Appendix K Socio-Economic Impact Assessment

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QUEENSLAND COKE & ENERGY

STANWELL CORPORATION LIMITED

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Socio-Economic Impact Assessment
Queensland Coke Plant and Power Station Project

Queensland Coke & Energy Pty Ltd
Stanwell Corporation Limited

Institute for Sustainable Regional Development
Central Queensland University

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1. Introduction

1.1. Overview

This draft economic and social impact assessment was prepared by the Institute for Sustainable Regional Development (ISRD) at Central Queensland University (CQU), to estimate the magnitude and distribution of the social and economic impacts associated with Queensland Coke & Energy (QCE) and Stanwell Corporation's proposed construction of a coke and energy Plant at Stanwell. The research undertaken in this study focuses on potential impacts for Local Government Areas (LGAs) (Rockhampton (C), Fitzroy (S), Livingstone (S) and Mount Morgan (S)) all of which are within close proximity to the proposed project site and are most likely to experience any potential impact. Wider economic and social impacts for central Queensland and Queensland have also been reported.

There are a number of underlying factors that reinforce the necessity for comprehensive economic and social impact assessment of this project. Firstly, although coke production has occurred in Australia for many years there have been no new coke Plants constructed in recent years. Older generation coke Plants have often been associated with pollution issues and health risks. The advanced cleaner technology of the proposed Plant is superior in that pollutants are destroyed in the coking process and gases reused for the generation of electricity. A second underlying factor is that the area immediately surrounding the proposed site is only lightly populated, suggesting that direct impacts on the local population could be expected to be minimal. Thirdly, the development will occur against a background of an increase in mining activity across the Bowen Basin, which has resulted in a regional skilled labour shortage. Identification of the skill gaps will assist Government and training bodies to address the skill shortage issues in a timely manner. Finally, since the site of the proposed project is that of the failed Australian Magnesium Corporation (AMC) project of 2000/2001, community attitude toward QCE/Stanwell's proposal may be complex. This factor however, is difficult to gauge in advance.

This study is an important document for LGAs, regional businesses and the public as it indicates the potential impacts (both positive and negative) the proposed project may have for the region's social and economic welfare. This assessment combines the analysis of various levels of research and modelling to identify the impact of the project on the four LGAs listed above. It was not undertaken to recommend a preferred option but rather to identify the full range of economic and social impacts anticipated to occur as a result of the proposed project. By providing appropriate information, the report will enable various stakeholders to make more informed contributions to the assessment options and project planning.

This section begins with a brief overview of coke production technologies presently employed in Australia compared with that of the proposed Plant. This is followed by an explanation of the economic and social impact assessment techniques employed in this assessment.

1.1.1. Background

Queensland Coke and Energy Pty Ltd P.L (QCE), a subsidiary of Macarthur Coal Limited, and Stanwell Corporation Limited have proposed to construct a modern coke processing Plant and power station on a site adjacent to the existing Stanwell Power Station. The coke production is aimed at servicing Australia's export coke market while electricity generated will contribute to Stanwell's electricity production servicing the National Electricity Market.

Coke, a derivative of coal, is a critical raw component of the steel and iron making process. Coke is produced by pyrolising or heating bituminous coal in ovens in the absence of oxygen at high temperatures (~ 1000^{o} C). This process effectively removes the gaseous component of the coal with the resulting coke being almost pure carbon.

Two forms of coke production technology are currently in use in Australia, the by-product coke making process and the non-recovery coke technology. Since the heat-recovery coke production technology to be employed in the QCE/Stanwell proposal is new to Australia a brief description is provided below to differentiate between these technologies.

At present, there are five coke production Plants in Australia. Coke production is not a process common to all integrated steel makers. Both Bluescope Steel's operations at Port Kembla and OneSteel's operation at Whyalla in South Australia include coke production facilities utilizing by-product recovery technology. Bluescope's coke is produced largely for its own steel making processes, with some volume produced for the export market. Coke produced at the OneSteel Plant is produced primarily for internal use. Illawarra Coke Company's (ICC) two Plants, also at Port Kembla, and Xstrata's Plant at Bowen in North Queensland are both stand alone operations utilizing non-recovery technology. ICC produces coke for both the domestic and export market while Xstrata's product is largely for the export market.

1.1.2. By-product recovery coke production

The by-product coke production process consists of a battery of coke ovens with a collecting main that captures the resulting coke oven gas. During this process, raw coke oven gas is removed through an offtake system, by-products such as benzene, toluene, and xylene are recovered, and the cleaned gas is used to underfire the coke ovens and for fuel elsewhere in the Plant. During by-product coke making, pollutants may be emitted into the atmosphere from several sources. The sources of most emissions occur during the pushing of coke from the ovens, quenching of the incandescent coke, and by-product recovery. Coke pushing results in fugitive particulate emissions, which may include volatile organic compounds (VOCs), while coke quenching results in particulate emissions with traces of organic compounds. In addition, the byproduct recovery stacks may emit benzene, naphthalene and other polynuclear aromatic hydrocarbons (Mussatti, 1998).

1.1.3. Non-recovery coke production

The significant difference between non-recovery and by-product coke ovens occurs during the handling of the volatile gases released during coking. Non-recovery coke ovens operate under negative pressure and are designed to completely capture the volatile gases which are subsequently combusted in the oven chamber rather than recovered in a by-product Plant. The oxidation of the gases above the coal bed provides the heat for the process and, thus, eliminates the need for external heat sources (Mussatti, 1998). The ovens are conveyor charged, and the incandescent coke is conventionally pushed and quenched. Large volumes of steam are produced as a result of the quenching process and subsequently emitted via tall towers.

1.1.4. Heat-recovery coke production

The heat recovery technology is based on that of the non-recovery process with the exception that the heat recovery process combines the cleaning of hot gas from the ovens with the clean production of steam and electrical power. The hot oven gas is ducted to waste heat boilers where the excess heat is converted to steam. The steam is then used to power a turbine to subsequently drive a generator producing

electricity. Cold flue gas exits the steam generator and is scrubbed for sulfur dioxide and particulate removal before release via stacks.

1.2. Overview of the region

Rockhampton is the regional hub of central Queensland, with Gladstone and Emerald also being important centres. Agriculture (beef cattle, cropping, cotton and horticulture), mining and tourism are primary export earners for the region, with some processing (abattoirs and cotton gins) to provide value adding. Rockhampton is a central hub for service industries, as well as providing important transport and education facilities.

Despite the growth in agriculture and mining industries in the region, Rockhampton has not grown as fast in recent decades as other regional centres in Queensland. To compare it with close neighbours, Gladstone to the south has developed into a major industrial centre and port facility, while Mackay to the north has developed into a major service centre for mining and port facility. While there were hopes in 2000-2001 that the proposed AMC Plant at Stanwell would provide a significant development boost to the region, this proposal failed.

Since 2004, substantial investment coupled with increases in coal production in the region has generated improvements in employment and economic conditions in the Rockhampton region.

Queensland's coal production is predicted to increase significantly over the next decade, and regional Queensland is expected to benefit from substantial increases in regional income, output and employment. With the bulk of Queensland's export coal coming from central Queensland's Bowen Basin, Rockhampton and the central Queensland region is well positioned to benefit from this growth.

Whilst rapid growth provides economic opportunities, efficient planning is necessary to ensure that the region's infrastructure and service industry providers are appropriately equipped to facilitate this growth. Such planning is necessary to ensure the economic benefits accrue within the central Queensland economy. These benefits are expected to accrue both directly and indirectly. Direct impacts will be realised through employment and purchase of goods and services from local businesses. Indirect benefits will result through the flow-on effects of an increase in spending and employment.

Rapid industry growth has created a number of associated adjustment problems for the region. These include shortages in the skilled labour market, congestion of rail and port infrastructure, and management of the environmental and social impacts associated with rapid industry growth.

1.3. Tools of Economic and Social Research

An economic and social impact assessment analyses the impact of a proposed development on existing and future social factors and community infrastructure, including impacts on economic factors, employment, affordable housing, public realm, community services and facilities. There is a wide range of techniques that can be applied to identify local and regional impacts resulting from industry development. Economic tools can be used in conjunction with various categories of impact assessment techniques to assist in the decision making process. A brief description of these is provided below.

1.3.1. Demographic overview

Economic and social impact assessment techniques share a common first stage where demographic and other background information about the case study is collected. This can involve a situational analysis of the local and regional areas affected, a description of the project proposal, and modelling of employment, population and associated factors.

1.3.2. Economic impact assessment

Economic impact assessment is used to identify where the proposed project may impact upon different groups in society. The focus of economic impact assessment is similar to that of social impact assessment, where a key focus is to identify groups that may be disadvantaged so that remedial or compensatory strategies can be developed. Different economic techniques are needed to determine if a project has net benefits; these are detailed below.

Mathematical models termed input-output models are the most accurate means for estimating economic impacts. Input-output modelling is used to help estimate the flow-on effects of changes in income, expenditure and employment. Input-output modelling attempts to quantify the mutual interrelationship and interdependence of multiple economic sectors within a complex economic system. Modelling therefore estimates these relationships using dollars as the primary means of measurement. Such models describe the regional economy in terms of a number of sectors, and further allow for differential impacts between sectors, depending upon the extent to which sectors supply inputs to each other. Input-output analysis is a descriptive technique used to identify how different sectors in the economy interact, and how changes in one sector generate 'ripple' effects through the wider economy.

While economic impact assessment focuses on the identification and prediction of types and distributions of impacts, many other techniques focus on evaluating whether the net outcomes of various impacts are worthwhile. The most commonly employed tool is cost-benefit analysis, which offers a methodology to evaluate the overall benefit of a project to society. The principle behind a cost-benefit analysis is simple in that it tries to assess the overall outcomes of the project by adding all benefits and costs associated with the project. A positive net result implies that the proposed project produces more benefits than costs and consequently appears worthwhile. The advantages of a cost-benefit study are that it explicitly values the different impacts and outcomes, and provides a framework where differing outcomes may be assessed against each other.

The difference between input-output analysis and cost-benefit analysis is that the former is focussed on identifying the total impacts without any evaluation of their desirability, while the latter is focussed on identifying the net benefits, with an overall assessment of whether a project is desirable to society as a whole. While an Environmental Impact Assessment can include both forms of analysis, most of the focus in Environmental Impact Assessment is on input-output analysis.

1.3.3. Social impact assessment

There are two broad schools of thought on the basic purpose of social impact assessment (SIA). The first focuses on using SIA to make predictions about social change while the second focuses on using SIA as a tool to facilitate public involvement in decision-making. According to the US Interorganisational Committee on Guidelines and Principles for SIA:

> Social impact assessment can be defined as the process of assessing or estimating in advance the social consequences that are likely to follow from specific policy actions or project development … (Burdge and Vanclay 1995).

There is a general consensus within the SIA profession that assessing potential impacts accurately and achieving positive development outcomes is dependent on widespread stakeholder participation in the impact assessment and planning process (Burdge and Robertson 1998; Coakes 1999; Vanclay 2000). Further, they consider it necessary to begin participation/social assessment as early in the life of a project as possible in order to ensure that:

- the impact assessment process incorporates local knowledge about social conditions, processes and likely impacts;
- attitudes and perceptions towards proposed change can be identified;
- subjective and cultural impacts such as how people perceive change in their local environment may be identified;
- appropriate mechanisms to involve different groups in the decision-making process may be identified;
- the outcomes of the SIA and the views of the public may be incorporated at the project design stage and used to maximise benefits rather than simply to compensate the losers following implementation;
- potential alternatives may be identified and adequately assessed; and
- conflict over projects may be minimised by ensuring that as many interests as possible are considered in decisions and appropriate mitigation strategies are put in place (see Burdge *et al* 1995; Bisset 2000; Burdge and Robertson 1998; Dale *et al*, 1997; SIAU 2000).

Some social impacts associated with increased population in the Rockhampton region as a result of the proposed coke Plant and power station have the potential to be significant. This is because some of the key impacts may exacerbate existing issues such as reduced housing affordability, with impacts on lower socio-economic groups. The focus of this social impact assessment has been on predictive social impacts. The interactive and consultative elements will be strengthened by other elements of the EIS process, including a community information process and the public comment phases of the EIS process.

In this assessment a combined approach of desktop analysis and community consultation has been used to predict social impacts and perceptions. The key changes in social impacts that have been assessed include possible impacts on housing affordability, employment (e.g. skill shortages) and infrastructure (e.g. existing and projected demand).

1.3.4. Overall approach

The tasks undertaken in this assessment included:

- an overview of the general economic outlook for the region
- consultation with relevant government bodies
- consultation with local communities
- analysis of socio-economic data for the Local Government Areas in the study region
- analysis of the anticipated economic and social impacts likely to occur as a result of the project.

2. Demographic Profile

This section briefly outlines the current demographic profile of the relevant regions. Current and predicted population levels are outlined. Existing industry and labour force characteristics are summarised, followed by labour market characteristics.

2.1. Current Demographic Profile

Table 2.1 below illustrates the broad demographic features of the current population in the communities close to the proposed site. This information was compiled using data from the 2001 Census conducted by the Australian Bureau of Statistics.

Table 2.1 General Demographic Characteristics

Characteristic	Fitzroy LGA		Rockhampton LGA		Livingstone LGA		Mt Morgan LGA		Rockhampton SSD		Calliope LGA		Gladstone LGA		Queensland	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
General																
2001 Population	9,554	100.0	58,382	100.0	27,017	100	2,776	100	61,019	100	15,091	100	26,835	100.0	3,655,139	100.0
Residency Rate*	5,081	53.24	27,005	46.26	11,865	43.92	1,424	51.30	27,820	45.59	6,561	43.48	11,437	42.61	1,584,873	43.36
Males	4,659	48.82	28,433	48.70	13,774	50.98	1,386	49.93	29,693	48.66	7,744	51.32	13,671	50.94	1,807,730	49.46
Females	4,894	51.28	29,949	51.30	13,243	49.02	1,390	50.07	31,326	51.34	7,347	48.68	13,164	49.06	1,847,409	50.54
Aboriginal Origin	310	3.25	2,591	4.44	641	2.37	279	10.05	2,816	4.61	307	2.03	751	2.80	87,322	2.39
Born Overseas	475	4.98	3,696	6.33	2,615	9.68	236	8.50	3,706	6.07	1,774	11.76	2,672	9.96	616,168	16.86
Labour Force																
Persons 15+ Years	6,941	72.73	45,554	78.01	20,857	77.20	2,227	80.22	47,457	77.77	11,102	73.57	20,117	74.97	2,884,181	78.9
Labour Force	4,370	45.79	26,754	45.83	11,149	41.27	800	28.82	28,281	46.35	6,878	45.58	13,292	49.53	1,709,612	46.77
Persons Employed	4,068	42.62	24,277	41.58	10,196	37.74	614	22.12	25,703	42.12	6,357	42.12	12,033	44.84	1,568,864	42.92
Unemployment Rate		7.0%		9.3%		8.6%		23.4%		9.11%		7.7%		9.5%		8.2%

Source: 2001 Census, Australian Bureau of Statistics.
Note: *Indicates the number of persons residing at the same address 5 years ago
LGA – Local Government Area
SSD – Statistical Sub District

2.1.1. Population size and distribution

Rockhampton is the major population centre close to the proposed Stanwell site and provides a large proportion of services to the area. Demographic information for the Rockhampton statistical sub-district (SSD), which includes Rockhampton City and Fitzroy Shire Part A, shows that approximately 96% of the SSD's total population resides in Rockhampton. In the 2001 Census, Gracemere recorded a population of 4,463 – approximately 50% of the population of the Fitzroy LGA. Gracemere is located around nine kilometres south west of Rockhampton

The Stanwell community itself is approximately five kilometres from the proposed site. In the 2001 Census, Stanwell's population registered at fewer than 200 people, as did Kabra, a small community eight kilometres east of the site.

