project, as required. Community values identified in CAC's bi-monthly meetings included:

- local connectivity, in terms of residents and visitors' ability to move around the local area by car, cycle or walking;
- cultural recognition of early families and graves sites in the area;
- the visual qualities of the Hinze Dam, Gilston and Advancetown areas, which contribute to both residents' and visitors' enjoyment of the area;
- the quietness and serenity of the residential areas near the dam;
- security from flooding, including safe dam construction, and realising flood mitigation benefits;
- the science and biodiversity values of the Numinbah Forest Reserve;
- the ecological and scenic values of vegetation and habitat trees near the dam; and
- the importance of people's homes, and the need to protect them from damage or hazards.

The Hinze Dam Alliance is also conducting a comprehensive communication and consultation program to provide for public awareness and information, and to gain community feedback. This consultation includes:

- door knocks and meetings with residents closest to the dam;
- meetings with interested residents and businesses, environmental groups and community groups;
- information sessions to communicate with other local and interested residents;
- static and staffed library displays inviting comment;
- a 1800 (free call) information line to answer questions and provide information about the project and the consultation process; and
- communication materials including newsletters, print advertisements, community announcements, direct mail drops, posters, fact sheets and a website.

The consultation process and outcomes are comprehensively documented in the **Appendix D**. The following outline of local community values is informed by that consultation. Community input regarding issues about the dam's construction or operation is discussed in **Section 16.2**.

Amenity and Lifestyle

Local amenity values of the Hinze Dam area include the quiet ambiance of the area, space to enjoy semi-rural pursuits, closeness to a range of urban attractors and the aesthetic values offered by rural landscapes and the dam. Gilston Road and Advancetown Road provide the two points of access to the dam and all visitors use one of these roads, in addition these roads are used by local residents. This traffic is increased on weekends when the recreation use of the dam is at its peak. With the exception of traffic associated with the dam the residential areas close to the dam enjoy the quietness and serenity of the area. Many homes represent the single most significant investment for residents, and as such residents are very concerned to ensure local amenity and property values are protected.

Recreational access to Hinze Dam was frequently mentioned in consultation, and this included access to public space, casual recreation and nature appreciation, as well as active pursuits. The area's other natural attractions include the Numinbah Forest Reserve and the Nerang River, both of which feature in the lifestyle pursuits of some residents. Community use of business such as the Dam Tasty Cafe and Cedar Lake Country Resort is also important to some residents.

The quality of the local environment is important to community members and supports an active lifestyle including walking and nature observation such as that shown in **Figure 16-4**. Consultation participants identified the importance of the area's ecology, and were concerned to ensure that flora (such as vegetation, wildlife corridors and habitat trees) and fauna (including bees, fish, birds and terrestrial mammals) were protected. The need for catchment management to protect water quality, environmental flows and riparian areas was also identified.

- **Figure 16-4 Hinze Dam Parkland**

Community Vitality

Residents generally move to rural residential areas to enjoy privacy and greater space to pursue a more nature-based lifestyle or to withdraw from urbanised areas. The local area contains several features which support community vitality, and these include:

- local halls and recreational areas at Hinze Dam for community activities;
- shared interests (such as conservation or recreational pursuits);
- a degree of stability (including high home ownership) in the population; and
- household resources sufficient to allow time for participation (e.g. in sport or events).

Access and Mobility

People in rural and rural residential areas depend heavily on their local roads and connecting routes. Few things can be accessed without private transport, and there are limited road options in the area, thus any loss or impediment to local roads is felt more keenly than where other transport choices or road routes exist. People in sparsely settled areas also tend to spend more time commuting and transporting children and seniors. In this respect, local connecting roads such as Gilston Road, Worongary Road, Advancetown Road and Nerang-Murwillumbah Road are highly valued local infrastructure. Gilston Road in particular is narrow and steep in parts, and an upgrade of the road is currently planned by the Department of Main Roads. Road improvement works around the Gilston Primary School area (Advancetown-Mudgeeraba Road /Worongary Road) were current at April 30 2007.

Whilst cycling from Gilston, Advancetown and Tallai to other areas within the study area is possible, there are few bike paths or bicycle lanes on the roads therefore making this challenging and unsafe in parts. Cycling connectivity through the suburbs of the study area (on other than on-road routes) is limited. As such, the cycling opportunities offered by areas around the dam are valuable to local residents but there are currently few safe routes available.

Safety and Security

The communities near Hinze Dam have a good level of community safety[12]. Rural areas in particular are removed from the nightlife facilities and public open areas which are more likely to be associated with crime against people and property. Road safety is the predominant concern for community safety as identified in consultation for this EIS, given the level of traffic on Gilston Road during peak visiting times and the road's narrow and windy nature. This is being addressed through an upgrade to the road.

The potential for flooding is a risk to community safety and security. This is more directly relevant in downstream areas within the floodplain of the Nerang River; however the social and economic costs of floods are borne by the whole community. Flood protection and mitigation has therefore been identified as an important element of the community's security.

Previous research has identified a poor level of general community awareness of flood events[13]. This is likely attributed to the high mobility of Gold Coast residents, high rates of growth bringing in new residents who are unfamiliar with past events, and the time which has passed since the last flood event. Longer term residents of the Gold Coast are more aware of the impacts of local floods, and some have fears about increased flooding and increased numbers of properties affected as a result of development upstream of the dam since the last major flood. This was naturally of more concern to downstream residents than to the local area[14], but the need for flood mitigation was also identified in local area consultation. Notwithstanding the Council's considerable education efforts, the lack of awareness of potential flooding impacts represents a potential vulnerability in the community.

Many residents, including some in the area surrounding the dam but more so from other areas[15], expressed the view that consultation and research regarding raising the dam had gone on long enough, and they were keen to see action which would secure the City's water supply and increase flood mitigation.

South East Queensland's current water shortages and restrictions have focused community attention on water supply issues. Given recent (and projected) population growth, many residents believe that increasing the dam's water storage capacity is overdue. Whilst there are some differences of opinion about the most appropriate way to ensure water storage and use is sustainable, the security of Gold Coast's water supply to meet existing and projected needs is a high priority.

16.2 Social Impact Assessment

Potential social changes and subsequent likely benefits and impacts are detailed in this section, while the economic impacts and benefits are addressed in **Section 16.3**.

Project elements with potential for impacts on the social environment are listed in **Table 16-13**. Effects are noted as either due to construction or due to consequent operation of the dam. This differentiates (in most cases) whether the potential impact is likely to be temporary or permanent. Some effects on the social environment are not easily differentiated, for example, changes to vehicle access across the dam wall that will begin with construction and persist throughout the operation of the dam.

[12] As reported by Nerang Police April 2007.

13 Gold Coast City Council (2002) Nerang River Flood Mitigation Options Project Market Research Report, and Community Workshops results (www.goldcoast.qld.gov.au/t_standard.aspx?pid=4768)

[14] Derived from comparing results of local area and downstream community workshops conducted for the EIS.

[15] As per footnote No. 16.

Table 16-13 Project Elements

Construction	Operation
■ Dam site closure and site access restrictions ■ Construction infrastructure on site and establishment of worksite ■ Dam embankments works and construction of saddle dam extension ■ Quarrying from the existing quarry site west of the dam wall, and excavation of clay ■ Delivery of materials not sourced on-site (e.g. cement and reinforcement steel) ■ Upgrading and raising of water intake towers ■ Removal of Vegetation	■ Increased flooding protection ■ Increased height of the wall, saddle dam and intake towers ■ Increased water supply capacity ■ Improved safety of the dam wall infrastructure ■ Provision of a new and upgraded recreation facilities accessed via Advancetown Road ■ Improved access around dam site for pedestrians and cyclists ■ Provision of an interpretive centre and associated food outlet ■ Provision of two upgraded boat ramps that will increase safety for users

16.2.1 Property Impacts, Demographic Structure and Local Businesses

Properties and Property Owners Directly Impacted

The dam wall and impoundment area, and most of the construction activities are located wholly upon land owned by Gold Coast City Council. The exceptions are road works to be undertaken as part of the construction works.

Details of the extent of works required with road upgrading works are addressed further in **Section 13** of this EIS.

The increase in the 1 in 100 year ARI flood level will temporarily inundate part of five freehold parcels on Little Nerang Creek and Gold Coast Springbrook Road (**Figure 6-11** in **Section 6**). Easements are proposed for the areas inundated in a 1 in 100 year ARI flood event and these will be obtained through a voluntary agreement process with the land holders under the *Land Title Act 1994*. In the event that a voluntary easement cannot be reached, the easements will be obtained through compulsory acquisition under the provisions of the *Acquisition of Land Act 1964*. The easements will be registered against the land title, and will prohibit habitable structures within the easement.

Current Land Uses and Demographic Change

The impoundment area contained wholly within a Community Infrastructure Designation area, and the majority of works associated with the dam will not have a direct effect on private land, with the exception of road works and the impact of flooding addressed above. Hinze Dam was constructed in 1976, so many people in the area have purchased their property after the construction of the dam, while some have bought there within the period during which raising of the dam (Stage 3) has been mooted. It is therefore likely that there will be very few decisions to relocate from the area as a result of the project and the impact on local demographic characteristics would be minimal.

The raising of the dam is considered a positive step for many Gold Coast residents, with 92% of residents stated Hinze Dam was a 'good' or 'very good' option for flood mitigation [16]. In a social planning sense, the increased water supply and flood protection offered by the raising of the dam wall are seen as supporting the City's current and intended urban settlement pattern[17] and therefore population growth.

The raising of the dam is therefore not expected to impact on residential land uses within the study area although there may be wider implications on land use within the downstream flood prone areas. There may be greater opportunity for site redevelopment or change of land use due to the flood mitigation characteristics of the project. These future land uses will be regulated through the provisions of the Gold Coast Planning Scheme

16 Gold Coast City Council (2003b) Nerang River Flood Mitigation Options Project – Consultation Report
17 Please refer to the EIS Section on Land use for further detail on existing land use and potential effects on land uses.

Impacts on Local Businesses

Access to the construction site will be limited to the construction workforce and suppliers from October 2007, with no public access permitted within the closed construction area. Accordingly businesses that use and access the facilities near the dam wall will not longer have access to these facilities from the commencement of construction works. In addition the closure of the cafe will also impact on some residents who use it as a meeting place and relaxation spot.

The Cedar Lake Country Resort is located within two kilometres of the dam wall. Resort managers have not identified issues or impacts for their business, and will assist and participate in the project through information distribution about construction and access restrictions.

Whilst noise impacts are generally managed to avoid impacts on daily living (as discussed elsewhere in the EIS), it will be important to recognise that some residents also work from home, and to ensure that any noise impacts on home-based businesses are avoided or mitigated. The noise mitigation measures are addressed in **Section 12** of the EIS.

16.2.2 Community Values and Lifestyles

Potential issues relating to construction identified by local residents in consultation for the EIS include:

- potential for noise from the site to impair daily living and working conditions;
- inconvenience of loss of access across dam wall, due to the closure of the road over the dam wall during construction;
- change to views due to tree removal and construction infrastructure;
- potential for dust to settle on homes, pools, and vegetation;
- concern regarding potential for vibrations to cause damage to buildings or pools;
- concern regarding traffic safety on Gilston Road and Nerang-Murwillumbah Road due to construction traffic;
- potential for reduced amenity (visual and noise) to impair property sales and values; and
- concern for potential for damage to ecological systems, including the wellbeing of flora and fauna due to disruption or changes to habitat, including loss/ relocation of koala habitat trees[18].

Community issues pertaining to the operational phase of the dam include both impacts and benefits, as follows:

- supports flood mitigation strategy recommended through community input[19];
- addresses need for more secure water supply (other water supply options were also recommended);
- potential for the higher dam and lack of tree coverage to reduce visual amenity from residences;
- potential for dam wall failure and local/ downstream flooding; and
- provision of recreational access and facilities should be maintained or enhanced.

Categories of issues raised by the community at 31 March 2007[20], along with frequencies at which these issues were raised, are listed in **Table 16-14.** These provide an indication of the level of community concern about each issue. Issues regarding traffic, road and access accounted for about 46% of residents' concerns, whilst blasting, noise and construction issues counted for a further 29% of concerns.

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18 This is comprehensively addressed in the EIS.

19 Gold Coast City Council (2003b) Nerang River Flood Mitigation Options Project – Advisory Committee Recommendations

20 In mid April, the consultation team also received correspondence from more than 50 community members from the region, noting that the areas has Aboriginal cultural heritage values, and identifying their interest in participating in the Cultural Heritage Management Plan. These issues are addressed in the Cultural Heritage section of the EIS.

Issues raised by the community in relation to community values are discussed in the following sections.

Table 16-14 Consultation Issues and Frequencies

Category of Community Issue	Frequency
Traffic	30
Local road and bridge upgrades	25
Access	23
Blasting	18
Noise	18
Construction	14
Recreational areas and facility relocation	13
Dust	10
Potential property impacts	10
Consultation	9
Total	**170**

Visual Amenity

Impacts on the site's aesthetic qualities are likely during construction, as a result of site levelling, loss of vegetation, quarrying, extraction of clay and construction site infrastructure. This is a predictable and unavoidable aspect of construction. At the neighbourhood level, houses with direct views of the construction site may feel the area's aesthetic appeal and character are diminished. Some residents will be interested in watching construction activities, but for those who particularly value views over the dam, construction activity and placement of infrastructure may be experienced as a loss of visual amenity.

In the longer term, there will be a small change to existing views due to the increased height of the dam wall in relation to the surrounding topography. The existing landscape near the dam wall has a strong open parkland character, and the dominant landscape as seen from residences is the view out over the impoundment and the surrounding hills. Given the prominence and permanence of existing dam infrastructure, the raising of the wall is not considered to represent a significant diminution of visual amenity, once construction is completed.

The landscape and visual amenity of the project is addressed in **Section 18** of this EIS.

Noise, Vibration and Dust

Construction of the project has the potential to generate impacts as a result of dust, noise and vibration. The assessment of potential air quality impacts along with proposed management measures to mitigate these impacts are presented in **Section 11**. The assessment of potential noise and vibration impacts along with proposed management measures to mitigate these impacts are detailed in **Section 12**.

Local Access and Connectivity

Vehicle and pedestrian access across the dam wall will be unavailable during the construction phase of the project with the wall remaining closed to public traffic following completion of the construction works. This restriction in access may be inconvenient for some residents, however it does not pose a major barrier between residents and employment places or daily needs, as other local roads are available in the near vicinity, and most attractors (such as shops and activity centres) are located nearer the coast.

Following construction, access across the dam wall will be confined to pedestrians and cyclists. Again this may pose an inconvenience, but may also encourage more walking activity. Emergency and maintenance vehicle access across the dam will also be possible with the installation of a gate and key system.

All quarrying activities will be confined to the Hinze Dam site where suitable construction materials are located. Advancetown Road, within the CID boundary, will be closed during construction, and following construction will be the primary access to the site. Gilston Road will be terminated near the intersection of Duncan Road. This will be a permanent road closure. Neither of these road closures is expected to have a material effect on access to the dam and its recreational values, with the proviso that adequate parking for people with disability and pathways to accessible parts of the site will be required. Equitable assess is an important element of the recreation master plan that has been prepared for the site.

As previously noted, Gold Coast-Springbrook Road will be re-aligned, and this will cause temporary traffic disruptions for a period of some weeks to a few months for residents and others traversing this road.

Property Values

Some residents who participated in consultation during the EIS were concerned that property values in the vicinity of the dam would decrease during construction due to a perception by buyers that amenity would be reduced, including changes to views from their properties. A smaller number were concerned that increasing the height of the dam wall and associated infrastructure (saddle dam to the right abutment, spillway near the left abutment and two intake towers) would impact on their views (and therefore property values) in the longer term.

There is limited data available to support and quantify an impact on the values of properties sold during the construction period. On average approximately 330 properties are sold in the eight suburbs in the study area each year, however very few properties sold within the study area would be adjacent to or potentially affected by the construction works. Areas which could conceivably experience construction impacts are in the suburbs of Advancetown and Gilston, however, due to the small number of property sales in this area, statistically reliable data on property prices was not available. It is expected that any impacts on market value of properties near the dam will be site specific and largely dependent on the location of the property relative to the construction site, affected traffic flows, buyer expectations, and other key variables in a buyer's amenity derived from a property. It is therefore not possible to calculate potential property price impacts.