2.1.2. Recent population growth

Table 2.2 details the population growth in the six regions surrounding the proposed site – Fitzroy, Rockhampton, Livingstone, Mt Morgan, Calliope and Gladstone LGAs – for the interval 1991-2001.

Table 2.2 Population growth

	1991	**1996**	***growth***	**2001**	***growth***	**Average annual growth**
Fitzroy LGA	8,047	9,499	*18.0*	9,553	*0.5*	1.9
Rockhampton LGA	59,394	59,732	*0.6*	58,382	*-2.3*	-0.2
Livingstone LGA	19,334	24,796	*28.25*	27,017	*8.96*	3.7
Mt Morgan LGA	3,093	2,858	*-7.59*	2,776	*-2.87*	-1.1
Calliope LGA	10,853	13,954	*28.57*	15,091	*8.15*	3.7
Gladstone LGA	24,202	26,454	*9.31*	26,835	*1.44*	1.1
Queensland	2,977,810	3,368,850	*13.13*	3,655,139	*8.49*	2.2

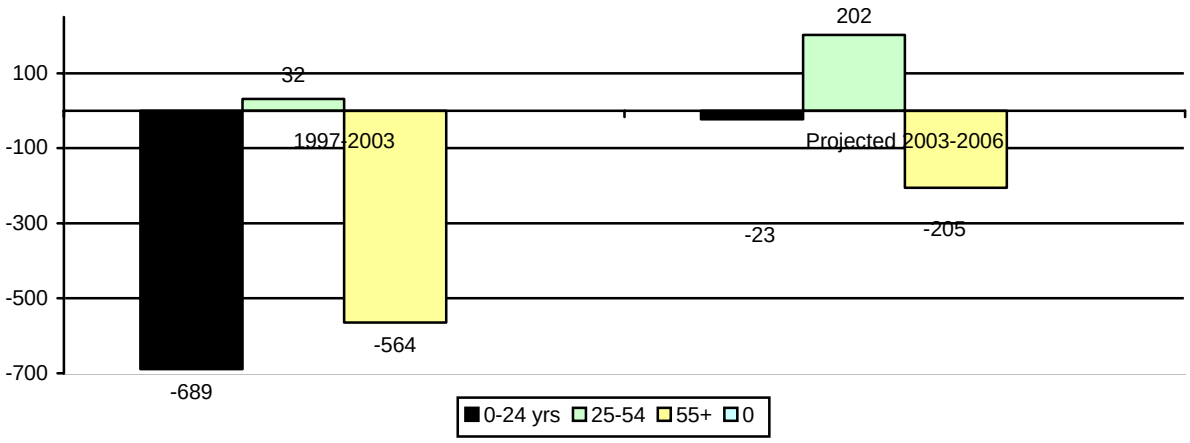
Source: 2001 Census, Australian Bureau of Statistics.

Table 2.2 demonstrates that the growth rate in the Fitzroy LGA outstrips that of the more urban Rockhampton LGA, although the population of the Fitzroy LGA is approximately 1/6 the population of Rockhampton. It is also clear that the higher growth areas within the nominated region are Livingstone, Calliope and Fitzroy. The small communities in the region, including Stanwell, have maintained their population over the ten year period to 2001, while the Calliope and Livingstone areas have experienced a rate of growth significantly higher when compared to the rate of growth across Queensland.

2.1.3. Population and net migration to Fitzroy

Figure 2.1 shows that people have been generally moving out of the Fitzroy region areas since 1997. Over the six year period from 1997-2003, 689 people below 24 years old and 564 people above 55 years old moved out of Fitzroy. There was a positive net migration of people between 25-54 years old. It is expected that this trend will continue to 2006 as employment becomes more attractive in the Fitzroy LGA, with more people in this age group relocating there for work. The younger and older age groups are still anticipated to move out of the region. Figure 2.1 shows the current and projected migration for Fitzroy.

Figure 2.1 Current and projected net migration in Fitzroy



(National Economics, 2005)

2.1.4. Projected Population Growth

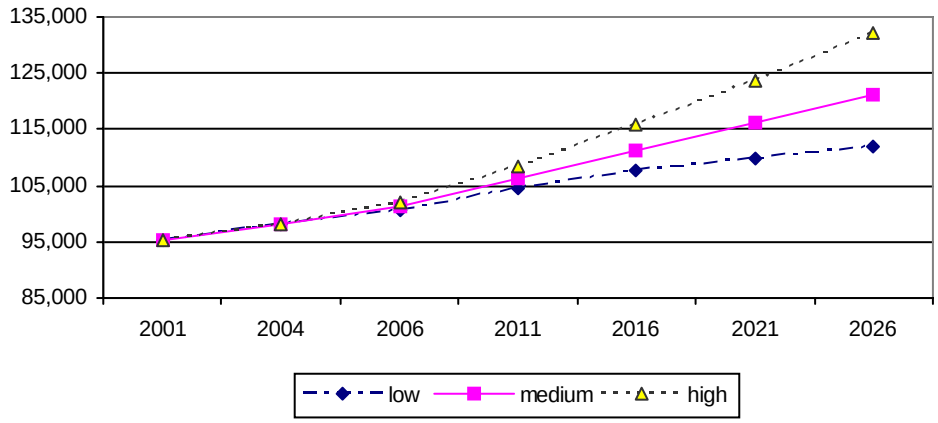
The estimated resident population in the Rockhampton region comprising Fitzroy, Mt Morgan, Rockhampton city, and Livingstone was 98,164 in 2004 according to the Department of Local Government, Planning, Sport and Recreation (DLGPSR, 2005). Projections prepared by DLGPSR (Table 2.3, Figure 2.2) indicate that by 2011, the population is expected to increase to between 104,400 and 108,500 people. By 2026 this is expected to increase to between 111,800 and 132,200 people.

The median age of the region's population is projected to increase by six years, from 35 years in 2001 to 41 years in 2026.

Table 2.3 Projected population

Year	Low	Medium	High
2006	100,676	101,265	101,942
2011	104,479	106,327	108,448
2016	107,548	111,359	115,757
2021	109,986	116,339	123,740
2026	111,820	121,155	132,124

Figure 2.2 Population projected for Rockhampton and surrounding region



Source: DLGP (2005)

2.1.5. Age structure

The age structure of the population in the regions local to the proposed project site (Table 2.4) varies slightly from that of the State as a whole. Apart from Mt Morgan LGA, all areas show a higher proportion of the population in the 0-19 year age groups. The 20-29 age bracket shows Gladstone and Rockhampton with a proportion higher than the State, while Fitzroy, Livingstone, Mt Morgan and Calliope show significantly lower populations for this age group. This illustrates the trend for young singles to reside in larger urban areas. Livingstone and Mt Morgan have significantly high proportions of population in the 50-79 age groups relative to the State population, suggesting that these LGAs are popular migration targets for retirees.

The population figures show a higher proportion of children below the age of ten years and adults in the 30 to 50 year age bracket in the Fitzroy, Calliope and Gladstone LGAs, when compared with the data for Queensland, indicating a higher population of families with young children residing in these areas.

2.1.6. Sex structure

As Table 2.5 illustrates, the Fitzroy LGA shows a lower ratio of men to women than Queensland as a whole, while the figures within the Rockhampton region are similar to those for the State. As is the case across Queensland, most of the regions examined show a higher population of women than men in the 20-49 year age groups, with the exception of Calliope and Livingstone LGAs, which show a higher population of men in most age groups.

Table 2.4 Age of population

	Fitzroy LGA		Rockhampton LGA		Livingstone LGA		Mt Morgan LGA		Rockhampton SSD		Calliope LGA		Gladstone LGA		Queensland	
		%		%		%		%		%		%		%		%
Under 10	1,679	17.58	8,032	13.76	3,599	13.32	369	13.29	8,848	14.50	2,373	15.72	4,495	16.75	503,505	13.76
10-19	1,602	16.77	9,367	16.04	4,218	15.61	367	13.22	10,058	16.48	2,476	16.41	4,124	15.37	516,579	14.13
20-29	925	9.68	8,402	14.39	2,331	8.63	225	8.11	8,681	14.23	1,459	9.67	3,794	14.14	487,373	13.33
30-39	1,484	15.53	7,673	13.14	3,592	13.30	295	10.63	8,256	13.53	2,328	15.43	4,175	15.56	527,254	14.43
40-49	1,490	15.60	7,826	13.40	3,972	14.70	361	13.00	8,369	13.72	2,386	15.81	4,064	15.14	518,380	14.18
50-59	1,029	10.77	6,221	10.66	2,631	13.00	428	15.42	6,385	10.46	1,824	12.09	3,012	11.22	433,341	11.86
60-69	774	8.10	4,552	7.80	2,419	10.63	353	12.72	4,544	7.45	1,140	7.55	1,674	6.24	284,357	7.78
70-79	367	3.84	3,751	6.42	1,342	6.62	250	9.00	3,737	6.12	643	4.26	975	3.63	210,635	5.76
Over 80	189	1.98	2,039	3.49	467	2.55	120	4.32	2,142	3.51	229	1.52	406	1.51	104,215	2.85
Total	**9,544**	**100**	**58,382**	**100**	**27,017**	**100**	**2,776**	**100**	**61,019**	**100**	**15,091**	**100**	**26,835**	**100**	**3,655,139**	**100**

Source: 2001 Census, Australian Bureau of Statistics.

Table 2.5 Age by sex

	Under 10		**10-19**		**20-29**		**30-39**		**40-49**		**50-59**		**60-69**		**70-79**		**Over 80**	
	male	female	male	female	male	Female	male	female	male	female	male	female	male	female	male	female	male	female
Fitzroy LGA	836 (49.8%)	843 (50.2%)	791 (49.4%)	811 (50.6%)	436 (47.1%)	489 (52.9%)	679 (45.8%)	805 (54.2%)	710 (47.7%)	780 (52.3%)	530 (51.6%)	499 (48.5%)	409 (52.8%)	365 (47.2%)	202 (55.0%)	165 (45%)	61 (32.2%)	128 (67.7%)
Rockhampton LGA	4,079 (50.8%)	3,953 (49.2%)	4,720 (50.4%)	4,647 (49.6)	4,095 (48.7%)	4,307 (51.3%)	3,768 (49.1%)	3,905 (50.9%)	3,856 (49.3%)	3,970 (50.7%)	3,196 (51.4%)	3,065 (48.7%)	2,156 (47.4%)	2,396 (52.6%)	1,672 (44.6%)	2,079 (55.4%)	702 (34.4%)	1338 (65.6%)
Livingstone LGA	1,816 (50.5)	1,783 (49.5%)	2,354 (55.8%)	1,864 (44.2%)	1,221 (52.4%)	1,110 (47.6%)	1,840 (51.2%)	1,880 (48.8%)	1,764 (44.4%)	1,736 (55.6%)	1,354 (51.5%)	1,277 (48.5%)	1,274 (52.7%)	1,145 (47.3%)	689 (51.3%)	653 (48.7%)	188 (40.3%)	279 (59.7%)
Mt Morgan LGA	207 (56.1%)	162 (43.9%)	191 (52%)	176 (48%)	117 (52%)	108 (48%)	123 (41.7%)	172 (58.3%)	181 (50.1%)	180 (49.9%)	212 (49.5%)	216 (50.5%)	186 (52.7%)	167 (47.3%)	125 (50.0%)	125 (50.0%)	44 (36.7%)	84 (63.3%)
Rockhampton SSD	4,499 (50.8%)	4,349 (49.2%)	5,068 (50.4%)	4,990 (49.6%)	4,204 (48.4%)	4,477 (51.6%)	4,025 (48.8%)	4,231 (51.2%)	4,144 (49.5%)	6,237 (50.5%)	3,131 (49.0%)	6,385 (51.0%)	2,152 (47.4%)	2,392 (52.7%)	1,651 (44.2%)	2,086 (55.8%)	736 (34.3%)	1,406 (65.6%)
Calliope LGA	1,216 (51.2%)	1,157 (48.8%)	1,281 (51.7%)	1,195 (48.3%)	730 (50%)	729 (50%)	1,122 (48.2%)	1,206 (51.8%)	1,278 (53.6%)	1,108 (46.4%)	945 (51.8%)	879 (48.2%)	622 (54.6%)	518 (45.4%)	347 (54.0%)	296 (46.0%)	91 (39.7%)	141 (62.3%)
Gladstone LGA	2,320 (51.6%)	2,175 (48.4%)	2,054 (49.8%)	2,070 ((50.2%)	1,885 (49.7%)	1,909 (50.3%)	2,103 (50.4%)	2,072 (49.6%)	2,123 (52.2%)	1,941 (47.8%)	1,633 (54.2%)	1,379 (45.8%)	893 (53.3%)	781 (46.7%)	458 (47.0%)	517 (53.0%)	139 (34.2%)	267 (65.8%)
Queensland	258,143 (51.3%)	245,362 (48.7%)	264,297 (51.2%)	252,282 (48.8%)	243,323 (49.9%)	244,050 (50.1%)	256,847 (48.7%)	270,407 (51.3%)	254,612 (49.1%)	263,768 (50.9%)	218,027 (50.3%)	215,314 (49.7%)	142,928 (52.3%)	141,429 (49.7%)	98,666 (46.8%)	111,969 (53.2%)	38,711 (37.1%)	65,504 (62.9%)

Source: 2001 Census, Australian Bureau of Statistics.

2.1.7. Ethnicity

In the 2001 Census, of the regions relevant to this assessment only Livingstone and Calliope LGAs reported a proportion of residents with Aboriginal origin lower than that for Queensland. Mount Morgan reported a proportion of around 10% and Rockhampton LGA around 4.5%, compared to the State figure of approximately 2.4% (see Table 2.6).

For the state of Queensland, the 2001 Census showed that around 16.9% of the population was born overseas. The regions examined for this assessment show much lower proportions. The percentage of the population born overseas is lower for the population of the Rockhampton region and Fitzroy LGA than for the State in general. Only 4.9% of the population from the Fitzroy LGA was born overseas. Calliope LGA recorded the highest in the regions at 11.76%.

Table 2.6 Population with aboriginal origin and born overseas

	Aboriginal origin	%	Born overseas	%
Fitzroy LGA	310	3.25	475	4.98
Rockhampton LGA	2,591	4.44	3,696	6.33
Livingstone LGA	641	2.37	2,615	9.68
Mt Morgan LGA	279	10.05	236	8.50
Rockhampton SSD	2,790	4.57	3,706	6.07
Calliope LGA	307	2.03	1,774	11.76
Gladstone LGA	751	2.80	2,672	9.96
Queensland	87,322	2.39	616,168	16.86

Source: 2001 Census, Australian Bureau of Statistics.

2.1.8. Length of residency

An indicator of mobility/stability of residents in a region is the percentage of the population that has remained in the same residence for two consecutive Census periods. Census data from 2001 (Table 2.7) shows that the Fitzroy and Rockhampton regions have a slightly higher percentage of population with residency greater than five years when compared to the State. This illustrates a relatively stable population. Mt Morgan and Fitzroy in particular have a stable population, with greater than 50% of population remaining at the same address for more than five years.

Table 2.7 Population with more than 5 years residency

	Residency	%
Fitzroy LGA	5,081	53.24
Rockhampton LGA	27,005	46.26
Livingstone LGA	11,865	43.92
Mt Morgan LGA	1,424	51.30
Rockhampton SSD	27,820	45.59
Calliope LGA	6,561	43.48
Gladstone LGA	11,437	42.61
Queensland	1,584,873	43.36

Source: 2001 Census, Australian Bureau of Statistics.

2.1.9. Educational status

Table 2.8 shows the education level of the relevant regions, as well as those for Queensland. When compared with the State figures, all regions examined in this report showed lower proportions of the population with a bachelor degree or higher qualification. Fitzroy and Mt Morgan LGAs in particular show a significantly smaller proportion of the population with a diploma/advanced diploma or above.