There are not expected to be any tangible changes in market value of properties once construction of the dam wall is complete. The key reasons for this include:

- very few properties with direct line of sight to the dam wall; and
- the project is an extension of an existing structure, which lessens the impact on visual amenity.

16.2.3 Impacts on Recreational Access

Land Based Activities

During construction, the Advancetown Road and Gilston Road accesses to the site will be closed to the public at the site boundary. The area around the dam wall will become a construction zone, and will not be accessible to the public for the period of construction. The construction exclusion zone incorporates all recreation areas located in the vicinity of the dam wall, including the boat ramps, parks, and the walking/mountain bike tracks. All of these areas and uses will be inaccessible during construction. This loss may be important to its users during the construction period but is not expected to have a significant effect on the dam's recreational values following the completion of construction works.

Other sites in and around the dam will remain open for public access. Relative to the recreational benefits of the remaining dam and lakeside areas, these changes are not expected to be a significant diminution, however some residents will experience this as a decrease in amenity. It is also possible that some visitors to the dam will be deterred by the decrease in access to the site facilities (e.g. the dam wall), or by changes to the area's visual amenity. Some visitors will be interested to see major infrastructure being constructed.

A new lakeside park, incorporating picnic and BBQ facilities, and amenities, will be constructed for use by the public at the completion of site construction works. This area will gain access from Advancetown Road and will

link with an interpretive centre constructed as the key public access point to the park and recreational areas. This will provide a significant addition to the dam's recreational values following construction, for residents and visitors alike.

Numinbah State Forest Reserve borders the southern boundary of the dam's CID area along the Nerang River branch of the dam. This Forest Reserve is in the process of being designated as a National Park under the Regional Forest Agreement for the area and is likely to be declared in 2007. The operation of the dam will increase the inundation area within Numinbah Forest Reserve by about 27 hectares, and this area will need to be revoked from the National Park designation. Consultation with Council staff responsible for catchment management in that area did not identify any recreational activities or other community uses in the area which would be inundated. In addition, further areas of State Forest will be temporarily affected during a 1 in 100 ARI flood event. Neither effect is expected to cause a diminution of use by the community. On the other hand, it is possible that some tourists will favour the Numinbah area over Hinze Dam during construction, so visitation to the forest could increase.

A model aeroplane club site is located near the most southerly reach of the dam along the Nerang River. The club's grounds are not expected to be inundated by the full supply level, but may be inundated by flood events. Given the nature of this use, occasional flood inundation is not likely to affect its use or the safety of users.

Water Based Activities

The dam must remain available as a water supply during construction works, and there will be some restrictions placed on access, particularly for boating, fishing and sailing in the vicinity of the dam wall. The site is highly valued by local schools, as other sites for still water activities are over an hour away, however access to land-based activities and water-based activities in other areas of the dam will still be available. This may also constrain some fishing activity and events, but the remainder of the dam will remain open for water based recreation.

The boat ramps located in the vicinity of the dam will be removed during construction, whilst the two upstream ramps will be upgraded. The net effect of this is expected to be positive, in terms of both access and safety and safety. Fishing is an important recreational value pertaining to the dam, and communication with fishing groups during construction is desirable to ensure co-operation and mitigation of any diminution of access. Following construction, access to all of the impoundment area will become available for non-motorised craft and electric boats.

Construction will require removal of the rowing course which runs perpendicular to the dam wall in the northern section of the impoundment. This has been an important site for competitions. Other local rowing courses in Gold Coast City are available (e.g. at Varsity Lakes), and the development of a new rowing course at Coomera is currently being undertaken by Gold Coast City Council. At the regional level, other courses are available at Lake Kurwongbah and Lake Samsonvale (Brisbane), the Milton Reach of the Brisbane River, the Tweed River (Murwillumbah) and Kawana (Sunshine Coast). It is likely that these other options will mitigate the loss of the rowing course at the dam.

Restrictions to water access during construction will also impact on other events that may occur on the dam, in particular dragon boat racing. The dam is only one of many water-based reserves for recreational activity in Gold Coast City, and potential alternatives exist in locations such as the Brisbane River, Gold Coast canals, Lake Wivenhoe, Moreton Bay, Lake Moogarah and Maroon Dam. The relocation of such events to other Gold Coast locations is not expected to decrease the city's recreational values, or the value of events to the city's social activities level.

Recreational infrastructure at Hinze Dam is an important attraction, however the city's other attractions and amenities should ensure that overall, recreational access is not impaired during the closure of the site for construction.

16.2.4 Impacts on Social Infrastructure

Rural Fire Brigade Access

Gilston Rural Brigade was consulted during the EIS process, and identified a need for access across the dam to ensure they can attend to fires in bushland on the eastern side of the dam. As a result, project planning has ensured the fire brigade will have access to fire trails accessed via the construction site. The Alliance project team have also initiated consultation with the district Fire and Rescue Service, to ensure a co-operative approach to local and site safety.

Numinbah Valley Environmental Education Centre

At full supply level, and in flood events, lower lying areas of the Numinbah Valley Environmental Education Centre property (off Nerang-Murwillumbah Road) may be inundated. This would affect walking tracks and trails in this area, however the Centre's other functions would not be affected. There is potential for co-operative projects between the proponent and the centre, to develop educational activities involving learning about water management and/ or construction management. Ongoing consultation with the School's principal/ facilities manager and the Department of Education Training and the Arts will be required to ensure the centre and the department are aware of potential changes to access to the dam wall area, and the potential for inundation to affect low lying land.

Scout Grounds

A camping ground used by the Scouts Association is located to the east of the south west branch of the dam. The camping ground may need to be relocated to slightly higher ground in the vicinity as a result of the potential for inundation at full supply level. It is not expected that this will diminish the value or use of the facility.

Gilston State School

Gilston State School (located on Gilston Road) is the nearest school to the dam, and uses the dam's environs as a learning environment. The school also makes use of the dam's recreational infrastructure. Whilst access arrangements will change, some areas of the dam will remain accessible for these types of activities. Communication with local schools including Gilston will be important prior to and during construction, to ensure that the dam's recreational and educational values are affected to the least extent possible.

The other issue of importance to the school is traffic safety. As noted, Gilston Road and Worongary Road near the school are being upgraded or improved by Department of Main Roads. The construction site's primary access will be via Advancetown Road. Notwithstanding, traffic management planning will need to ensure that the school's access needs and student safety are considered during the construction phase of the project.

16.2.5 Workforce Impacts - Housing, Community Services and Cohesion

The construction workforce is expected to experience a peak of approximately 240 people (**Section 16.3.1**). The construction workforce is likely to be drawn from other parts of Gold Coast City or adjacent areas. As such the workforce would travel to the construction site daily.

While it is unlikely that construction workers will seek to buy houses in the local area for the purpose of accommodation during construction it is possible that a small number of construction employees would seek to rent houses in the area, closer to their work, and relocate their families. The possibility is tempered by low rental vacancy rates overall, and particularly low level of rentals available in the suburbs closest to the dam. Should 10% of the direct workforce (directly employed by the project) seek to relocate to rental accommodation in the suburbs near the dam, this would represent 16 households. Against a total number of 9086 households in the study area, of whom 1789 rented their homes, this is not considered an impost on rental availability.

As few (if any) construction employees are likely to relocate to the area, the project is not likely to generate additional demand for community services and facilities. The possible exceptions to this are demand for emergency services (Ambulance and Fire and Rescue) in the event of an accident or incident, and potentially, emergency

medical assistance. Workers' potential purchase of meals, materials or private vehicle fuel in the local area will be a positive effect.

Given compliance with work site codes of practice and behaviour, and with traffic management plans, it is not anticipated that the workforce will impact on the local community in any regard, with the exception of an increase in traffic to the site, as dealt with below.

There is not expected to be any change in the operational workforce of the Hinze Dam facility.

16.2.6 Community Safety and Security

Traffic Safety

There is likely to be an increase in heavy vehicle traffic along Advancetown Road and Spillway Road, (and on Gilston Road in the initial stages of construction), due to trucks delivering off-site construction material such as cement. It will be important to ensure traffic management mitigates any difficulty which could be experienced by residents on accessing or leaving their properties on Advancetown and Gilston Roads. Traffic management measures may also need to be extended to Nerang-Murwillumbah Road to avoid potential impacts on traffic safety from trucks travelling at speed.

Traffic management and road safety during construction is addressed in **Section 13** of this EIS.

Flood Mitigation

The lower Nerang River flows through dense residential, community and commercial areas in the suburbs of Carrara, Nerang, Burleigh Waters, Benowa, Miami, Surfers Paradise, Mermaid Waters, Main Beach, Robina, Mudgeeraba and Burleigh Heads. Major rainfall events in the Nerang River catchment can cause flooding to rural, residential, commercial and publicly owned properties and infrastructure in this area. The flood mitigation component of the dam upgrade will delay the release of floodwater into the lower reaches of the floodplain, by raising the dam wall to temporarily store a greater volume of water.

The new dam design will also incorporate a new spillway, designed to reduce the flow of water from the dam during large rainfall events. By reducing the rate at which floodwater is released from the dam, the number of properties potentially affected by flooding in the lower catchment would be reduced, as would peak flood levels and flooding damage.

Currently 4441 existing properties downstream of Hinze Dam are affected in a 1in 100 year flood event. The effect of raising the dam in respect to flood mitigation is a reduction of 3284 affected properties. Additionally, the dam raising will ensure Hinze Dam conforms with safety requirements under State legislation for Potential Maximum Flood (PMF) events, reducing the risk to downstream properties and community uses of PMF events.

The personal costs of flooding can be immense – in terms of both financial and personal losses. Personal losses include damage to homes and valued items, loss of family possessions, and damage to fittings, whilst the psychological effects can include anxiety, stress and depression. Older people may be particularly at risk in floods, both from the perspective of personal losses, and from a personal safety perspective due to a higher level of frailty and disability. One quarter of the Gold Coast's population is aged over 55 years, and this proportion will reach about 32% in 2021 (GCCC 2006c).

Flooding also affects community facilities at both local and citywide levels, given that substantial community infrastructure is located in downstream areas. Facilities associated with sporting fields, which are often located near water courses and in low lying areas, are particularly affected. Few community organisations have the resources to protect their facilities, and recovery from flood damage is time consuming and expensive at the community level. The reduction in flooding risk represents a significant community benefit to downstream areas and the broader community. Economic aspects of flood damage mitigation are detailed in **Section 16.5**.

The social environments in downstream areas are unlikely to experience impacts from construction of the dam, apart from those experienced by other Gold Coast City residents (e.g. restriction of recreational access during construction). They will however benefit from flood mitigation and increased security of water supply, following dam construction. In a social sense the dam is generally seen as supporting intended growth patterns, and protecting residential and community assets.

Increased Capacity of Water Supply

The Hinze Dam is the main bulk water supply source for Gold Coast region. The project constitutes an augmentation of the water supply within the South East Queensland Region, which is particularly significant in the light of recent drought conditions decreasing dam levels across the region, and subsequent water restrictions placed on residents and businesses. The Water Futures report (GCCC 2005c), which outlines strategies and options for increasing water supply to the City over the next 50 years, identified the raising of the dam for water supply as a key element in overall security of supply for Gold Coast City. The raising of the dam therefore represents a benefit in terms of adequate water supplies for the existing population at community and regional levels.

Increased supply of water, and confidence that supply is adequate, will support the forecast population increase, and allow urban development to proceed as outlined in the South East Queensland Regional Plan and the Gold Coast City Council's (draft) Local Growth Management Strategy.

Increased supply of bulk water is considered as an important and significant community benefit at Citywide and regional levels.

16.2.7 Summary and Significance of Social Impacts and Benefits

Whilst nearest residents may find construction effects such as increased traffic or noise annoying or stressful, the sum of effects is not expected to substantially diminish quality of life at the neighbourhood or community level, or to affect community well being. This is on the basis that the Hinze Dam Alliance, as the environmental and construction manager, will ensure noise and access impacts are sufficiently mitigated through implementation of an environmental management plan.

Permanent impacts and benefits of the dam's operation are expected to include:

- avoidance of flooding and flood damage for more than 3200 downstream properties;
- increased security of the water supply to meet existing and future demands;
- support for the Gold Coast's planned urban development and population growth;
- increased safety of the dam wall infrastructure for flood protection purposes; and
- potential for increased recreational amenity due to safer boat ramps and the creation of the lakeside park.

Given the scale at which benefits will be experienced (e.g. the large number of properties for whom flooding mitigation will be achieved, and increased water supply for Gold Coast City), the project's benefits are considered significant at local and citywide levels.

Impacts which are likely to be experienced during construction include:

- limitations on land and water-based activities in the vicinity of the dam wall, and some restrictions to recreational access at the northern part of the dam reserve;
- potential for construction noise to be audible and annoying at nearest residences (**Section 12** of the EIS);
- a diminution of the visual amenity during construction for some residences with views to the dam;
- potential for a decrease in the sale prices of properties if construction impacts are considered deleterious by the buyer;
- an increase in traffic to and from the construction site on Gilston, Nerang-Murwillumbah and Advancetown Roads;

- potential for anxiety about the effects of blasting on private property and community safety;
- loss of local amenity value offered by the Dam Tasty Cafe;
- the inconvenience of restricted access across the dam wall;
- removal of the rowing course;
- impact on the Scouts' camping ground at the south western reach of the dam;
- potential for additional flooding in a 1 in 100 year flood event of 5 additional properties, with no residential buildings affected; and
- potential for increased visitation to Numinbah Forest Reserve.

In conclusion, the net community benefits of the project are substantial and significant at the local, city and regional level, whilst some negative impacts on neighbourhood amenity and a recreational access may be experienced. Environmental management objectives and measures to address potential impacts are outlined in the environmental management plan.

16.3 Economic Impact Assessment

This section examines the impact of the construction activity of the project and the impacts following on from this once Hinze Dam returns to steady state operation. Aspects examined in this section include the:

- economic impact to the state and regional (local Gold Coast) economies;
- impacts to local small to medium enterprises (SMEs);
- benefits from flood mitigation; and
- security of water supply.

The key components of the methodology are explained in **Appendix F.16.1**.

16.3.1 Regional and State Economy

The upgrade of the Hinze Dam is expected to cost $382.1 million in total, comprised of approximately $30.9 million in the design and engineering and $351.2 million in the construction of the dam. It is expected that the majority of expenditure will be retained within the Queensland and South East Queensland economies due to the nature of the construction, with much of the input material being sourced from the area surrounding the dam. Capital construction costs associated with the project are identified in **Table 16-15**.

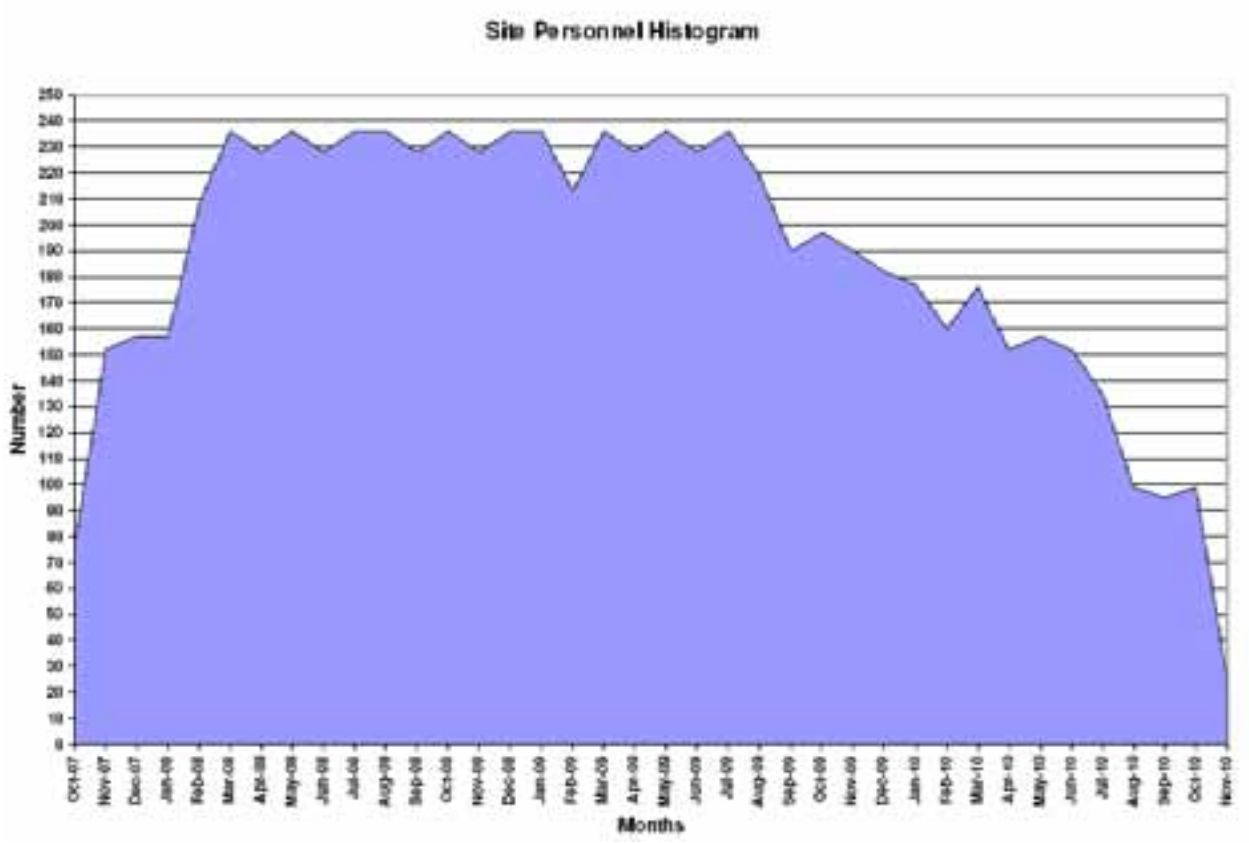
- **Table 16-15 Capital Construction Costs ($M 2006)**