Gladstone, Livingstone and Calliope LGAs all showed a higher proportion of their populations with Certificate III/ Certificate IV level qualifications, and Livingstone showed a higher population with postgraduate qualifications, when compared with the State.

Table 2.8 Education level of population

	Fitzroy LGA		Rockhampton LGA		Livingstone LGA		Mt Morgan LGA		Rockhampton SSD		Calliope LGA		Gladstone LGA		Queensland	
		%		%		%		%		%		%		%		%
Postgraduate Degree	20	0.21	472	0.81	229	0.85	7	0.25	477	0.78	68	0.45	144	0.54	38,740	1.06
Graduate Diploma and Graduate Certificate	47	0.49	463	0.79	252	0.93	6	0.22	489	0.80	109	0.72	179	0.67	31,775	0.87
Bachelor Degree	282	2.95	3,147	5.39	1,339	4.96	46	1.66	3,278	5.37	640	4.24	1,304	4.86	235,113	6.43
Advanced Diploma and Diploma	251	2.63	1,831	3.14	972	3.60	52	1.87	1,952	3.20	479	3.17	812	3.03	156,001	4.27
																Certificate
Certificate: Level, nfd(b)	22	0.23	164	0.28	59	0.22	5	0.18	176	0.29	30	0.20	98	0.37	12,715	0.35
Certificate III & IV	909	9.51	5,689	9.74	3,037	11.24	244	8.79	6,097	10.0	2,005	13.29	3,646	13.59	385,661	10.55
Certificate I & II	93	0.97	625	1.07	315	1.17	17	0.61	671	1.10	173	1.15	320	1.19	53,149	1.45
Not stated(c)	704	7.37	4,654	7.97	2,467	9.13	304	10.95	4,996	8.19	905	6.00	1,827	6.81	305,262	8.35
Not applicable(d)	4,617	48.33	28,509	48.83	12,189	45.12	1,530	55.12	30,539	50.05	6,700	44.40	11,786	43.92	1,604,681	43.90
Total	**6,945**	**72.69**	**45,554**	**78.03**	**20,859**	**77.21**	**2,211**	**79.65**	**48,675**	**79.77**	**11,109**	**73.61**	**20,116**	**74.96**	**2,823,097**	**77.24**
Total population	9,554	100.0	58,382	100.0	27,017	100	2,776	100	61,019	100	15,091	100	26,835	100.0	3,655,139	100.0

Source: 2001 Census, Australian Bureau of Statistics.

2.2. Existing Industries and Labour Force

2.2.1. Labour force characteristics

a) Existing labour force

The 2001 Census shows the Rockhampton labour force at 28,281, 46.35% of the total population. This is comparable with the State proportion of 46.77%. Gladstone recorded a somewhat larger labour force at 49.53% of its population. Overall the region examined has a slightly lower proportion of its population in the workforce when compared to the figures for Queensland.

b) Unemployment

The Rockhampton region registered an unemployment rate of 9.11% for the 2001 Census. This was 0.9% higher than the level for Queensland. Rockhampton city, the largest population centre in the region, had a slightly higher rate (9.3%). Livingstone and Gladstone LGAs were also slightly higher than the state level, while Fitzroy and Calliope LGAs were significantly lower at 7.0% and 7.7% respectively. Mt Morgan's unemployment rate of 23.4% is a significant anomaly.

c) Existing industries and industry sector (Table 2.9)

The structure of industry in the region examined has been significantly influenced by Rockhampton's development as a service centre for the central Queensland area. This is illustrated by the existing sectors of transport and storage, education, retail trade, health and community services. These sectors all show higher employment levels than the corresponding Queensland levels. The retail trade holds particular significance, employing 17.1% of the working population, which equates to more than three times the State level. Manufacturing, wholesale trade and hospitality related services have employment levels similar to those across Queensland. Major industry employment figures for Fitzroy LGA are similar to those for the State, apart from the Agriculture, Forestry and Fisheries sector which accounts for 10.7% of employment in Fitzroy, compared to 4.9% across Queensland. Almost a quarter of employment in Calliope LGA is attributed to the manufacturing industry.

Table 2.9 Employed persons by industry

	Fitzroy LGA		Rockhampton LGA		Livingstone LGA		Mt Morgan LGA		Rockhampton SSD		Calliope LGA		Gladstone LGA		Queensland	
		%		%		%		%		%		%		%		%
Agriculture, Forestry and Fishing	435	10.7	340	1.4	714	7.0	26	4.2	357	1.4	360	5.7	127	1.1	76,532	4.9
Mining	46	1.1	196	0.8	198	1.9	16	2.6	231	0.9	75	1.2	125	1.0	19,286	1.2
Manufacturing	394	9.7	2,374	9.8	832	8.2	52	8.4	2,503	9.7	1,543	24.2	2,229	18.5	167,380	10.7
Electricity, Gas and Water Supply	85	2.1	540	2.2	141	1.4	9	1.5	605	2.4	99	1.6	330	2.7	12,359	0.8
Construction	268	6.6	1,440	5.9	808	7.9	44	7.1	1,564	6.1	562	8.8	1,019	8.5	111,209	7.1
Wholesale Trade	261	6.4	1,388	5.7	414	4.1	22	3.6	1,448	5.6	227	3.6	640	5.3	79,718	5.1
Retail Trade	632	15.5	4,131	17.0	1,407	13.8	76	12.3	4,404	17.1	807	12.7	1,934	16.1	239,615	15.3
Accommodation, Cafes and Restaurants	152	3.7	1,353	5.6	869	8.5	24	3.9	1,408	5.5	338	5.3	543	4.5	88,381	5.6
Transport and Storage	340	8.3	1,566	6.5	450	4.4	38	6.1	1,713	6.7	362	5.7	973	8.1	77,587	4.9
Communication Services	43	1.1	292	1.2	100	1.0	6	1.0	296	1.2	40	0.6	89	0.7	23,016	1.5
Finance and Insurance	53	1.3	572	2.4	195	1.9	0	0	602	2.3	70	1.1	218	1.8	44,562	2.8
Property and Business Services	203	5.0	1,716	7.1	735	7.2	24	3.9	1,764	6.9	491	7.8	1,082	9.0	153,864	9.8
Government Administration and Defence	115	2.8	983	4.0	432	4.2	48	7.8	1,009	3.9	171	2.7	338	2.8	75,048	4.8
Education	300	7.4	2,441	10.1	1,159	11.4	56	9.0	2,567	10.0	462	7.3	863	7.2	118,896	7.6
Health and Community Services	471	11.5	2,781	11.5	952	9.3	118	19.1	3,003	11.7	375	5.9	787	6.5	151,029	9.6
Cultural and Recreational Services	57	1.4	514	2.1	199	2.0	12	1.9	506	2.0	66	1.0	165	1.4	37,341	2.4
Personal and Other Services	140	3.4	1,122	4.6	358	3.5	21	3.4	1,180	4.6	168	2.6	344	2.9	57,662	3.7
Non-classifiable economic units	23	0.6	74	0.3	48	0.5	0	0	80	0.3	31	0.5	71	0.6	7,452	0.5
Not stated	60	1.5	452	1.9	192	1.9	27	4.4	463	1.8	124	1.9	159	1.3	27,927	1.8
Total	**4,078**		**24,275**		**10,203**		**619**		**25,703**		**6,371**		**12,036**		**1,568,864**	

Source: 2001 Census, Australian Bureau of Statistics.

d) Occupation characteristics (Table 2.10)

2001 Census data for the Rockhampton region shows a smaller proportion of occupations to be managers and administrators when compared with the State figures. Intermediate clerical, sales and services workers (18.3%) and labourers and related workers (12.5%) for Rockhampton are higher than the corresponding State proportions, while other categories show similar proportions to the State levels.

When compared to Queensland, Fitzroy LGA shows greater proportions of employment in the categories of managers and administrators, tradespersons and related workers, intermediate production and transport workers, and labourers and related workers. Fitzroy shows a much lower proportion of professionals than the State figures.

Mount Morgan LGA has a relatively higher percentage of labourers at 16.3%, which is 6.6% more than the state average. Calliope and Gladstone LGAs show higher proportions of intermediate production and transport workers when compared to the State levels.

Table 2.10 Occupation of population by region

	Managers and Administrators	%	Professionals	%	Associate professionals	%	Tradespersons and related workers	%	Advanced clerical and service workers	%	Intermediate clerical, sales and service workers	%	Intermediate production and transport workers	%	Elementary clerical, sales and service workers	%	Labourers and related workers	%	Total employed
Fitzroy LGA	473	11.6	393	9.7	370	9.1	608	14.9	109	2.7	661	16.2	441	10.8	380	9.3	556	13.7	**4,071**
Rockhampton LGA	1,157	4.8	3,852	15.9	2,968	12.2	3,183	13.1	685	2.8	4,438	18.3	1,854	7.6	2,632	10.8	3,028	12.5	**24,275**
Livingstone LGA	949	9.3	1,606	15.7	1,281	12.6	1,337	13.1	345	3.4	1,655	16.2	761	7.5	910	8.9	1,148	11.3	**10,198**
Mt Morgan LGA	27	4.4	49	7.9	78	12.6	93	15.0	11	1.8	103	16.7	74	12.0	64	10.4	101	16.3	**618**
Rockhampton SSD	1,169	4.5	3,962	15.4	3,091	12.0	3,468	13.5	725	2.8	4,699	18.3	2,042	7.9	2,802	10.9	3,245	12.6	**25,703**
Calliope LGA	549	8.6	762	12.0	683	10.8	1,120	17.6	173	2.7	752	11.8	1,076	16.9	470	7.4	633	10.0	**6,351**
Gladstone LGA	571	4.7	1,555	12.9	1,397	11.6	2,247	18.7	353	2.9	1,692	14.1	1,806	15.0	1,123	9.3	1,084	9.0	**12,034**
Queensland	133,295	8.5	251,273	16.0	187,910	12.0	200,665	12.8	54,677	3.5	265,751	16.9	133,702	8.5	158,222	10.1	152,773	9.7	**1,568,864**

Source: 2001 Census, Australian Bureau of Statistics.

e) Income (Table 2.11)

The Rockhampton region distribution of weekly income shows a higher than average number of people on very low incomes – especially in the $1-$299 per week groupings. There is also a significant proportion of households in the region with negative or nil income (5.5% compared to the state average of 0.8%).

Calliope and Gladstone LGAs show a higher proportion of households earning between $800 and $1999 per week when compared to the other areas and to the State.

Table 2.11 Weekly household income by household type[1]

	Fitzroy LGA		Rockhampton LGA		Livingstone LGA		Mt Morgan LGA		Rockhampton SSD		Calliope LGA		Gladstone LGA		Queensland	
		%		%		%		%		%		%		%		%
Negative/Nil income	38	1.2	107	0.5	64	0.7	7	0.6	2,605	5.5	31	0.6	42	0.4	9,803	0.8
$1-$199	106	3.3	999	4.8	410	4.7	106	9.5	11228	23.7	135	2.8	328	3.5	49,119	3.9
$200-$299	184	5.8	2,070	9.9	771	8.8	195	17.4	6,930	14.6	289	6.0	678	7.2	99,530	7.8
$300-$399	310	9.7	2,197	10.5	1,022	11.6	213	19.0	4,308	9.1	417	8.6	762	8.1	118,458	9.3
$400-$499	246	7.7	1,637	7.9	733	8.3	121	10.8	4,017	8.5	342	7.0	584	6.2	104,114	8.2
$500-$599	178	5.6	1,267	6.1	511	5.8	78	7.0	3,812	8.0	220	4.5	441	4.7	75,586	5.9
$600-$699	246	7.7	1,408	6.8	633	7.2	61	5.4	2,870	6.0	243	5.0	506	5.4	85,859	6.7
$700-$799	178	5.6	1,104	5.3	409	4.6	50	4.4	2,291	4.8	208	4.3	462	4.9	66,142	5.2
$800-$999	334	10.5	2,079	10.0	769	8.7	66	5.9	2,690	5.7	550	11.3	987	10.5	125,246	9.8
$1,000-$1,199	271	8.5	1,557	7.5	627	7.1	33	2.9	2,547	5.4	488	10.1	1,002	10.6	103,765	8.1
$1,200-$1,499	284	8.9	1,632	7.8	641	7.3	34	3.0			520	10.7	1,029	10.9	104,433	8.2
$1,500-$1,999	213	6.7	1,542	7.4	635	7.2	21	1.9	765	1.6	528	10.9	1,007	10.7	113,215	8.9
$2,000 or more	121	3.8	864	4.1	407	4.6	14	1.2			284	5.8	541	5.7	75,549	5.9
Partial income stated[2]	339	10.7	1,536	7.4	837	9.5	57	5.1			465	9.6	746	7.9	98,368	7.7
All incomes not stated[3]	135	4.2	828	4.0	339	3.8	65	5.8	3,398	7.2	135	2.8	299	3.2	46,233	3.6
Total	**3,183**		**20,827**		**8,808**		**1,121**		**47,461**		**4,855**		**9,414**		**1,275,420**	

Source: 2001 Census, Australian Bureau of Statistics.

[1] Excludes 'Other not classifiable households' and 'Visitor only households'.

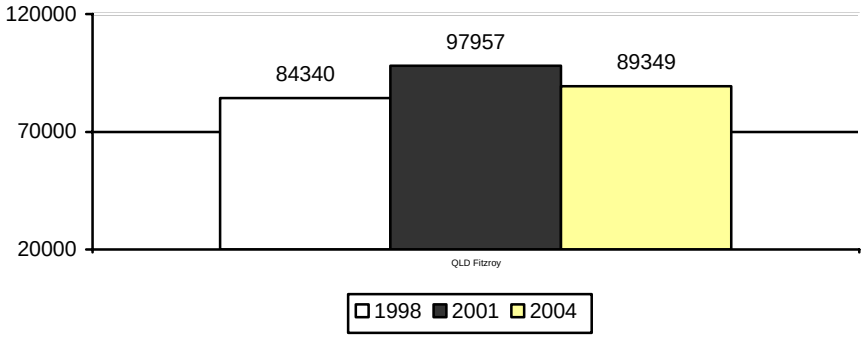
[2] Includes families where at least one, but not all, member(s) aged 15 years and over did not state an income and/or at least one family member aged 15 years and over was temporarily absent.

[3] Includes households where no members present stated an income

2.3. Labour Market Characteristics

This section on the labour market is based on the *State of the Regions Report 2004-5*. The existing local and regional population is classified under the Fitzroy region encompassing major centres such as Rockhampton and Gladstone; and surrounding areas such as Banana, Bauhinia, Calliope, Duaringa, Emerald, Fitzroy, Jericho, Livingstone, Mount Morgan and Peak Downs.

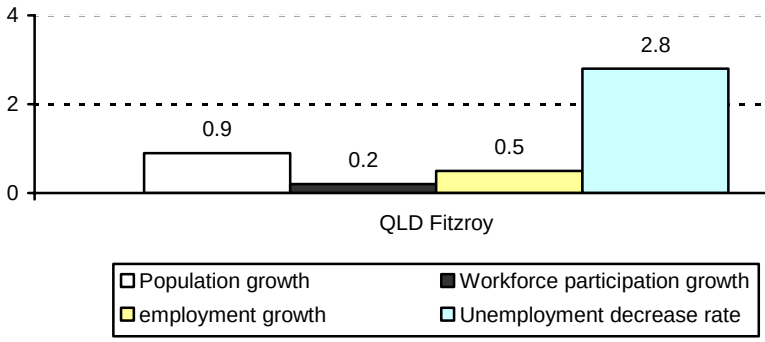
Figure 2.3 Number of persons in employment – Fitzroy



(National Economics, 2005)

As shown in Figure 2.3, employment in the Fitzroy region grew from 1998 to 2001 to 97,957 people employed. But this fell slightly over the three year period to 89,349 people in 2004.