Phase	Duration (Years)	Cost ($M)	Retained in Qld ($M)	Retained in GC LGA ($M)	Retained in Qld (%)	Retained in GC LGA (%)
Design	1	$30.9	$29.4	$3.1	95.0%	10.0%
Construction	3.25	$351.2	$280.9	$245.8	80.0%	70.0%
Total		$382.1	$310.3	$248.9	83.0%	58.0%

Note: Qld = Queensland. GC LGA = Gold Coast local government area.
Source: Hinze Dam Alliance

The direct labour force associated with the design phase of the development includes approximately 75 full time equivalent (FTE) employees. The construction workforce is expected to build up and peak at approximately 240 FTE for a period of approximately 18 months before declining. There are on average approximately 162 FTE employees per month over the 36 month construction phase. **Figure 16-5** shows the construction workforce for the construction phase of the project and highlights the variable nature of the construction crew.

■ **Figure 16-5 Construction Workforce**



Source: Hinze Dam Alliance

16.3.2 State & Regional Economic Impacts

The multipliers utilised in the input-output assessment are developed from the transaction table published by the Queensland Office of the Government Statistician (2002).

Table 16-16, **Table 16-17**, **Table 16-18** and **Table 16-19** highlight the economic impact of the design and construction phases, independently and in aggregate, for both the impact on the Queensland and the Gold Coast LGA economies.

■ **Table 16-16 Impact of Design Phase ($M 2006)**

	Queensland				Gold Coast LGA			
	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)
Direct	$29.4	$12.0	$6.4	75	$3.1	$1.3	$0.4	5
Flow-on	$28.2	$12.4	$6.5	109	$3.0	$1.3	$0.4	8
Total	$57.6	$24.4	$13.0	184	$6.1	$2.6	$0.9	13

Source: Hinze Dam Alliance based on data from Queensland Office of the Government Statistician (2002)

Table 16-17 Impact of Construction Phase: Annual Average Impact ($M 2006)

	Queensland				Gold Coast LGA			
	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)
Direct	$86.4	$37.4	$12.2	162	$75.6	$32.8	$10.6	162
Flow-on	$60.3	$24.6	$13.1	228	$52.8	$21.6	$11.5	173
Total	$146.8	$62.1	$25.3	390	$128.4	$54.3	$22.1	335

Source: Hinze Dam Alliance based on data from Queensland Office of the Government Statistician (2002)

Table 16-18 Impact of Construction Phase ($M 2006)

	Queensland				Gold Coast LGA			
	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)
Direct	$280.9	$121.7	$39.5	527	$245.8	$106.4	$34.6	527
Flow-on	$196.1	$80.1	$42.7	740	$171.6	$70.1	$37.4	561
Total	$477.1	$201.7	$82.2	1,267	$417.4	$176.5	$72.0	1,088

Source: Hinze Dam Alliance based on data from Queensland Office of the Government Statistician (2002)

Table 16-19 Impact of Design & Construction Phase ($M 2006)

	Queensland				Gold Coast LGA			
	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)	Output ($M)	Value Added ($M)	Income ($M)	Emp. (FTE)
Direct	$310.3	$133.7	$46.0	602	$248.9	$107.7	$35.0	532
Flow-on	$224.3	$92.4	$49.2	849	$174.6	$71.4	$37.8	569
Total	$534.6	$226.1	$95.2	1,451	$423.5	$179.1	$72.8	1,100

Note: Design + 36 Month Construction Period
Source: Hinze Dam Alliance based on data from Queensland Office of the Government Statistician (2002)

The economic impact of the design and construction phase of the project is positive. The key points from the impact assessment include an additional:

- $534.6 million in output (direct and indirect) to the Queensland economy, with $423.5 million to the local Gold Coast economy;
- $226.1 million in value added production (direct and indirect) to the Queensland economy, with $179.1 million to the local Gold Coast economy;
- $95.2 million in wages and salaries (direct and indirect) to the Queensland economy, with $72.8 million to the local Gold Coast economy; and
- 1451 employment positions over the life of the project (direct and indirect) to the Queensland economy, with 1100 to the local Gold Coast economy over the life of the project.

The nature of the operations at Hinze Dam is not expected to change materially following the completion of the upgrade. Therefore there is not expected to be any significant change associated with the economic impact of the operation.

16.3.3 Local Small-Medium Enterprises (SMEs)

Cafe

The Dam Tasty Cafe that currently services visitors to the Hinze Dam, with the majority of patronage being visitors to the site for amenity or recreational purposes. This cafe will not operate during the construction phase given access issues. The turnover of the existing cafe is not available. An estimated annual turnover of $375, 000 used to estimate the economic impact of the closure of the existing cafe in **Table 16-20** are based on the following characteristics, based on:

- expected visitor numbers to Hinze Dam: approximately 500 000 visitors per year;
- patronage rates: estimated 7.5% of visitors would make a purchase from the cafe; and
- average expenditure per purchase ($10.00).

Table 16-20 Impact of Café Closure ($M 2006)

	Output ($M)	Value Added ($M)	Income ($M)
Direct	$0.375	$0.174	$0.104
Flow-on	$0.281	$0.117	$0.036
Total	$0.656	$0.291	$0.140

Note: There is not expected to be any significant difference between the impact of the operation of the café to the Queensland economy and the local study area (Gold Coast LGA).
Source: Hinze Dam Alliance based on data from Queensland Office of the Government Statistician (2002)

The reduction in economic activity resulting from the closure of the café during the construction phase is relatively small in relation to the additional economic activity generated by design and construction, and comprises a reduction of:

- approximately $656 000 in output (direct and indirect);
- approximately $291 000 in value added production (direct and indirect);
- approximately $140 000 in wages and salaries (direct and indirect); and
- between three to four employment positions over the construction phase of the project.

This impact of food purchased made by construction workers is incorporated in the economic impact assessment of the construction phase.

Other Businesses

There may also be some economic impacts associated with removing recreational access to the dam for a period on businesses in the local area who may have supplied food/drink for picnic/BBQ purposes for both individual or small group visitors and organised events. However, these are expected to be minimal and localised. It is reasonable to expect that previous recreational users would relocate their recreational activities elsewhere within the Gold Coast LGA.

There is not expected to be any other tangible operating impacts incurred by existing businesses in the study area as a result of the construction phase.

16.3.4 Flood Mitigation Benefits

This section of the report presents the results of the impacts of flooding for the base case (no change from existing conditions) and the Hinze Dam Stage 3 scenario PS1a[21].

[21] Flood modelling results from scenario PS4 have been used in this assessment as PS4 displays identical flooding characteristics as the selected design specification of PS1a.

Properties Flooded

The GCCC flood damage model was used to compute the total number of properties (residential and commercial/ industrial) that may be potentially flooded for the base case (existing dam) and the Hinze Dam upgrade scenario for each flood event. **Table 16-21** summarises the model outputs.

Table 16-21 Number of Properties Flooded

		Base Case Flooded Properties			HDS3 Flooded Properties		
	AEP	Residential	Commercial/ Industrial	Total	Residential	Commercial/ Industrial	Total
10	0.1	121	16	137	85	12	97
20	0.05	358	41	399	232	23	255
50	0.02	940	98	1 038	491	49	540
100	0.01	4212	229	4 441	1046	111	1157
200	0.005	7495	323	7818	2358	172	2530
500	0.002	12 218	491	12 709	5044	239	5283
1 000	0.001	20 008	764	20 772	14 480	543	15 023
10 000	0.0001	26 867	1026	27 893	25 064	947	26 011
PMF	0.0000002	31 391	1749	33 140	30 966	1697	32 663

Notes: ARI: Annual Recurrence Interval. AEP: Annual exceedance probability. PMF: Probable maximum flood.
Source: GCCC hydraulic modelling

Under the "no change" scenario it is estimated that 4 441 properties would be flooded for a one in 100 year ARI flood event. It is estimated that under the HDS3 scenario modelled, the number of properties flooded in a 1 in 100 year ARI flood event would be reduced by 3 284 to 1 157.

Damages from Properties Flooded: Base Case

The GCCC flood damage model also identifies the direct damages to these properties (residential and commercial/ industrial) associated with each flood event, along with the identified additional impacts required to be assessed under the Disaster Loss Assessment Guidelines (QDES 2002a).

Following the flood damages assessment methodology outlined in a previous section of this report, a value was assigned to each category of damages (direct tangible, indirect tangible, intangible) and benefits received by the region (insurances, funding from outside the region, etc) in order to populate the cost matrix as shown in **Table 16-22** for a 1 in 100 year ARI flood event. Similar assessments were undertaken for each of the modelled flood events (ARI 10y, 20y, 50y, 100y, 200y, 500y, 1000y, 10 000y and the PMF).

The assessment for the 1 in 100 year ARI flood event for the base case (no change) scenario indicates economic losses in the region of $170.0 million and benefits of approximately $48.8 million. This results in a net economic loss of approximately $124.8 million.

Table 16-22 Loss Assessment for the 1 in 100 year Flood Event: Base Case ($2006)

Loss Type	Economic Loss to the Region ($M)	Benefits to the Region			Net Economic Loss ($M)
		NDRA[(b)] ($M)	Insurance ($M)	Total ($M)	
Direct					
Residential[(a)]	$95.7		$9.6	$9.6	$86.1
Commercial	$7.4		$0.7	$0.7	$6.7
Infrastructure	$21.2	$13.0	$0.0	$13.0	$8.2
Vehicles & Boats	$26.3		$21.9	$21.9	$4.3
Indirect					
Business disruption	$2.3				$2.3
Transport network disruption	$4.4				$4.4
Tourism	$4.5				$4.5
Disaster response and relief	$1.1	$0.9		$0.9	$0.2
Intangible					
Death, injury and health	$7.5				$7.5
Environmental	$0.6				$0.6
Total	**$171.0**	**$13.9**	**$32.3**	**$46.2**	**$124.8**

Notes: (a) Includes loss of memorabilia (b) Natural Disaster Relief Arrangements funding
Source: Hinze Dam Alliance based GCCC hydraulic modelling

The economic damages from each flood event and the average annual damages (ADD) value estimate is shown in **Table 16-23**.

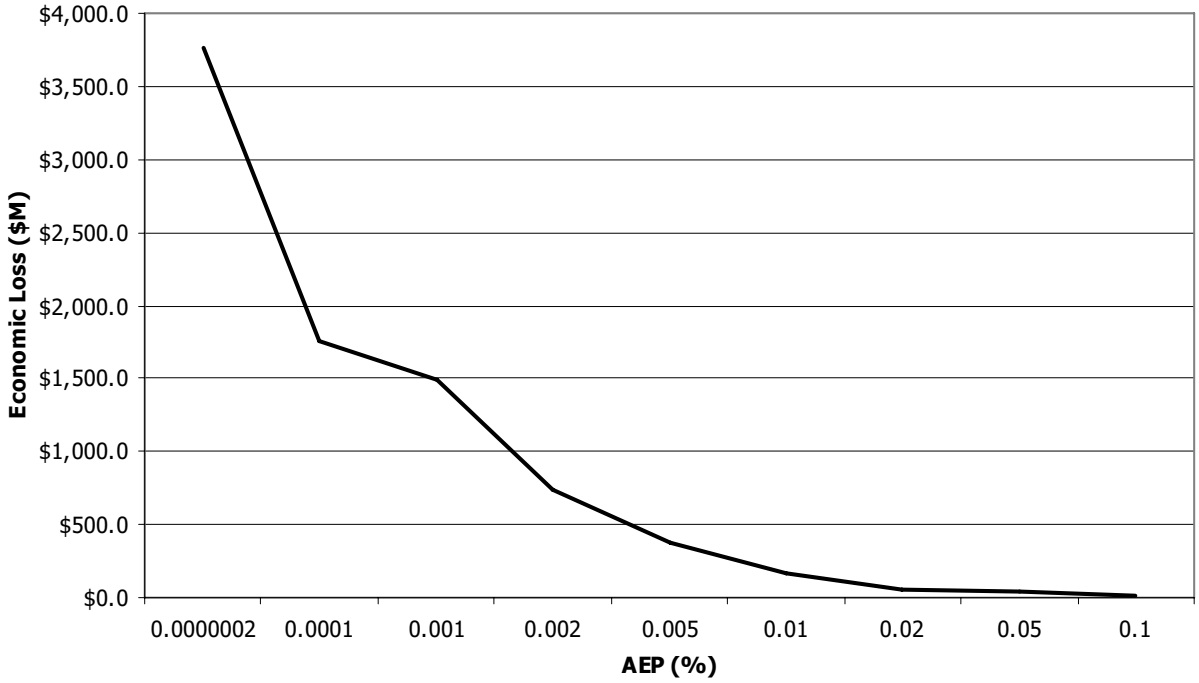
Table 16-23 Average Annual Damages: Base Case ($2006)

ARI	AEP	Economic Damages ($M)	Net Economic Damages ($)
10	0.1	$19.7	$16.4
20	0.05	$36.1	$28.9
50	0.02	$61.4	$46.1
100	0.01	$171.0	$124.8
200	0.005	$378.1	$285.1
500	0.002	$736.8	$568.9
1 000	0.001	$1,495.5	$1,176.3
10 000	0.0001	$1,755.3	$1,366.7
PMF	0.0000002	$3,765.4	$3,047.2
AAD		$9.92	$7.66

Notes: ARI: Annual Recurrence Interval. AEP: Annual exceedance probability. PMF: Probable maximum flood
Source: Hinze Dam Alliance based GCCC hydraulic modelling

The area under the curve presented in the **Figure 16-6** provides the estimate of the ADD value which, for the base case scenario, is estimated to be $9.92 million (or $7.66 million if benefits are taken into account).

- **Figure 16-6 Average Annual Damages: Base Case (Economic Damages $2006)**



Notes: AEP: Annual exceedance probability.
Source: Hinze Dam Alliance based GCCC hydraulic modelling

Damages from Properties Flooded: HDS3 (PS4 Modelling Scenario)

As per the base case assessment, the properties identified as being flooded for each ARI flood event and their associated damages were identified for the project scenario. The flood mitigation provided by the project would significantly reduce the number of properties flooded. For example, for a 1 in 100 year ARI flood event the additional flood mitigation in would see:

- 3, 166 less residential properties flooded (1 046 properties still flooded); and
- 118 less commercial/ industrial properties flooded (111 properties still flooded).

The assessment for the 1 in 100 year ARI flood event for the project scenario indicates economic losses in the region of $62.7 million and benefits of approximately $14.7 million. This results in a net economic loss of approximately $47.9 million. **Table 16-24** lists the economic losses.