Figure 2.4 Population, employment, workforce participation and unemployment growth rates in Fitzroy 1998-2004



(National Economics, 2005)

Figure 2.4 shows that from 1998 – 2004 the population increased in the Fitzroy region. It is expected that with an increase in population, there will be an increase in employable people. In this case, the population growth rate is higher than the employment growth rate, which in turn is much lower than the rate of decrease in unemployment (Figure 2.4). This suggests that a growing proportion of people are either moving into retirement and/or giving up the search for paid employment.

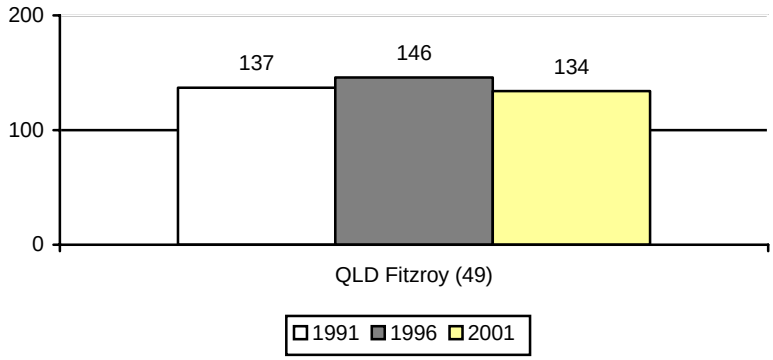
2.3.1. Accessibility to employment

Accessibility indices were derived from the 2001 census. Statistical Local Area (SLA) car driving times were taken from a commercial peak travel time software programme. The time-distance used in the indicators is the quickest of motoring and

public transport options. Indices calculated at the SLA level were averaged to the SOR regions using population or employment weights. Industry corrected factors were scores based on the number of job-locations appropriate to the industry of employment of the resident population accessible from residences.

The accessibility factor with industry corrected factor shows that Fitzroy, along with other regions in Queensland such as Mackay, Wide Bay, and North Queensland, has a reasonably low rating in access to employment. The scores are given out of 1000 and Fitzroy attained less than 150 (Figure 2.5). Fitzroy was ranked 49th out of the 64 regions in Australia.

Figure 2.5 Accessibility to Employment scores for Fitzroy



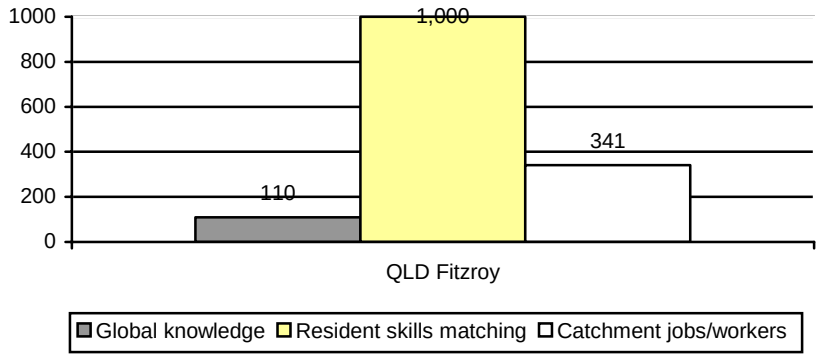
(National Economics, 2005)

The global knowledge factor is based on knowledge-intensive jobs (occupational skills associated with information technology, international business, and innovation in finance, marketing, design and production) accessible from within residences (National Economics, 2005). Each region is given a score out of 1000. Again Fitzroy has a relatively low score of 110 implying that there are fewer knowledge jobs in the region for residents. This is because the Fitzroy region encompasses resource-based, rural and agricultural areas affecting the nature of employment of the population and the use of global knowledge or technology.

The resident skills matching factor is the difference between the skills corrected factor and a similar factor calculated in reverse (number of resident workers with appropriate skills whose residences are accessible within 40 minutes of job locations) (National Economics, 2005). Fitzroy region had the maximum score in this area (Figure 2.6).

Catchment jobs or workers is based on the ratio of the accessibility factor and a similar ratio calculated in reverse i.e. the number of resident workers whose residences are accessible within 40 minutes of job locations (National Economics, 2005). Fitzroy scored 341 out of 1,000 in this area.

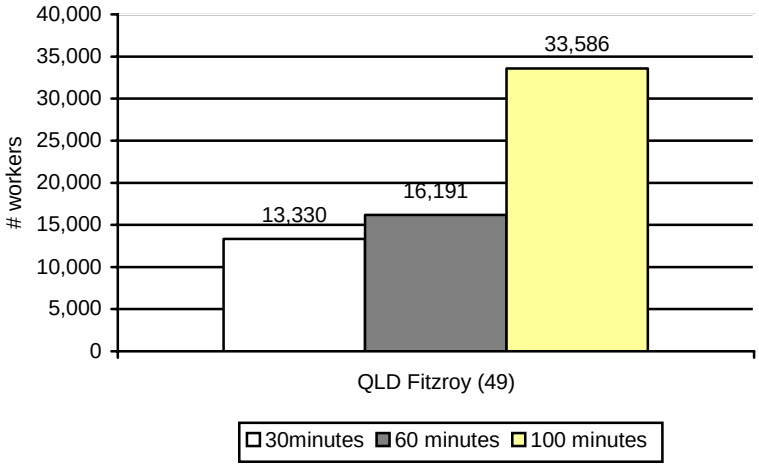
Figure 2.6 Global knowledge, resident skills matching and catchment jobs/workers in Fitzroy



(National Economics, 2005)

The time taken to travel to work was also measured for various regions. In the Fitzroy region, the figures show that there are more jobs necessitating approximately 100 minutes of travel than there are jobs requiring either 30 or 60 minute commuting times (Figure 2.7). This is a reflection of life style choices where many people choose to live at the Capricorn Coast and commute to work.

Figure 2.7 Time taken to travel to work (door to door)



(National Economics, 2005)

The congestion exposure risk factor (measured out of 100) establishes the marginal loss in employment access which is likely to be experienced by residents (National Economics, 2005). As shown in the SOR report (2005), there is a significant decline in the number of people accessing employment beyond a 40 minute travel time. In effect, the 40 minute point represents a serious point of inflection in peoples' behaviour. As congestion increases, and the number of jobs that can be accessed within this 40 minute window falls, the capacity of a local region to remain optimally employed is reduced. The steeper the loss in access that is likely to be experienced by a region, the stronger the congestion exposure risk factor. Therefore a region with a high score is likely to face the steepest relative loss of employment caused by an increase in congestion around the critical 40 minute time point. The Fitzroy region however has a relatively low score at 3 out of a 100. This implies that there is less congestion, as residents are willing to live further away and travel longer distances to

work. In Queensland, West Moreton has the highest congestion risk factor because it is a production zone.

2.3.2. Labour utilisation

The labour utilisation indicator measures how well the region is utilising the total available workforce hours in the region. Due to the increasing casualisation of the workforce, it is important to calculate a measure that takes account of those that work full time, part time and casually. The labour utilisation indicator thus measures the total hours of paid work provided by the population. The potential workforce includes all those between 18 and 60 years old not studying full-time. If every one of these people was to work 37.5 hours per week, this would be a fully utilised workforce. Therefore, the labour utilisation rate is the total hours worked divided by the potential labour force numbers multiplied by 37.5. The labour utilisation indicator can help identify potential pools of under utilised labour. A low rate reflects lower levels of total income and spending within the region which will constrain local economic growth prospects. In contrast to the national average of 59.4%, the labour utilisation is very high for the Fitzroy region[4] at 62.3% and ranked 14th out of 64 in Australia. This indicates that there is limited potential to source additional labour.

2.3.3. Infrastructure

The infrastructure indicator measures the completion rate for commercial infrastructure periods. Commercial infrastructure includes shops, factories, offices, hotels, health and education institutions, entertainment and recreation facilities. This indicator establishes the rate at which the current stock is being replaced, which is a proxy for short term growth expectations. The higher the indicator, the more likely the immediate prospects for employment growth.

The Fitzroy infrastructure value is 0.44 which is below the national average of 1.53; implying that low or insufficient infrastructure is available. Fitzroy is ranked 63rd out of 64 in Australia.

2.3.4. Household prosperity potential

This indicator is a forward looking measure that attempts to gauge an area's economic growth potential based on socio-demographic features. Certain patterns have emerged based on analysing the past fifteen years of income and employment in Australia. These patterns infer that when certain socio-demographic characteristics are in place, particular economic outcomes can be expected. Different features (eg. level of ethnic diversity, income disparity, propensity to spend, skills of workforce, proportion of renters to homeowners, marriage and divorce rates, housing homogeneity, vacant dwelling rate, size of LGA) are likely to produce different outcomes.

These features when presented in differing mixes across a variety of regions, infer differing levels of propensity potential. For example, if a region is endowed with a high propensity to spend, and a skilled and educated workforce, residents are unlikely to face structural barriers to employment and income growth and the prosperity of the local economy will most likely be high. If a particular area is characterised by high levels of ethnic homogeneity, low workforce skills and income disparity, the level of income generation and retained expenditure within the community will most likely be insufficient to support a robust economy. Consequently, the community's prosperity potential, or its future growth outlook will most likely be

[4] This includes Banana, Bauhinia, Calliope, Duaringa, Emerald, Fitzroy, Gladstone, Jericho, Livingstone, Mt Morgan, Peak Downs, Rockhampton

low. As a general rule, areas that encompass a greater degree of diversity, as opposed to ethnic homogeneity, for example, have a greater level of prosperity potential. The level and type of skills within an economy influences employment and income growth prospects, which are key determinants of household growth. Poor workforce skills undermine future household growth by limiting potential for earnings growth. High propensity infers dynamic spending patterns; hence the information will assist in making local decisions for retail outlets.

The household prosperity potential value for Fitzroy region is 72%, which is below the national average of 100%. The region is ranked 41st out of 64 in Australia.

2.3.5. Knowledge intensity

As knowledge intensity of economic activity increases, superior economic outcomes at the regional level are generated. To support knowledge intensive industries, there must be an adequate supply of requisite skills and smooth knowledge flows. A region needs access to certain types of skills in order to support the proliferation of high growth and value adding industries. The number and type of skills available within a region will define a region's capacity to support particular industries and consequently its outlook for economic growth.

The global knowledge flow indicator is the proportion of workers identified as global knowledge flow workers out of the entire workforce. These workers have occupational skills associated with information technology, international business and innovation in finance, design, marketing and production. A high indicator signifies high concentration, that is, a region with a high indicator can be an effective knowledge transfer centre integrated into the global information economy. This indicator shows a region's connectedness to global flows of knowledge and its innovative capacity. Regions with the highest values are best placed to take advantage of global information flows and participate in innovative value creating enterprise networks.

The Fitzroy region is ranked 40th out of 64 in Australia at 6.9% which is lower than the national average of 12.9%.

The knowledge driven growth potential factor measures the ratio of symbolic analysts (occupations that use codified systems to process information used to inform decisions) to routine workers (low skilled occupations). The higher the ratio, the more secure the employment prospects of the workforce and regional growth. Regions that are ranked high for knowledge driven growth potential are best positioned to participate in the 'new economy'. Regions where the requisite skills base and knowledge capacity are in place are more likely to attract industries that will lead to more dynamic economic outcomes.

The Fitzroy region has a knowledge driven growth potential value of 0.45 which is lower than the national average of 0.67. The region is ranked 44th out of 64 regions in Australia.

3. Demographic Impact of the Proposed Project

3.1. Overview

The impact of the project on the population of the local and regional areas, and Queensland as a whole, will depend on a number of factors. In this section, these are discussed in more detail. Changes in population, whether permanent or temporary, are important because they signal both where economic growth is occurring and where social impacts might be expected.

The impacts on population can be characterised in three main ways. The first main distinction is between construction and operating phases, where the former might provide a temporary surge, and the latter a more long term sustainable rise. The second issue to consider is the likely proportion of jobs that will be taken up by local residents as against residents who live outside the area or who move into it. The third issue to consider is the net secondary and flow-on effects, where downstream growth in the economy might generate increased population migration

These issues are discussed in the following sections, together with a summary of the key social impacts that might be expected.

3.2. Construction Phase

During the construction phase of the coke Plant and power Plant, an average workforce of 1180 people is expected to be needed for an eighteen month period. The peak construction workforce for limited periods of time is anticipated to be 1900 people.

There will be some additional construction workforce needed for the building of the rail loops at Stanwell and Gladstone, and for the extension of the port at Fisherman's Landing near Gladstone. Because there are already crews in central Queensland building new railway lines and port additions in Gladstone, it is likely that these constructions can be undertaken with existing labour forces. Consequently, the demographic impacts of the construction of the transport infrastructure is not considered further in this report.

A key issue is the extent to which workers from the local region would be available for construction, and how many workers will need to be sourced from the rest of Queensland or elsewhere. Some of the additional issues to consider are:

- some construction jobs require specialised skills which may not be available locally,
- substantial growth in coal mining in 2004/5 has already generated some skills shortages in the region,
- many potential workers may be reluctant to engage in a short-term project with 18 months or less of work,
- there is a substantial population base in the region, with a declining but still high rate of unemployment,
- the attraction of skilled labour from existing jobs may cause downstream effects on the ability of other businesses to retain and attract skilled labour.

To explore these issues, the average number of construction workers have been identified by broad category, and then compared to the number of skilled workers in Local Government Areas drawn from ABS Census data (Table 3.1).

The results show that the construction stage of the project will require a modest proportion of the local force. The areas where the largest proportion of the available workforce in the Rockhampton Statistical Division would be needed are:

- Tradespersons and related workers (15% of the available workforce)
- Labourers and related workers (11% of the available workforce).

It is very unlikely that the full construction workforce could be supplied from the local region, although there are substantial pools of labour available in the neighbouring local government areas of Gladstone and Calliope (Table 3.1). Given the growth in the coal mining industry in the region, it is likely that a substantial proportion of the construction workforce will need to be imported to the region. Evidence from similar developments in the region (e.g. at Gladstone) suggests that the bulk of a construction workforce tends to come from outside the region. While the local component of the construction workforce could be as high as 40%, there are also arguments that it could be lower, or that the knock-on effects on the labour supply for other industries in the region mean the net increase in jobs is lower.