Table 16-24 Loss Assessment for the 1 in 100 year Flood Event: Project Scenario ($2006)

Loss Type	Economic Loss to the Region ($M)	Benefits to the Region			Net Economic Loss ($M)
		NDRA[(b)] ($M)	Insurance ($M)	Total ($M)	
Direct					
Residential[(a)]	$25.6		$2.6	$2.6	$23.1
Commercial	$4.7		$0.5	$0.5	$4.2
Infrastructure	$9.3	$5.7	$0.0	$5.7	$3.6
Vehicles & Boats	$6.8		$5.7	$5.7	$1.1
Indirect					
Business disruption	$3.2				$3.2
Transport network disruption	$6.0				$6.0
Tourism	$4.5				$4.5
Disaster response and relief	$0.3	$0.3		$0.3	$0.1
Intangible					
Death, injury and health	$2.0				$2.0
Environmental	$0.2				$0.2
Total	**$62.7**	**$6.0**	**$8.8**	**$14.7**	**$47.9**

Notes: (a) Includes loss of memorabilia (b) Natural Disaster Relief Arrangements funding
Source: Hinze Dam Alliance based GCCC hydraulic modelling

This equates, for a 1 in 100 year flood event, to a reduction in the economic loss experienced over the base case (no change scenario) of approximately $108.3 million. The reduction in net economic loss experienced by the region over the base case for a 1 in 100 year flood event is approximately $76.9 million. The economic damages from each flood event and the average annual damages (ADD) value estimate is shown in **Table 16-25**.

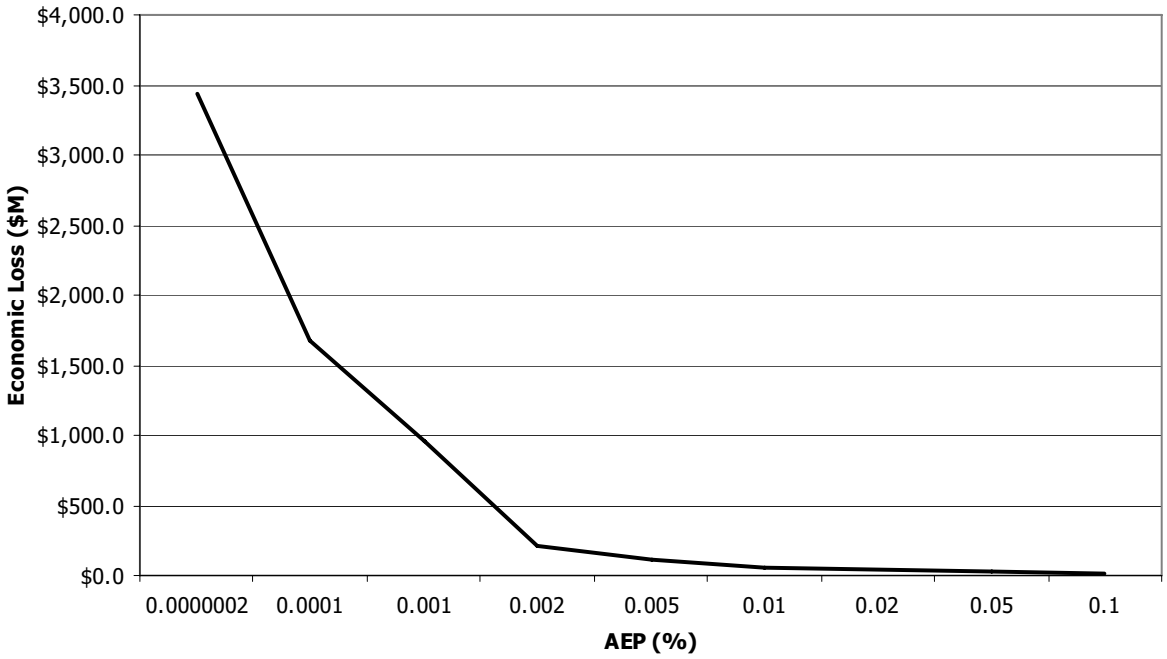
Table 16-25 Average Annual Damages: Project Scenario ($2006)

ARI	AEP	Economic Damages ($M)	Net Economic Damages ($)
10	0.1	$16.8	$14.0
20	0.05	$31.0	$25.1
50	0.02	$45.1	$35.8
100	0.01	$62.7	$47.9
200	0.005	$110.9	$83.1
500	0.002	$217.0	$160.9
1 000	0.001	$959.0	$749.6
10 000	0.0001	$1675.8	$1,310.0
PMF	0.0000002	$3436.3	$2,790.7
AAD		$5.83	$4.59
Benefit over the base case		$4.09	$3.07

Notes: ARI: Annual Recurrence Interval. AEP: Annual exceedance probability. PMF: Probable maximum flood.
Source: Hinze Dam Alliance based GCCC hydraulic modelling

The area under the curve presented in the **Figure 16-7** provides the estimate of the ADD value which, for the HDS3 scenario, is estimated to be $5.83 million (or $4.59 million if benefits are taken into account). This equates to a benefit over the base case (no change scenario) of approximately $4.09 million.

- **Figure 16-7 Average Annual Damages: Project Scenario (Economic Damages $2006)**



Notes: AEP: Annual exceedance probability.
Source: Hinze Dam Alliance based GCCC hydraulic modelling

16.3.5 Security of Water Supply

Amongst the range of objectives for undertaking the project raising include providing increased capacity, yield and reliability to the region's future water supply. The project, once operational, will become a component of the augmentation of water supplies for urban and industrial users in South East Queensland as part of the SEQ Water Grid.

The Queensland Water Commission, who have been charged with developing a System Operating Plan to facilitate the 'water grid' through:

- establishing a regional water grid to facilitate water sharing across the South East Queensland region;
- providing operating principles that link major water storages and ensure that water can be moved to where it is needed. Operating principles will need to consider factors such as:
  - varying capacity and performance of water storages;
  - technical issues relating to operating water storages, reservoirs and pipelines;
  - water quality and environmental considerations; and
  - advising the Water Grid Manager on how best to operate the water grid in accordance with the System Operating Plan.

The SEQ Water Grid will:

- provide a network of two-way pipelines to connect major bulk water sources in the region;
- allow water from areas of water surplus to be moved to areas that face a shortfall;
- allow risk to be managed at a regional level rather on a storage basis;
- allow the coordinated use of all major South East Queensland water supply sources, including Hinze Dam, along with:

- the Wivenhoe/Somerset system;
- the future Traveston Crossing and Wyaralong dams;
- the proposed desalination plant at Tugun on the Gold Coast; and
- the Western Corridor Recycled Water Scheme.

The operation of Hinze Dam following the upgrade will increase water security as part of the overall South East Queensland (SEQ) Water Grid at a higher cost. The project is one project of many in the SEQ Water Grid to secure supply and provides a relatively small increase in overall yield for the SEQ region. The economic benefits of this small increase in yield, are difficult to quantify, but are considered to be significant in the current environment of water scarcity.

16.3.6 Long-term Provision of Fish Passage

An assessment was undertaken as to whether the long-term provision of fish passage negatively impacts upon the viability of the project. The direct capital cost of the 'trap and truck' option proposed for Hinze Dam is estimated at $1, 602, 100 (representing just 0.4% of the total capital cost of the project), while the ongoing operational costs are likely to be in the order of $150, 000 per annum.

In annual full cost recovery terms (taking into account total project operating costs, depreciation and a return on capital), the additional cost per megalitre from the fishway option proposed is estimated at around $20/ML in terms of an annual yield cost. This equates to less than 1% of the total cost per ML yielded for the overall project.

16.3.7 Use of Locally Sourced Goods and Services

The majority of goods and services for the project will be sourced locally, with the majority of externally sourced goods and services a result of the need to access certain specialist input into the project that is unavailable in the local area.

Specific materials sources locally include the majority, if not all of the rock, clay and other materials and fill for construction of the dam wall, as well as specialised equipment were available locally (e.g. valves, fittings, etc as appropriate). It is estimated that approximately 70% of the inputs during the construction period will be sourced from within the local Gold Coast local government area.

16.4 Employment & Training

16.4.1 Workforce, Recruitment, and Deployment

During the construction phase of the project, the peak workforce will be approximately 240 employees, with an average of 150. Indicative workforce split is 60% permanent, 30% subcontract, and 10% labour hire / casual. Employee's skills base will generally be one or more of the following: project manager, superintendent, engineer, foreman, plant operator, general hand, specialist trade, apprentice, trainee, administration, and/or management support.

Recruitment of employees will be predominately from the local Gold Coast market, with this to be supplemented from existing resources available internally from within the Alliance. Recruitment for employees will follow a traditional merit based process e.g. advertising, application assessment, interview(s), medical examinations, selection and appointment. Recruitment of the workforce will be in accordance with existing Thiess policies.

Recruitment of subcontract services will also be a merit based process based on factors including OHS record and systems, pricing submission, locality, availability, previous work history, quality of machinery, and consideration of any value added services offered.

The recruitment process will commence once approval for the project is granted, and will be ongoing throughout the project in order to satisfy resources requirements.

During general operations of the dam (post construction), no additional resources will be required than what are currently provided by Gold Coast City Council.

No camp facilities or on site accommodation will be required / used by the project. A small percentage of the workforce (and in some instances their immediate family) will require accommodating, and this will be done using existing facilities (e.g. motels, apartments, caravan parks) on the Gold Coast.

Following the completion of the works, employees may be transferred to other projects operated by the individual Alliance partners. Other employees will be released from their work and available to source alternate work within the local market or further abroad.

16.4.2 Workforce Training

The Alliance is committed to workforce training and to satisfy the requirements of the Queensland Government "*10 per cent Training Policy"*. This has successfully undertaken by the Alliance partners on many projects in the past.

The required level of training will be provided through:

- the appointment and management of trainees and apprentices to the workforce; and
- structured and organised training to employees. Skills development matrices will be developed for salaried and wages personnel.

Evidence of satisfying the requirements of the Policy will be provided through the completion of a skills development matrix, regular compliance reports, and a practical completion report at the required times.

16.4.3 Indigenous Employment Opportunities

These is no specific requirement to satisfy the requirements of the Queensland Government *"Indigenous Employment Policy"* (the 20 per cent policy) as this project is not in a specified Aboriginal and Torres Strait Islander community.

All recruitment will be in accordance with the Alliance partners respective EEO and Workplace Diversity Policies.

16.5 Mitigation Measures

Changes to environmental conditions during construction will be managed by the Alliance so as to ensure that any impacts experienced are avoided, reduced or mitigated to the extent which is possible and may be reasonably expected.

This section outlines environmental objectives, performance criteria and mitigation measures required to address potential social and economic impacts. These have also been incorporated into the Environmental management Plan contained in **Section 19** of this EIS.

Social and Economic - Construction	
Environmental Objective	■ Protect the amenity and sense of security of residential properties
Performance Criteria	■ Aspect 1 - Residents in adjacent properties are aware in advance of construction activities, including blasting schedules and safety procedures
	■ Aspect 2 - Residents believe the construction team respond promptly to identified issues and impacts
	■ Aspect 3 - Potential impacts relating to vegetation removal which may impact on visual amenity are reduced
Mitigation Measures	■ Aspect 1 - provide a communication program targeted to residents in Advancetown and Gilston, and including ■ regular construction updates ■ advice on blasting and construction schedules ■ the results of monitoring required by the EMP
	■ Aspect 2 – provide a complaints response system including promotion and provision of phone contact with construction management staff during hours of construction, and a follow up procedure which notifies complainants within 24 hours of the intended response to the issue raised
	■ Aspect 3 – ensure site design minimises the removal of vegetation, and conduct tree planting at the earliest practicable opportunity to restore the existing visual qualities attributed to existing vegetation on the site
Monitoring	■ Survey residents in residential streets within 2 kilometres of the construction site on an annual basis to ascertain satisfaction with environmental management and complaint management procedures
Reporting	■ Provide monthly reports (publicly accessible on request) regarding communication activities, residents' complaints and resolution of complaints ■ Provide, as part of relevant monthly reports, the results of annual monitoring of community satisfaction with environmental and complaints management
Responsibility	■ Contractor

Social and Economic - Construction	
Environmental Objective	■ Reduce potential for impact on land sale prices during construction
Performance Criteria	■ Nil statistically valid decrease in property value directly attributable due to construction activities.
Mitigation Measures	■ Effective management of negative impacts on amenity e.g. movement of vehicles, personnel and materials to and from the site leading to a reduction in noise, traffic, dust, etc. ■ Provide transport for construction workers to and from the site from an external assembly point
Monitoring	■ A monitoring regime for this impact is impractical due to data limitations relating to both the baseline value of the local property market, the relatively small nature of the local market, the significant heterogeneity of properties begin sold and buyers' motivations, and the resources required to capture adequate data.
Reporting	N/A
Responsibility	Contractor

Social and Economic - Construction	
Environmental Objective	■ Ensure local roads near Hinze Dam retain the same or an enhanced level of safety and amenity
Performance Criteria	■ Aspect 1 - Nil road accidents on Gilston Road, Advancetown Roads and Nerang-Murwillumbah road attributable to a change in conditions as a result of HDS3 construction or construction vehicles ■ Aspect 2 - Nil increase in rubbish beside roads leading to the construction site

Mitigation Measures	■ Aspect 1 –
	  ■ Consult with Queensland Police regarding the potential need for increased measures such as speed restrictions on these roads
	  ■ Ensure all construction employees and contractors are aware and comply with the Traffic Management Plan for the project
	  ■ Investigate and take appropriate action on all community complaints regarding road safety pertaining to the project
	■ Aspect 2 – incorporate objectives regarding waste management and personal refuse in the Traffic Management Plan and employee orientation procedures

Monitoring	■ Aspect 1 - Monitoring of road safety indicators including accidents and incidences reported by community members ■ Aspect 2 – Monitoring and removal of road side attributable to the project or workforce
Reporting	N/A
Responsibility	Contractor

Social and Economic - Construction	
Environmental Objective	■ Decrease the potential impacts of loss of recreational access to the dam wall area and adjacent water body
Performance Criteria	■ Community organisations, facilities and sporting bodies including fishing associations who use the dam are aware of construction activities, access restrictions and alternatives to the dam for their recreational purpose ■ Number (percentage) of user groups successfully transferred to alternative sites within the Gold Coast region

Mitigation Measures	■ Effective transfer of recreational activities to other locations within the Hinze dam CID or to other Gold Coast sites where possible (e.g. rowing events):
	  ■ Events and activities typically using the Hinze Dam recreational area are identified.
	  ■ Suitable alternative sites within the Hinze Dam area or Gold Coast region are identified.
	  ■ Alternative sites are communicated to user groups through effective engagement strategy.

Monitoring	■ A monitoring regime is not required, as user groups once presented with appropriate information will select the alternative site that best retains their amenity. Local and regional expenditure associated with user groups will transfer accordingly.
Reporting	■ N/A
Responsibility	■ Contractor

Social and Economic - Construction	
Environmental Objective	■ Ensure effects of road re-alignments or increased inundation as a result of HDS3 do not negatively impact on residential uses, community facilities, or facility users
Performance Criteria	■ Aspect 1 – property owners receive adequate notice of road re-alignment works and are advised of likely Full Supply Level flood levels
	■ Aspect 2 - Access to land for community facilities within and adjacent to the CID area is maintained at an equivalent level following construction
Mitigation Measures	■ Aspect 1 - Consult property owners affected by road re-alignment regarding the use of the land required, and provide advice on construction schedule and environmental management measures; ■ Aspect 1 -provide written advice to affected private and governmental property holders regarding potential for increased inundation in flood events ■ Aspect 2 - Consult with the Scouts Association (Gold Coast Region) to identify potential need for an alternative site for the camping ground and ensure equivalent facility access is made available if necessary ■ Aspect 2 - Continue to consult with Education Queensland to ensure potential impacts of inundation on the Numinbah Environmental Education Centre property are satisfactorily addressed, and explore potential for co-operative projects between the Centre and Hinze Dam
Monitoring	■ Not required
Reporting	■ Activities pertaining to these mitigation measures should be reported in communications strategies.
Responsibility	■ Contractor

Social and Economic – Operation	
Environmental Objective	■ Maximise business activity and amenity values once dam site is reopened (Revenues and recreational amenity may take a while to return to pre-upgrade levels due to reduced visitor numbers immediately after site reopens).
Performance Criteria	■ Visitor numbers approaching and exceeding pre-construction numbers.
Mitigation Measures	■ Effective promotion, PR and advertising towards the end of the construction period indicating when it will be reopened to the public and what new facilities will be available, etc. ■ Develop an information and interpretive centre as part of new facility development to enhance recreational access and values at Hinze Dam
Monitoring	Visitor numbers ■ Capture and record total visitation and amend marketing strategy as required to facilitate use of site and new facilities
Reporting	■ N/A
Responsibility	■ Operator