Table 3.1 Estimate of workforce during the construction stage of the power station

	required		**Available**						
Occupation	**% of total**	**Approx peak**	Fitzroy LGA	Rockhampton LGA	Livingstone LGA	Mt Morgan LGA	Rockhampton SSD	Calliope LGA	Gladstone LGA
Managers and Administrators	**16.9**	**200**	473	1,157	949	27	1,169	549	571
Professionals			393	3,852	1,606	49	3,962	762	1,555
Associate professionals			370	2,968	1,281	78	3,091	683	1,397
Tradespersons and related workers	**43.2**	**510**	608	3,183	1,337	93	3,468	1,120	2,247
Elementary clerical and service workers			109	685	345	11	725	173	353
Intermediate clerical and service workers			661	4,438	1,655	103	4,699	752	1,692
Intermediate Production and Transport workers	**10.2**	**120**	441	1,854	761	74	2,042	1,076	1,806
Labourers and related workers	**29.7**	**350**	556	3,028	1,148	101	3,245	633	1,084
TOTAL	**100**	**1180**	4,071	24,275	10,198	618	25,703	6,351	12,034

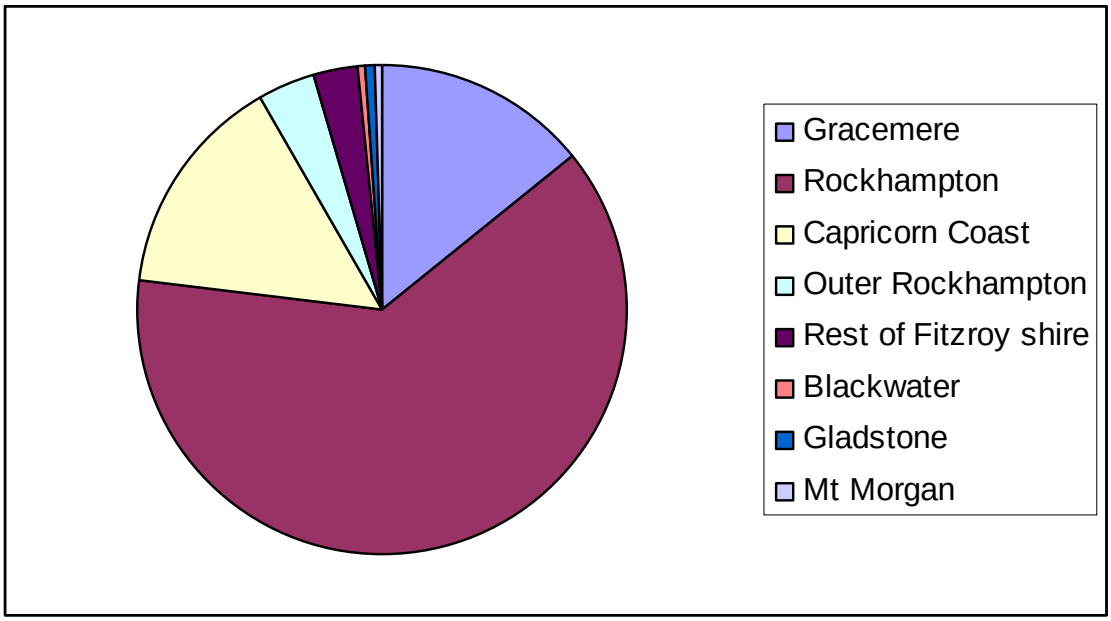
Source: Project proponents and ABS 2001 Census data.

In this report it is assumed that 33% of the construction workforce (400 jobs) will be sourced from the region, while 66% (800 jobs) will be sourced from the rest of Queensland and interstate. The proportion of local involvement may be lower if the labour market remains very tight, but could be higher if the construction period is extended to as much as three years. In either case, the knock-on effects will mean that a large proportion of locals gaining employment will need to be replaced, generating a population influx into the region. Assuming that there would be replacement effects for all workers apart from labourers (see section 6 on employment), the expected number of replacement workers at a 33% local takeup rate would be 277 persons.

The next issue to be considered is where the construction workers might be located, as this has implications for issues such as traffic congestion and adequacy of social services. The location of the project means that local workers from Fitzroy, Rockhampton and Mt Morgan LGAs will be easily able to access the site. Workers from Livingstone, Gladstone and Calliope LGAs will also be able to access the site, but it will not be as practical.

Some guide to location choices can be gained from an analysis of the residential addresses of existing Stanwell employees. These are shown in Figure 3.1 below.

Figure 3.1. Residence location of Stanwell employees in 2005



An analysis of the projected locations of the residential workers has been projected on this basis, and is shown in Table 3.2. A sensitivity analysis is also shown, where estimates for 20% and 40% of local participation in the construction stage are given. (It is also expected that downstream economic impacts will further increase employment and population in the region, and this is discussed in section 9, the economic modelling section).

Table 3.2 Projected residence areas for local population engaged in construction

Town	33% local	20% local	40% local
Gracemere	57	34	68
Rockhampton	251	151	302
Capricorn Coast	59	35	71
Outer Rockhampton	15	9	18
Rest of Fitzroy LGA	11	7	13
Mt Morgan	2	1	3
Rest of regional area	4	2	6
TOTAL	400	240	480

The non-residential construction workers are expected to live in a construction camp at Gracemere. The key advantages of these arrangements are that traffic impacts can be minimised through the use of buses to the worksite, and particular needs of the workers can be addressed with tailored services. The key disadvantage is that a workcamp arrangement tends to limit the economic impact of those workers on the local economy. There will be some direct stimulus for businesses providing food and cleaning services, but most disposable income will flow back to the area of residence.

If the construction period extends beyond two years (e.g. if stage 2 follows stage 1 directly), then a higher proportion of construction workers are expected to settle in the Rockhampton area, which will generate a greater demographic and economic impact.

3.3. Operational Phase

The operational phase of the project will involve increases in long term employment in the coke Plant and power station, as well as flow-on effects into transport, coal production, equipment maintenance and service industries. The key employment effects can be estimated as follows:

- Coke Plant – 63 positions
- Power station – 12 positions
- Railways – approximately 20 positions
- Port – approximately 15 positions.

A total of 250 additional jobs are expected to be created covering the coke Plant, power station, railway operation, port facilities and direct contracts. The breakup of these positions by occupation is outlined in Table 3.3, together with a summary of available skills in the region. The results show that it should be possible to fill positions from the existing labour pool, although the back-fill effects will still see more people moving to the region as additional jobs are created. The net demographic effect will depend on factors such as:

- the strength of the local economy as the Plant moves into operation,
- the strength of the labour market as the Plant moves into operation, and
- the potential of education and training programs to provide the required skills to local workers.

Because there is an existing skills shortage in the region, the direct demographic impacts of the project are expected to be positive. For the purposes of this study, a net demographic impact of 200 workers is adopted. (This allows for 50 labourers and other workers to be employed without backfilling).

Likely areas of residence for the operational workers can also be predicted from the current residence pattern of Stanwell employees (Figure 3.1). This suggests that approximately 60% will locate in Rockhampton, 15% in Gracemere, 15% at the Capricorn Coast and the remainder in the wider region.

There will be longer term demographic impacts resulting from the upstream and downstream economic development. These are outlined in more detail in section 9, the economic modelling section.

Table 3.3 Estimate of workforce during the operations stage of the power station

	required		Available						
Occupation	**% of total workforce**	**Approx peak**	Fitzroy LGA	Rockhampton LGA	Livingstone LGA	Mt Morgan LGA	Rockhampton SSD	Calliope LGA	Gladstone LGA
Managers and Administrators	**1.0**	**3**	473	1,157	949	27	1,169	549	571
Professionals	**10.0**	**25**	393	3,852	1,606	49	3,962	762	1,555
Associate professionals	**10.5**	**26**	370	2,968	1,281	78	3,091	683	1,397
Tradespersons and related workers	**43.0**	**108**	608	3,183	1,337	93	3,468	1,120	2,247
Elementary clerical and service workers	**2.0**	**5**	109	685	345	11	725	173	353
Intermediate clerical and service workers	**1.0**	**3**	661	4,438	1,655	103	4,699	752	1,692
Intermediate Production and Transport workers	**12.0**	**30**	441	1,854	761	74	2,042	1,076	1,806
Labourers and related workers	**20.5**	**50**	556	3,028	1,148	101	3,245	633	1,084
TOTAL	**100**	**250**	4,071	24,275	10,198	618	25,703	6,351	12,034

Source: Project proponents and ABS 2001 Census data.

3.4. Discussion

Impacts of the demographic changes are likely to occur in several ways. Increased people in the region means the potential for more pressure on infrastructure and services, and may change the social fabric of the region in both positive and negative ways. Many of these issues are considered in the following sections, starting with a review of the available infrastructure and services in the region.

There are two key areas where increased demands have the potential to 'ripple' through the rest of the economy. These are in the employment and housing sectors, where current buoyant conditions mean that additional demands may cause strong reactions. These issues are examined separately in subsequent sections.

4. Existing infrastructure and services

Each of the LGAs close to the proposed development site has existing services and infrastructure that may be impacted by the project. This section outlines the range of infrastructure and services that currently exist in those areas.

4.1. Rockhampton LGA

4.1.1. Health and Medical Facilities

The Rockhampton city is well serviced by health and medical facilities with four hospitals within the Rockhampton City area. The Rockhampton Base Hospital is the largest in the central Queensland region providing a range of specialist medical services. There is an additional 85 general practice and 34 specialist medical facilities, 20 dental practitioners, four specialist dental services and six nursing homes within Rockhampton.

4.1.2. Educational Facilities

Rockhampton's educational requirements are well catered for with 22 pre-schools, 27 primary schools and eleven high schools. Tertiary facilities include the Central Queensland Institute of TAFE (CQIT) and Central Queensland University (CQU).

4.1.3. Cultural and Recreational Facilities

The city of Rockhampton is a major regional service centre and possesses a wide array of facilities and services to meet recreational and cultural needs. Recreational and sporting facilities include two Olympic sized swimming pools, a cycling velodrome, water-ski gardens, rowing venues, day and night tennis courts, skating rink, and indoor sports venues. Organised sports include all codes of football, bowls, golf, water skiing, fishing, tennis, soccer, hockey, basketball, cricket and a variety of indoor sports. A race track provides a venue for horse and greyhound racing.

A variety of community facilities exist in the city including libraries, museums, an art gallery, an arts centre, theatre, botanic gardens, zoo, Dreamtime Cultural Centre, service clubs and places of worship.

There is a strong sense of community in the region, illustrated by the number of festivals and community events that take place. These include regional festivals and shows, multicultural events, art shows, musical festivals, regular and special markets and other community events. The success of these events demonstrates the region's commitment to "community" and its recognition of the importance of culture and recreation to a community's wellbeing.

4.1.4. Emergency Services

Emergency services in Rockhampton include: the Queensland Police Service (QPS) with Regional Headquarters (Central Region) and two police stations, a Criminal Investigation Bureau (CIB) and Juvenile Aid Bureau (JAB); Queensland Ambulance Service (QAS) with two ambulance stations in Rockhampton; and Queensland Fire and Rescue Services with two fire stations located in Rockhampton. QAS Central Region provides coverage to the people of the region through permanent and honorary ambulance stations based across the region. QAS Central Region also services the region's industrial sector through commercial arrangements, providing pre-hospital care, and servicing mines and other major industrial sites.

There are rescue helicopters based in Rockhampton and Mackay, and Royal Flying Doctor Service (RFDS) fixed wing aircraft based in Rockhampton. QAS works closely with both of these facilities to provide rescue and emergency services to the region. The Capricorn District Office for Counter Disaster and Rescue Services and the Regional Office for the Department of Emergency Services are both based in Rockhampton.

4.1.5. Community and Welfare Services

Rockhampton has a range of community and welfare services, including child care, community and individual support programs, youth programs and disability programs. The Queensland Department of Communities administers many of these services, as well as licensing private child care providers. Counselling and similar services in Rockhampton are also delivered by a range of private providers.

4.2. Livingstone LGA

4.2.1. Health and Medical Facilities

Yeppoon has both a public (Yeppoon Hospital) and private (Mater Hospital Yeppoon) hospital. The number of persons admitted to Yeppoon Hospital increased 1.0% in 2002-03 from the previous year with an annual average growth rate of 5.1% in the ten year period since 1992-93 (OESR, 2005). Community health services available in Yeppoon include a child health clinic and community nursing services. Health care needs in Livingstone LGA are also serviced by the private sector with general practice facilities and dental practices.

4.2.2. Emergency Services

Police services in the Livingstone LGA are concentrated on the coast with two police stations incorporating a CIB unit and a water division. There are two permanent fire stations, based in Yeppoon and Emu Park, and these are complemented by a number of auxiliary rural fire services. An ambulance service is provided for in Yeppoon. The community of Marlborough at the northern extremity of the LGA has its own police and ambulance service and is serviced by a rural fire brigade.

4.2.3. Educational Facilities

There are thirteen State primary schools across the Livingstone LGA, six of which also offer preschool facilities. This is further complemented by two non-state primary schools both offering preschool facilities. Secondary schooling is provided by one State and two non-state schools, all of which are located in Yeppoon.

4.2.4. Cultural and Recreational Facilities

The Livingstone LGA comprises the communities of Yeppoon, Emu Park, Keppel Sands, Great Keppel Island, Byfield, Cawarral and Malborough. With Yeppoon the major town centre of the Livingstone LGA, the region boasts a full complement of service clubs and organisations including Queensland Country Women's Association (QCWA), Returned Services League (RSL), Lions and Rotary Clubs, sporting organisations as well as the Capricorn Coast Tourist Organisation and the Capricorn Coast Chamber of Commerce. The region also has a number of natural attractions including Great Keppel Island, rainforests at Byfield, caves and wetlands. Other attractions include a crocodile farm, fish farm and Australia's largest coffee Plantation.

Churches of a range of denominations are present across Yeppoon and Emu Park. Multicultural groups and the region's strong ties to the Southsea Islanders are well recognised with representative groups active in the area.

4.2.5. Community and Welfare Services

The Community Development Centre in Yeppoon provides a venue for a range of community services ranging from youth, family and aged support services through to craft and self help courses. Other community health services Include: a child health clinic, community nursing services, counselling services, home and community care co-ordinator, volunteer co-coordinator services and a nursing service. Visiting services include: psychologists, Relationships Australia, Breakeven counsellor, drug and alcohol services, mental health service and child and youth mental health counsellors.

4.3. Fitzroy LGA

For the purposes of this report much of the facilities and services research in the Fitzroy LGA focuses on the township of Gracemere, due to the proximity of this township to the proposed project site.

4.3.1. Health and Medical Facilities

Gracemere, the most populated township of the Fitzroy LGA, is serviced by three general medical practitioners and a nursing home. Public and private hospital facilities are located in Rockhampton.

4.3.2. Emergency Services

Fire and Police services exist in the Gracemere township, while ambulance services are provided for by either Rockhampton or Mount Morgan.

4.3.3. Educational Facilities

Fitzroy LGA has eleven primary schools, with one state and 1 private primary school in situated in Gracemere. Westwood and Stanwell also host state primary schools. Secondary schooling is available in Rockhampton with some schools being serviced by a daily school bus service.

Tertiary education is available in Rockhampton through the CQIT and CQU.

4.3.4. Cultural and Recreational Facilities

Gracemere's recreational needs are met by a wide range of community organizations including Scouts, Lion's Club, music associations, community halls, and a sports complex. Organised sporting activities include an international cart racing track, motor cross, tennis, lawn bowls, croquet, golf, cricket and most codes of football. A number of parks and gardens provide further venues for recreation while Port Alma, at the southern tip of the LGA, provides facilities for recreational boating, fishing, crabbing and other water related activities. The Gracemere Saleyards is the largest in the southern hemisphere and is well renowned for its stud sales, conducting the largest sale of this type in Australia. The LGA's religious needs are well catered for with a multitude of churches of various denominations across the LGA.

4.3.5. Community and Welfare Services

There are three child care centres located in Gracemere. Anglicare CQ, although based in Rockhampton, provides a range of community services in Gracemere. Other community and welfare services are available in Rockhampton.

4.4. Mount Morgan LGA

4.4.1. Health and Medical Facilities

Mount Morgan is serviced by at least one private practice general medical practitioner, a hospital and a Blue Care Nursing Service. The number of persons

admitted to Mount Morgan Hospital increased 37.1% in 2002-03 from the previous year but experienced a ten year annual average decline of 4.4% (OESR, 2005).

4.4.2. Emergency Services

Three emergency services (police, ambulance and fire) are provided for in Mount Morgan.

4.4.3. Educational Facilities

The educational requirements of Mount Morgan's community are met by state primary and secondary schools.

4.4.4. Cultural and Recreational Facilities

Given the historical mining significance of Mount Morgan, the LGA offers a number of tourist attractions that include the original mine site, an historical rail complex, a museum and a number of buildings and structures of historical significance.

The community's recreational needs are met by a sporting complex that offers an outdoor pool and an indoor heated pool with a range of organized associated water sports and a number of other activities. This complex also includes a youth centre that provides a range of activities for young people of all ages. Indoor and outdoor bowls, a golf club and an arts and crafts group further complement the range of recreational activities in Mount Morgan.

Five churches of various denominations service the community of Mount Morgan.

5. Results of Consultation With Community, QCE and Other Relevant Parties

5.1. Community consultations

5.1.1. Methodology

Study type and data collection technique

An exploratory study was conducted in May 2005 involving semi-structured interviews of individuals representing households and local businesses in Stanwell, Kabra and Gracemere. The main aim of this study was to explore the attitudes of residents and business owners/employees toward the proposed coke and energy Plant in Stanwell. Convenience sampling was used as this provides a time and cost effective way of gaining an overview of community perceptions. Specifically, this involved visiting the study sites, approaching relevant businesses and households, and speaking to whomever was available at the time. In the case of businesses, the owner was interviewed wherever possible. However, in a small number of cases where the owner was not present, an employee was interviewed. In the case of private households, the person opening the door or in the yard was interviewed unless they deferred to another household member. Some individuals were interviewed on the street and at the pub/hotel in Kabra. In several cases, a colleague, family member or neighbour also participated in the interview. These were counted as separate interviews in a few cases where the second person stayed during most of the interview and expressed his/her own opinion.

The convenience method cannot be used to generate a proportionally representative sample and therefore cannot be used as a basis to make statistical inferences. The data should be seen as indicative of the range of community perceptions but not

necessarily of how many people hold any particular view. In order to ensure that a good understanding is generated of the spread of community perceptions, the researchers:

- Developed an interview schedule based on open-ended questions that provided respondents maximum opportunity to raise the issues and concerns of most relevance to them; and
- Approached as diverse a range of potential respondents as possible.

Residences in both easily accessible and less accessible areas were approached, as well as houses that looked more and less expensive, better and less well-maintained, obviously occupied and apparently empty, with and without dogs, and so on. The resulting sample size of 57 was large enough to reflect important variations in the population. As can be seen in Table 5.1, most respondents (34) were interviewed at home while 23 people were interviewed at their workplace (take-away store, wholesale trade store, hotel, pharmacy, doctors' practice, police station etc). Most business respondents (18) live in the town where they work, while four people live in Rockhampton and one in Emu Park. In total, 52 residents were interviewed, of whom 18 were interviewed at their workplace/business.

Table 5.1 Number of respondents divided by location and whether they are residing in that location and/or having/working in a business in the same location

Place interview	*Resident*		*Business*		*Total*
	Town	*Acreage*	*Resident*	*Non-resident*	
Gracemere	10	0	13	5	28
Kabra	7	4	3	0	14
Stanwell	8	5	2	0	15
Total	25	9	18	5	57

In Stanwell, twice as many women were interviewed as men. In Kabra, twice the number of men were interviewed compared to women and in Gracemere a few more women than men. Overall there was a male-female ratio of 26:31 or 54.39% women. This is slightly higher than the 51.28% females in Fitzroy LGA (see Table 2.1). This might be the result of the time interviews were conducted, i.e. during the day, resulting in a lower representation of those who worked away from home.

In Fitzroy LGA (see Table 2.6) 3.25% of the population is of Aboriginal origin, but only one of the participants in this part of the study (in Stanwell) was Aboriginal (1.75%). Apart from any potential bias associated with the statistical under-representation of Aborigines it must be recognised that separate consultation processes with Aboriginal people over cultural heritage and/or native title may be necessary.

While respondents were not asked explicitly about their ethnicity or age, the impression of the interviewers was that people born overseas (4.98% of Fitzroy LGA residents (see Table 2.5)) and people under 40 years of age were underrepresented in this sample. The reason could be again that younger people may have been at work when interviews were conducted.

A total of 66 people were asked to participate and 57 agreed, so the non-response rate was 13.64%. In Kabra, one female resident in her thirties did not want to

participate; stating that she did not care whether the proposal goes ahead or not. In Stanwell, one elderly female resident did not want to talk due to the need to care for her sick husband. In Gracemere, seven people refused to participate, with four residents citing a lack of interest and three female business owners/employees who were either too busy or cited a lack of interest. It is unlikely that the modest non-response rate has influenced the results of this study, as most of the people who refused to participate were women (who are already overrepresented in this study) of non-Aboriginal/overseas origin of all ages (so refusal to participate is not the reason for the under-representation of Aborigines, people born overseas and younger people). Further, non-respondents were either neutral or in favour of the establishment of a coke and energy Plant.

5.1.2. Summary of responses

Community values
The most frequently mentioned response to the question about what people valued about the area in which they lived was its quietness/small town feel/peacefulness (mentioned fourteen times). Five respondents valued the scenery/trees/country view the most. One person valued most that housing prices are still lower than in Rockhampton and another person valued most that 'it's a people's place' (not commercial) where the people are proud of their community. The last two respondents were both from Gracemere. The other 36 respondents either did not answer, or were not asked, this question.

Community concerns
The most frequently mentioned issue facing the residents of the area was water, which was mentioned eighteen times (see Table 5.2). Most of the respondents raising these concerns resided in Stanwell and many of them raised the fact that they do not have access to (town) water. Most preferred the idea of free water provided by the power Plant over of council water they would have to pay for. They said that the council is considering whether to provide the people of Stanwell with water or not. A resident of a cluster of houses close to the project site said:

> "There have been arguments between the power station and the residents, both the township and here, about water issues… People have to get water from the creek or buy water, which is very expensive. Once our water tasted very tinny and bad and was tested; they said that only 1% was dust from the power station, the rest was dust from the coal trains. Here there's enough water, but not in the township; some people get water by truck every 6 weeks."

In Gracemere, which has access to town water, most of the respondents who raised water as the most important issue did so in the context of recently introduced water rates.

After water, the most mentioned answer was 'nothing' and 'don't know' (nine times).

The fact that the AMC project didn't come into existence/lost money was mentioned three times.

Highway needed/road safety was mentioned by three residents of Gracemere.

Drought, unemployment and the proposed coke Plant (no benefits for the community) were all mentioned twice, while a proposed church and a proposed quarry were both mentioned once.

Table 5.2 Answers (and frequency) of respondents to the question: What do you think is THE most important issue facing residents of this area?

Location interview	*Water*	*Something else*	*Nothing*	*Don't know*	*No response*	*Total*
Gracemere	6	7	1	2	12	28
Kabra	3	3	3	1	4	14
Stanwell	9	4	2	0	0	15
Total	18	14	6	3	16	57

Community expectations
All respondents believe there will be benefits from this project for the Rockhampton region. Most people think the business people/ workers/ industry/ trades/ services/ producers (e.g. contractors, retail, manufacturing, construction, accommodation) within the region will benefit; this was mentioned 35 times. The respondents thought those people will benefit because of more employment/ business/ income/ industrial corridor/ export/ more staff/ more clients (see also Figure 5.1). Eight people expected that land owners/ house owners will benefit because they expect the value of land to increase/ increase in house prices/ potential for increased return on investment (rental property).

Almost all respondents believe there will be benefits from this project for the local community. Most people stated that workers/ industry/ trades etc. within the local community will benefit because of more jobs/business etc (mentioned 34 times). Thirteen people expected road users/consumers/citizens to benefit because of improved town services (schools, shops, roads, tourism, library, bank, motel, youth drop in centre, improvements in electricity supply, parking places, new/improved bridge; all this predominantly mentioned by respondents from Gracemere). Nine people expected that real estate will benefit. Four people (three from Stanwell and one from Kabra) don't expect any benefits for the local community and one person didn't know.

Most people (26) believe there will be benefits from this project for them and their family, mostly due to more work/income etc (mentioned 20 times) and/or increase in their land/house price (eight times; mainly Kabra respondents) and/or because of the town services (expected supermarket etc; mentioned twice by Gracemere respondents). Twenty people didn't expect any personal benefits from the project and one person didn't know.

None of the respondents believe there will be negative repercussions from this project for the Rockhampton region, but most people (35) think there will be negative repercussions from the project for the local community. They believe that the citizens will be affected by coal fallout/ pollution of drinking water/ loss of trees/ air pollution/ corrosion/ smell (mentioned 21 times) and/or by a busier railway (they will have to wait even longer to pass)/noisy trains/dust from road trains/deterioration of the roads (tyres get punctured) as the roads won't hold that many trucks/hard to get around so many trucks (mentioned twelve times, mainly by Stanwell residents) and/or the many new construction workers who are temporary residents/non-locals, who might bring crime/vandalism/rough element/strange cultures (mentioned eight times; mainly by respondents from Gracemere). Seventeen people believe there won't be any negative repercussions for the local community.

Most respondents (36) believe there won't be negative repercussions from this project for them and their family, but fourteen people were either afraid their health will be negatively affected by an unclean environment because of air/water pollution/they wonder how much water the Plant will use and where the waste water will go to/say that a lot can go wrong (mentioned seven times, mainly in Kabra and Stanwell) and/or think more traffic/trains will affect them personally (four, mentioned only in Kabra and Stanwell) or expect more competition/ more work/ less free-time/ can't get staff (three, all mentioned by business people from Gracemere) and/or were afraid to lose the small country feel/ country life endangered (mentioned three times).

The closer the community to the proposed Plant site, the more people were against the idea of a coke and energy Plant in Stanwell. But overall (including Stanwell) more people were in favour than opposed. In total, 36 respondents were in favour of the project, eight were opposed and thirteen respondents didn't care/were neutral.

As the findings of this consultation are not statistically representative for all towns that would be affected by the project, the data gathered was cross-checked with evidence from the Phillips Group. The Phillips Group keeps a record of the content of emails, phone calls, feedback forms and letters from the general public of the entire Rockhampton region to QC&E, in addition to what individuals of the public contribute to radio programs, face-to-face meetings and public meetings organised by QC&E. The Phillips Group data correlates with the findings presented here. Issues like odour, noise and dust from trains, impacts on tranquillity and health, traffic (roads/coal transport) and water are being brought forward, but are being outnumbered by comments on benefits and positive employment impacts.

It appeared during interviews that most people are easily reassured about environmental issues. When participants mentioned pollution, they often assumed that the government would take care of it. For example, a resident from Stanwell stated that:

> "The power house impacts the environment, so I expect the coke Plant will as well. But I believe that the government will keep an eye on the environmental impacts."

Further, those people who really did worry about health and pollution appeared to adopt a fatalistic attitude; that the development and its consequences will go ahead no matter what they say or do. The following quotes provide an impression of the anticipated negative environmental impacts. According to one Stanwell resident:

> "Most of the times the wind is favourable, but when it's cloudy the emissions keep hanging over Stanwell. I wonder whether it's really harmless and now it's only a power house, so with the coke Plant it might get worse. I have worked in Mount Isa mines; if there were surveys they put down the works so that there were no fumes/dust etc. but when the surveyors were gone they turned up the power again."

Another resident from an acreage in Stanwell:

> "Nobody is happy about the plans but it doesn't affect me negatively, except for onee week per year when there's wind. Properties higher up the hill get a lot of wind, I feel sorry for them; they can't drink their rain water."

Separate residents from Kabra claimed that:

> "Possibly other people are more concerned; here the wind is from a good direction."
>
> "It affects all the roofs, don't know exactly what it is. And our aluminium fly screens are rotting; always had this problem since we live here (13 years). We collect drinking water from the roof, which is sometimes really polluted. We have to clean it once in a while; looks like acid… We get the smoke here, when the power station goes off. The fumes make my wife sick. South-east winds are okay, which occur 70%, 300 days per year, but with other winds you can see the grey haze in the air. I personally think the creeks attract the fumes… Yesterday the power house gave a dreadful smell; we were in Stanwell and I cannot imagine how people can live there… They say they burn the gases, but it has to go somewhere isn't it? No matter how 'low' you burn, there has to be an exhaust somewhere; you can't put everything back into the system…I was a crane driver in several places; they always tell the people that the Plants won't impact, but it always does. It kills the trees and damages the cars."
>
> "I know all kinds of Plants from Victoria, where I grew up. Lots of people died and still die from cancer from all these power Plants… All the other people live here (Kabra) maximum 4-5 years, so they don't know what this area is about. Some people who live here get a ton of coal dust on them when a coal train passes."

When asked about negative repercussions from the project, other residents from Kabra said:

> "Extra traffic and pollution, but there is already pollution; can't drink bore water… Have no tap so have to drink rain (tank) water, which will be affected by the Plant."
>
> "I don't know about the environment; you don't know yet what bad things will come out in the future. Like now what we know about asbestos; before you didn't know… They should ask the coke Plant bosses whether they would like their women and children to live near the Plant. If yes, it can go ahead. If no, then not… I don't think the Plant will go on anyway, because you're too far from everything. I believe that the Rockhampton region will become a military area in the long term."

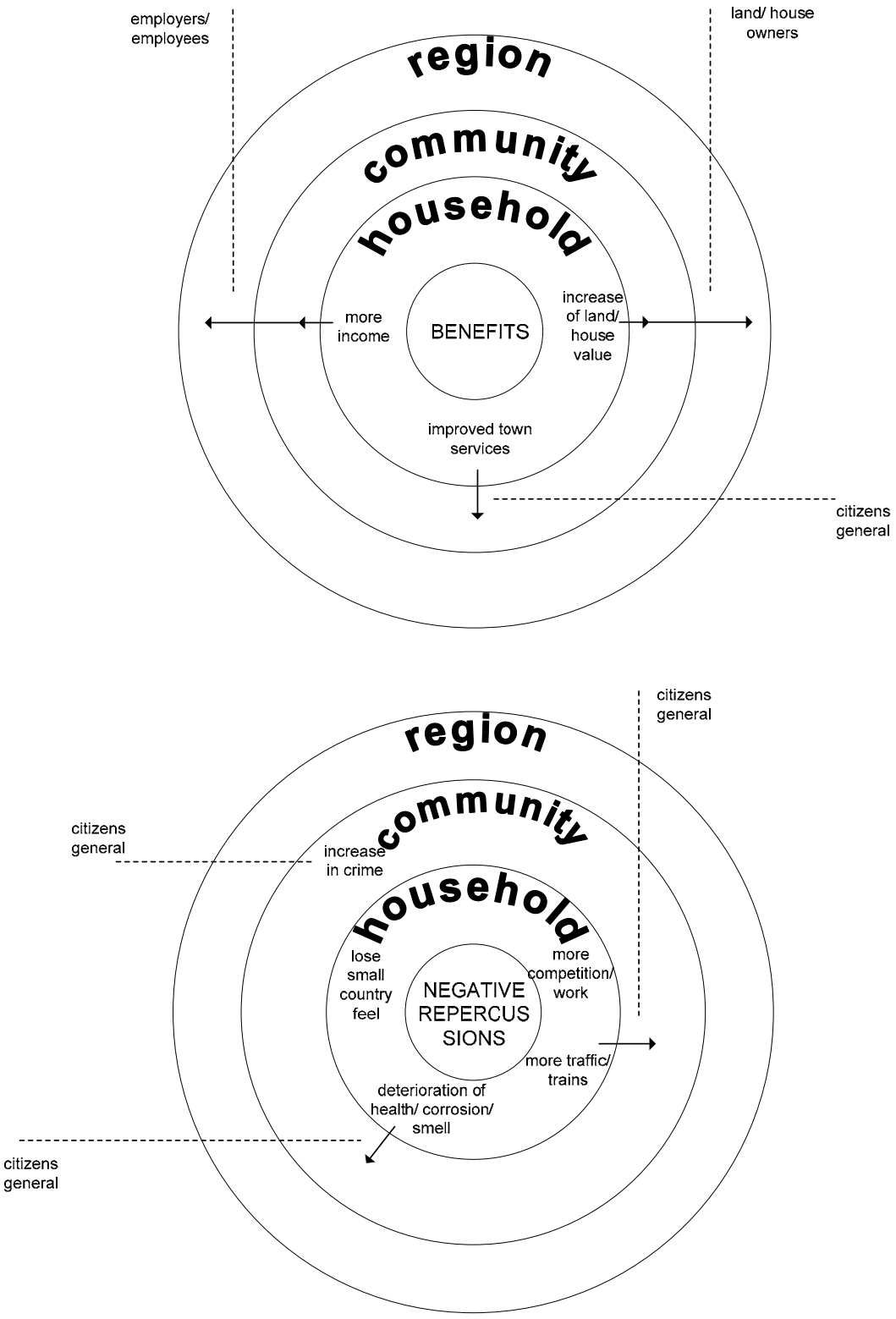
This respondent was very sceptical and believes that this project will end up like the AMC project, so didn't worry about the environment.

The top section of Figure 5.1 shows how respondents believe their own household, their local community and/or the Rockhampton region will benefit from/be affected by the project and who is expected to be (dis) advantaged. All positive aspects (more income, increase of land/house value and improved town services) are not only expected to benefit the respondents and their family, but the wider community as well. Furthermore, the whole region is expected to benefit from two of the three mentioned aspects; more income and an increase in land/house value.

In the bottom section of the Figure 5.1, it can be seen that there are no expected negative repercussions from the project for the Rockhampton region. Contrary to the expected benefits, not all negative outcomes are expected to affect the wider community as well as the personal sphere. So while the respondents expect that

both they and the wider community will be affected by a deterioration of health/corrosion/smell and more traffic/trains, the respondents see losing the small country feel and more competition/work as purely individual matters. On the other hand, an increase in crime was expected to affect the community in general rather than the respondents themselves.

Figure 5.1 Anticipated benefits and negative repercussions of a coke and energy Plant in Stanwell



Community visions about QC&E in comparison with AMC

By far the most people who said something about this topic said that they 'have to see it happening first to believe it', after the AMC experience and/or wonder where the Plant will get its water from, and/or think that the Plant will be too far away from everything in Stanwell, and/or think it will fall through like AMC (mentioned by ten people). Another ten people said that the majority of *other* people are a bit cynical because of the AMC experience, and/or they don't talk much about the coke Plant (contrary to AMC), and/or people (ordinary mums and dads) lost lots of money in the AMC and now wait and see as they are disappointed/broke. A pharmacy worker in Gracemere said:

> "People talked a lot about AMC, but not about this one. They talk more now about a Woolworth's coming to town."

After that, respondents mentioned most that they *do* know about AMC, but didn't make further comments (six times), and that they are concerned about this project as friends and colleagues lost considerable money/superannuation with AMC, and/or were concerned about the environment, as with AMC (mentioned four times). A resident from Gracemere:

> "I see the 'benefits' of this type of project (jobs etc.) like a small compensation for messing up the area."

Several individuals mentioned that they believe more in 'this one' than the AMC (as they're not looking for public investors or because 'Stanwell' is getting bigger all the time, contrary to the AMC) and/or that they never believed in the AMC (mentioned three times) and that they don't want the coke Plant to end up like the AMC/want it to go ahead (three times). Mentioned once were: 'with AMC people weren't employed locally so don't expect this to happen with the coke Plant'/'expect jobs, like with AMC'/'with the AMC the house prices didn't go up just because of the AMC so don't expect this now with QC&E'/'don't know about AMC' and one respondent confused QC&E with AMC.

Community needs

Preservation

Most people (29) didn't want to preserve anything in their area or didn't know, see Table 5.3. The more distant from the proposed Plant site, the less people would like to see something preserved; most people from Gracemere answered this question with 'nothing/don't know'. A resident from Kabra stated: "No preservation; the area can only be improved."

Table 5.3 Answers (and frequency) of respondents to the question: What would you like to see preserved in this area?

Location interview	*Nothing/don't know*	*Bushland/ beaches*	*Tranquillity*	*Fresh air*	*Old settler's property Gracemere*	*No response*	*Total*
Gracemere	18	2	1	1	1	5	28
Kabra	7	3	1	1	0	2	14
Stanwell	4	2	4	2	0	3	15
Total	29	7	6	4	1	10	57

Seven respondents would like to see the countryside/gums/animals/creek beds/bush-land (for horses)/beaches (Yeppoon) preserved. Six people (mainly from Stanwell) would like to see the quietness preserved and four people would like to see the fresh air preserved, while one person in Gracemere would like to see an old settler's property in town preserved.

Improvements in communication

Most people (25) could not recommend any improvements in communication (see Table 5.4). Even opponents of the project/big corporations in general said that the communication is excellent. Nine respondents would like to get more information/updates/follow up over the mail i.e. (news) letter/brochure. One lady in Stanwell said that she missed out on the brochure; the residents receive their mail in the store, but when the brochures run out, other residents don't get them. Interviewers carried brochures which were taken by a majority of respondents who claimed not to have received them by mail (while other people had received two or more). Five people would like QC&E to inform the people about pollution/the environment/the negatives/to be more honest/explain simpler/say exactly what they are going to do. A resident from Kabra stated:

> "We got the brochure and sent it back and got a 'thank you letter' in return from Stanwell, but the text is written way too complicated. Not only for us but for others as well."

Four people would like more media coverage (newspaper, Saturday edition of the Morning Bulletin, local free newspaper, local news channel, and local radio), informing people of project updates, keeping the project in the public eye and keeping the public informed. Three people want more/better advertised meetings. Two people would like QC&E to go around and involve the people (as the letters/meetings aren't in simple words) and one person would like to see a better utilisation of the internet (Rockhampton and Fitzroy Council websites should promote/provide information about the QC&E project in a better way).

Table 5.4 Answers (and frequency) of respondents to the question: Can you recommend any improvements to the communication with QC&E?

Location interview	*No*	*More mail*	*More honest/ explain simpler*	*More media coverage*	*More/ better adver-tised meetings*	*Involve people perso-nally*	*Better utilization of internet*	*No res-ponse*	*Total*
Gracemere	10	3	4	3	2	1	1	4	28
Kabra	7	3	0	1	0	1	0	2	14
Stanwell	8	3	1	0	1	0	0	2	15
Total	25	9	5	4	3	2	1	8	57

5.1.3. Conclusions / recommendations

Conclusions

Figure 5.1 presents the most important factors contributing to both positive and negative attitudes of the community toward the coke and energy project. While by far most respondents are in favour of the project, most benefits are expected to occur on the regional level, followed by the community and only to a lesser extent on a personal level. Negative impacts were reversed, with no respondents expecting negative regional impacts and most expecting negative impacts at the community level (though to a lesser extent in the personal sphere).

After the white elephant of the AMC development, many respondents do not believe a coke and energy Plant will be established in Stanwell. This could be a coping mechanism, as many people lost money due to the collapse of the AMC project. Of those people who did have confidence in QC&E, many hoped to get a job with the company and be able to get the invested money back. For the community in general, jobs outweigh pollution concerns and those people who are opposed are not taking proactive measures to express their opposition. Opponents of the project might however come out of their shell when they realise the coke and energy project

in Stanwell *will* go ahead. The water worries (absence of town water, high rates and pollution of ground water, rain and drinking water collected in tanks) are not, for most part, directly related to QC&E. However, some recognition and consideration of these concerns may be useful in dealing positively with local communities.

Recommendations
The provision of town water, sealing roads, fencing off the railway from houses and covering coal wagons are measures that would go a long way in promoting positive local responses to the proposed coke and energy Plant. Two residents of Stanwell told us happily stated that the Plant proponent has already helped raise funds to provide water to the school. Besides gaining local support, fixing things for the community will also give a clear sign that this is not another 'white' elephant project. On the other hand, this would be the moment to expect resistance from people who worry about pollution, their health and the environment. It might be important to elaborate on the exact environmental impacts of the coke and energy Plant in local media and other avenues.

Finally, it must be recognised that while this consultation exercise has provided a useful overview of community perceptions it is not sufficient to develop a long-term productive relationship with local communities. Additional strategies for consultation and engagement are needed to ensure two-way communication with those communities through the construction and operational phases of the Plant and to monitor social impacts and mitigation strategies over time.

5.2. Consultation with QCE

The regional community was provided with a number of contact sources to request further information or provide feedback relative to the preposed project. Table 5.5 outlines these contact methods and the percentage of total contacts for each method.

Table 5.5: Methods of Public Contact

Contact Method	Percentage of Total
Email	8%
Enquiry Line	21%
Feedback Form	36%
Face to Face Meetings	1.5%
Letter	0.5%
Media	1%
Public Meeting	32%
Total	100%

Public enquiries from all contact methods listed in table 5.5 have further been categorised, dependent upon the nature of the enquiry, into the classifications listed in Table 5.6. Enquiries that did could not be effectively categorised under a specific sub heading were classified under the sub heading "Other".

Table 5.6: Nature of Enquiry

Classification	Percent of Total
Employment	25.6%
Benefits	23.7%
Other	18%
Air emissions-odour/dust	10.9%
Water	4.7%
Housing	3.8%

Trains	3.8%
Supply	1.9%
Infrastructure/Services	1.9%
Social Amenity	1.9%
Noise	1.9%
Funding	0.95%
Traffic	0.95%
Total	100%

Employment
Of all enquiries, 25.6 % were employment related with 69% of these relating directly to either individual seeking employment or businesses offering or enquiring to prospective provision of services. Some 6% of further employment related enquiries demonstrated concern over the lack of skilled labour within the region and the potential for the project to exacerbate this problem. The remainder of contact relative to employment issues were generally indicating support for the project based on the provision of ensuing employment opportunities.

Benefits
Queries relative to perceived potential benefits of the project accounted for 23.7% of all contact. Some 94% of these expressed general support for the project and a perception that it (the project) will bring many benefits to the region. A further 3% of contacts under this classification queried perceived flow-on community and business benefits. The remaining 3% of enquiries related to investment opportunities.

Other
Enquiries that could not be satisfactorily be categorised under other classifications were listed as *"Other"* and comprised some 18% of total contact enquiries. Of these enquiries, 58% were of a technical nature relating to site selection through to product handling and process technology. Queries relative to the EIS accounted for a further 20% of the "Other" classification and were mostly concerned with the potential to fast track the EIS process. General project information requests accounted for a further19% with the remaining 3% of contact were expressing general support for the project.

Air Emissions/odour, dust
Enquiries regarding air emissions accounted for 10.9% of total enquiries. Of these some 48% specifically sought information regarding the potential for emissions, the chemical nature of potential emissions and technology used to abate same. A further 30% expressed concern for any potential emissions and the consequential impacts that may result on the region. Some 17% expressed an opposition to the project based on perceived potential emissions and consequential environmental/community harm. Another 4% expressed support for the project.

Water
Water related queries accounted for some 4.7% of total enquires. Some 50% of these questioned the source and availability of water supply for the projects requirements. 20% queried the state of any discharge water and the point of discharge. A further 10% of enquiry related to project water requirements and potential impact of environmental flows to the Fitzroy River. Another 10% raised comments of regarding the lack of town water in the Stanwell township with the remaining 10% suggesting potential for alternative water supply.

Housing
Enquiries relative to housing accounted for 3.8% of all enquiries. 38% of these questioned the possibility of the construction of a workers camp and potential location of such a camp. Another 38% were enquiries of a general nature and a further 24% expressed a potential interest in providing accommodation or land.

Trains
Enquiries relative to trains accounted for 3.8% of all enquiries. 50% of these were specifically related to the location of the rail spur. A further 25% of enquiries expressed concern over a potential increase in dust. The remaining 25% of enquiries were of a more technical nature.

Supply
Enquiries relative to supply accounted for 1.9% of total enquiries. There were limited enquiries relative to supply. 75% of these concerned the potential sourcing and supply of labour and materials for the project and use of product. The remaining 25% involved queries of a technical nature.

Infrastructure/Services
Enquiries relative to supply accounted for 1.9% of total enquiries. There were limited enquiries relative to infrastructure and services. Queries ranged from local governments capacity to provide sufficient infrastructure and services through to potential contract opportunities.

Social Amenity
Enquiries relative to social amenity accounted for 1.9% of total enquiries. There were limited enquiries relative to social amenity. General comments expressed concern for potential health implications of potential pollution from the coke Plant.

Noise
Enquiries relative to supply accounted for 1.9% of total enquiries. There were limited enquiries relative to noise issues. General interest was expressed regarding the degree of noise to come from the operation of the Plant as well as increased noise from increased rail use.

Funding
Accounting for only 0.95% of total enquiries, questions raised included QCE's ability to fund the project while another questioned correlations between AMC shares and this project.

Traffic
Accounting for only 0.95% of total enquiries, issues raised include coal transportation and road degradation.

5.3. Review of responses by agencies and other service providers

5.3.1. Methodology

While the majority of government and community facilities and services in the area of the proposed site are provided by Rockhampton city, the major urban centre local to the site, the surrounding Local Government Areas (LGAs) also service the region. Government and community facility and service providers within the Rockhampton, Fitzroy, Mt Morgan and Livingstone LGAs were approached to establish the capacity in the region to manage the population increase predicted as a result of the project. Gladstone and Calliope LGAs were approached because of these regions' previous experience with industrial growth, and to assess the impact the increased port activity resulting from the project may have on the Gladstone and Calliope region.

Information regarding the possible impact of the project on service provision was gathered via interviews with representatives from government agencies, community service providers and other service and facility providers. Information was gathered regarding the impact of the influx of workers during the construction phase and during operation, the impact of any work camps set up for construction workers, and the impact workers with families moving to the region may have on service provision. Information was offered by interviewees on other possible impacts, including traffic, housing and the effect on lower socio-economic groups. Interviewees were

also asked whether the current mining boom and the cumulative affect of that and other projects had impacted their operation, and whether the failed AMC project had yielded any lessons.

5.3.2. Health and Medical Facilities

The level of health services and infrastructure has been outlined for the different shires in section 4. The combined responses show that there are seven hospitals, approximately 105 general medical practitioners, 35 specialist medical practitioners and a range of dentistry, nursing and allied health services in the region. A core of health infrastructure is provided by the Rockhampton Base Hospital. Discussions with the Health Department indicated that the planning program for health is moving towards a more regionally focused model, where continuing development of the Rockhampton Base Hospital and associated medical services will provide a core of facilities and services in the region. The Queensland Government has announced a major upgrade of emergency service facilities at the Base Hospital, so that the facility has more capacity and integrity as a standalone facility. These factors suggest that there is a core level of health facilities available, and that there is potential for facilities and services to expand in line with population increase.

It was also suggested that additional health workers and professionals may relocate to the Rockhampton region as partners of employees for the coke and power plants. This may help to provide skilled labour in the health area.

5.3.3. Emergency Services Facilities

As outlined in Section 4, the Rockhampton region is well serviced by emergency services, although the site in Stanwell is approximately 30 kilometres from the major emergency services centre in North Rockhampton. Police stations situated close to the project site are located in Gracemere and Rockhampton. Ambulance and fire services that service the location of the site are in Rockhampton.

In the case of an emergency, the services in Rockhampton and Gracemere will respond. The expectation is that there will be on-site facilities as part of the project's workplace safety and risk management strategies, or that arrangements will be in place to share the facilities and services already in place at the Stanwell Power Station.

It is assumed that QCE/Stanwell, in conjunction with the relevant legislative bodies, will develop appropriate emergency response plans that include staff training and regular inspections to ensure the maintenance of plans and equipment.

5.3.4. Education Facilities

Only one school in the Rockhampton, Gracemere and Livingstone LGA areas are at capacity. Problems coping with any potential influx will only arise if the entire group of workers and their families are housed in the same area. Impacts are more likely to be felt from the increased mobility of lower socio-economic groups that may be displaced due to rises in home rental prices. Schools see the effects of this, with students in these situations coming to school hungry, unable to afford to pay for books, excursions etc, and exhibiting symptoms of increased stress at home.

Another issue of concern for schools is the location of any workers camp. The AMC project proposed a camp for an area that was very close to a school, which had the potential to create problems. A different proposal for the QCE project means any workers' camp will be located away from schools.

5.3.5. Cultural and Recreation Facilities

As reported in section 4, the Rockhampton region is well serviced by sporting clubs, organisations and facilities. It is not anticipated that the influx of population due to the proposed project will have an adverse impact on sport and recreation facilities in the region (McCosker, S pers comm., 2005; Rose, K, pers comm., 2005). It is anticipated that families settling in Gracemere will continue to travel to Rockhampton for children's sporting activities, as does the current population. However, there is some suggestion that there may need to be changes made in the operation of some facilities to accommodate the working hours of workers, should shift work arrangements be implemented.

5.3.6. Community and Welfare Services

The welfare of families moving to the region for work was raised by a number of interviewees. Issues discussed include the isolation of families moving to a new area, access to counselling services that are already stretched, and the need to focus services to the area where families will be living, rather than where the income earner is working. For example, if families moving to the region for work will be living on the Capricorn Coast, the focus of services cannot be on Fitzroy, the proposed project site.

There is concern that low income families within the region may become displaced if the development causes rent and house prices to increase. Many low income families, such as those on disability support and people with mental health issues, will need to relocate if rentals are too high. If they move to a low rental region that can't provide the services needed to support them, the situation will become more complex.

One suggestion made to ensure that employees of the project will have access to support services such as counselling, without placing undue pressure on the public service providers, was to set up an employee assistance plan. This involves the company working directly with a service provider to make certain that workers have access to services.

5.3.7. Transport

Transport infrastructure with the potential to be affected by this project include rail access to the Stanwell site, rail access to the new port facility at Fisherman's Landing, and trucking of materials to the site during the construction phase.

Discussion with Queensland Rail (QR) indicated that, if QR had 24 hour access to the site during the construction phase, and if the proponent did not require all materials to be delivered simultaneously, there would be few problems moving containerised freight from the delivery point in Rockhampton to the project site. The containers would need to be trucked into the site as the current rail loop runs in the wrong direction.

Further discussion with QR indicated that there may be a need for additional rolling stock to accommodate the additional load, both for the supply of coking coal to the site (it is assumed this will be coming from the Bowen Basin) and for hauling the end product to the port. For example, an additional three million tons of freight additional to what is currently being handled would require two new trains. It is not anticipated that this would trigger the need for new workshops, new maintenance programs or additional maintenance staff.

Discussion with both QR and Queensland Transport indicated that there was not expected to be an increase in risk of collisions or derailments. QR does not anticipate that the additional tonnage will change the risk profile (Hooker, B pers comm., 2005). Queensland Transport indicated that QR has one of the best safety records in Australia, with fewer incidents than other states (Bourne, A pers comm., 2005) and does not expect this to change.

An area of concern for Queensland Transport stem from level crossings and the increase of trucks on the road. Current statistics (Qld Transport, 2005) put traffic movements at approximately 2,200 per day of which 500 are trucks. Capacity is 20,000 traffic movements, indicating that while there may be additional pressure on road safety, it will not be at unmanageable levels. QR indicated that if coking coal was to be sourced from a region other than Central Queensland (e.g. if it needed to be brought in from the north) there could be problems.

Transport infrastructure and issues were raised in some form during each of the Interviews with the LGAs. Most indicated that if the coal and coke needed to be transported by road rather than rail, problems would arise. Other comments included:

- Gladstone City Council doesn't anticipate any problems with traffic at the port development;
- Rockhampton City Council sees a need to convert the Rockhampton to Gracemere road to a dual carriage way to deal with increased traffic;
- Fitzroy Shire Council believes that the highway can cope with the extra traffic.
- Mt Morgan Shire Council indicated that if there were 30-40 people travelling to Stanwell per day, they would investigate public transport issues.
- Livingstone Shire Council believes that any growth will impact what is already limited public transport in the region.

Fitzroy and Mt Morgan Shires both indicated that bussing in workers would reduce the impact on traffic. This strategy was used during the construction of the current Stanwell Power Station, and has continued in the operation phase. The "Razorback" route between Mt Morgan and Stanwell was upgraded in anticipation of the AMC development, and provides reduced travel time to Mt Morgan residents travelling to Stanwell.

Traffic issues were also raised during other interviews in relation to proximity of schools to the routes that are likely to be used to access the site (e.g. Westwood). Interviewees indicated that communication with the schools and a process for raising awareness of the issue amongst parents, teachers and students would be advisable. Others voiced concern of the pressure increased population would put on roads in and around residential areas, and on both routes to the Capricorn Coast.

5.3.8. Lessons from other major projects e.g. AMC

While most interviewees indicated that the AMC outcome was disappointing, few indicated that they would make many changes to the way the project was handled. A number of people expressed the opinion that a project needing such a large injection of funding from the State government could not be expected to succeed. Others suggested that the region would be better served if the State government committed to supporting local small and medium businesses, for example, helping with "clustering" arrangements, and even insisting that the project developer break down tenders into smaller parts to allow regional businesses the opportunity to provide services to the project. Provision of legal advice and training in responding to tenders were also suggested as areas in which the State government could provide support to the region in relation to the project. A number of interviewees expressed concern that "locals got burned" during the AMC project, and that some of the above suggestions could help to ensure that this did not re-occur.

The Gladstone region has experienced a great deal of industrial growth in the last few decades, and with that has come accelerated population growth. Some of the lessons that interviewees in Gladstone suggested that the Rockhampton region take from their experiences include anticipating and planning for the impact on the lower socio-economic group, especially housing, and managing community expectations via communication and community consultation.

5.4. Summary of projected social impacts from interview processes

5.4.1. Employment

Consultation with a number of employment agencies within Rockhampton revealed that at present, the strength in the Rockhampton labour market lies within the unskilled labour sector. Where demand for labouring type positions is generally being met, there is a distinct lack of semi-skilled and skilled labour such as qualified truck drivers and trades persons. This localised skill shortage can largely be attributed to the high salaries and working conditions offered as attraction and retention incentives by mining companies as a result of recent growth in this sector. This growth in the mining sector has contributed to a steady defection of qualified trade staff from the region over the past twelve months. Since local industry is generally unable to compete with these enhanced employment conditions, localised wage rates have thus far remained relatively unaffected. While it is considered the construction phase of the proposed project may provide some employment to the local unskilled market, there is some perception that the operational phase may present greater opportunity for both the local unskilled and skilled labour market. It can further be anticipated that this will increase the drain of local skilled personnel through the attraction of local tradespersons. There is some suggestion that the industry with the greatest potential to lose unskilled/semi-skilled employees to the proposed project will be the meat processing factories.

Consultation with the regional training body confirmed observations of a regional skill shortage of trades persons and further suggested declining numbers of support service personnel. It is envisaged that the majority of personnel required for the construction phase of the project would be sourced externally to the region. However, it was anticipated that staffing requirements for the operational phase of the project would provide the greatest opportunity for local employment seekers and consequently training services. This consultation further indicated that existing training infrastructure and services had the capacity to meet training requirements. There was some suggestion that greater collaboration between industry and training providers would be beneficial; in particular the identification of predicted skill set requirements would enhance the ability of training providers to meet requirements in a timely manner.

Further discussion of the impact on employment and related issues can be found in Section 6 of this report.

5.4.2. Housing

The majority of those interviewed believe that housing will be impacted by the project. While some local authorities indicated that there is more than enough land available for people moving to the area to build homes, there is a shortage of available rental properties.

Some interviewees expressed concern for lower socio-economic groups, currently living in lower priced private rentals. A possible impact of population growth due to the project is an increase in rental prices as the rental market tightens further, resulting in low income families being forced out of the private rental market. This would be compounded by both the shortage of public housing and the fact that, when rental markets have tightened in other central Queensland communities, this group has gravitated to Rockhampton because of its low rent housing availability – there is nowhere else in central Queensland with the capacity to absorb this group.

Some interviewees raised the possibility of investors building houses specifically for the rental market. Others cautioned against this as being too much of a risk. In particular, interviewees from Gladstone did not believe that this would provide a solution. They cited the instance of the recently completed Comalco expansion, where investors built houses for the higher end rental

market, to cater for the high income workers involved in the Comalco project. A large number of these rental houses are now empty, and investors are not seeing the returns that they expected.

Further discussion of the impact on housing issues can be found in Section 7 of this report.

5.4.3. Work camps

The issue of work camps for the construction force, the majority of which is expected to be imported (fly-in, fly-out) was mentioned by many interviewees as needing careful consideration. The location of the camp was given some attention, as a result of the unsatisfactory location of the camp for the unsuccessful AMC project. The availability of out of work hours recreational services (for example access to sporting facilities such as gyms and swimming pools) was suggested by a couple of interviewees as important in assuring that the people in the work camp were catered for, especially if there is shift work involved.

It was suggested that community expectations need to be managed with regard to the level of participation that the camp dwellers were likely to have within the community. For example, that it is unlikely that they would be interested in joining a local sporting club and coaching or refereeing local games. Interviewees believe that community participation by the project workforce is more likely to occur with the long-term employees; in particular, those in the operation stage workforce, or those with families.

5.4.4. Water

The supply of water to the new Plant site will be governed by the current framework for water supply and infrastructure planning. The Fitzroy Basin Water Resource Plan (WRP), affected under the *Water Act 2000*, established the framework for sustainable water resource management in the basin, consistent with the principles of ecological sustainable development. The plan establishes the levels of water that might be taken for consumptive purposes in the basin, while the Fitzroy Basin Resources Operations Plan (Fitzroy ROP) sets out the guidelines for water use that will achieve aquatic ecosystem sustainability.

As well as the regulatory framework, there are two planning frameworks that address water supply issues. A study led by the Queensland Department of State Development and Innovation (DSDI), the *Fitzroy Industry and Infrastructure Study*, assesses and identifies major industry development opportunities and requirements within the Rockhampton City, Fitzroy and Livingstone Local Government Areas. The objective of the study was to provide an Action/Sequencing Plan incorporating timing and triggers for industry development, infrastructure provision and investment attraction.

The *Central Queensland Regional Growth Management Framework* (CQ-RGMF) is a regional planning project that covers a wide range of topics relating to resource use, conservation, management and development. An integral component of the CQ-RGMF is the *Central Queensland Water Supply Study* (CQWSS). The CQWSS, initiated in 2003, aims to provide a long-term whole-of-region strategy for managing the regions' water resources to best meet future urban, industrial, mining and agricultural water needs. Led by NRM, the strategy will aim to achieve optimum outcomes in environmental, social and economic terms. Once finalised, the strategic plan should provide the basis for water resource management and infrastructure planning within the region for the next ten to twenty years. It should anticipate potential water requirements during this period and provide the preferred scenarios for responding at the regional level. In addition to the strategic plan the study should provide a guide for use in progressing preferred infrastructure development proposals identified as part of a regional planning study.

The main focus of the study is:

- Identification of the short, medium and long-term water supply aspirations and economic justification of water needs for the relevant urban, rural and industrial communities;
- Environmental, economic and social assessment of practical options/proposals to meet sustainable water supply needs including; trading, demand management practices, efficiency gains, water reuse, substitution, desalination, and new infrastructure development;
- Development of an integrated regional water supply strategy to optimise use of the available resources.

It is expected that any supplies of water provided to the new Plant will be consistent with these regulatory and planning frameworks.

5.4.5. Transport

Transport infrastructure with the potential to be affected by this project includes rail access to the Stanwell site, rail access to the new port facility at Fisherman's Landing, and trucking of materials to the site during the construction phase. There is also some potential for the increased traffic to impact on local and regional residents.

Discussion with Queensland Rail (QR) indicated that, if QR had 24 hour access to the site during the construction phase, and if the proponent did not require all materials to be delivered simultaneously, there would be few problems moving containerised freight from the delivery point in Rockhampton to the project site. The containers would need to be trucked into the site as the current rail loop runs in the wrong direction.

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Traffic issues were also raised during other interviews in relation to proximity of schools to the routes that are likely to be used to access the site (e.g. Westwood). Interviewees indicated that communication with the schools and a process for raising awareness of the issue amongst parents, teachers and students would be advisable. Others voiced concern about the pressure increased population will put on roads in and around residential areas, and on both routes to the Capricorn Coast.

6. Workforce training/employment impacts

6.1. Skill shortages

A significant skill shortage has already been identified as an existing issue for the region. This is largely attributed to the increase in mining activity in the Bowen Basin. The proponent has indicated a potential to recruit up to 40% of its staffing requirements through local sources. It is likely, however, that this may only be achieved by paying higher wages and attracting workers from existing jobs. A flow-on effect is that the Plant construction and development may increase local wage levels and exacerbate existing skill shortages.

Table 6.1 illustrates the number of unemployed and the unemployment rate for the previous twelve months to the March quarter 2005 across the four LGAs in the study region (DEWR, 2005). As is evidenced in Table 6.1 an increase in the labour force across three of the four LGAs has been met with a corresponding decrease in the unemployment rate. A decreasing unemployment rate is indicative of a tightening labour market and is consistent with the shortage of skilled labour that presently exists in the region.

Table 6.1 Number of Unemployed and Unemployment rates, (Unsmoothed data)

Statistical Area	Unemployment			Unemployment Rate (%)			Labour Force		
	Census 2001	March 2004	March 2005	Census 2001	March 2004	March 2005	Census 2001	March 2004	March 2005
Rockhampton (C)	2,477	2,876	2,185	9.3	9.4	6.7	26,754	30,676	32,536
Livingstone (S)	955	1,171	844	8.6	9.1	6.2	11,149	12,862	13,642
Fitzroy (S) Part A Part B	304	106 130	73 91	7.0	4.6 4.5	3.0 3.0	4,370	2,306 2,904	2,445 3,080
Mt Morgan (S)	185	218	251	23.4	22.4	24.3	800	975	1034

Source: DEWR, 2005

At the time of the 2001 Census, intermediate clerical, sales and service workers was the occupation with the largest number of employed persons in the Fitzroy (S), Livingstone (S), Mount Morgan (S) and Rockhampton (C) region (6,857 persons or 17.5% of employed persons). Other occupations with relatively large numbers of employed persons included professionals (5,900 persons or 15.1%), tradespersons and related workers (5,221 persons or 13.3%) and labourers and related workers (4,833 persons or 12.3%). The highest degree of specialisation in the region occurred in the labourers and related workers and tradespersons and related workers occupations. Of persons employed in the Fitzroy (S), Livingstone (S), Mount Morgan (S) and Rockhampton (C) region, 12.3% were employed in the labourers and related workers occupation compared with 9.7% for Queensland. The proportion of persons employed in the tradespersons and related workers occupation was 13.3% while the proportion for Queensland was 12.8%.

Table 6.2 Employed Persons by Occupation Fitzroy (S), Livingstone (S), Mount Morgan (S), Rockhampton (C) region and Queensland, 2001 (a).

Occupation	Region	Queensland	Specialisation Ratio (b)

	Number	%	Number	%	
Managers & Administrators	2,606	6.7	133,295	8.5	0.8
Professionals	5,900	15.1	251,273	16.0	0.9
Associate Professionals	4,697	12.0	187,910	12.0	1.0
Tradespersons and associated workers	5,221	13.3	200,665	12.8	1.0
Advanced clerical and service workers	1,150	2.9	54,677	3.5	0.8
Intermediate clerical, sales and service workers	6,857	17.5	265,751	16.9	1.0
Intermediate production and transport workers	3,130	8.0	133,702	8.5	0.9
Elementary clerical, sales and service workers	3,986	10.2	158,222	10.1	1.0
Labourers and related workers	4,833	12.3	152,773	9.7	1.3
Inadequately described	252	0.6	11,385	0.7	0.9
Not stated	530	1.4	19,211	1.2	1.1

(a) Based on place of enumeration data.
(b) Ratio of the percentage employed in the Fitzroy (S), Livingstone (S), Mount Morgan (S), Rockhampton (C) region to the percentage employed in Queensland.
Source: OESR, 2005

As Table 6.3 illustrates, the occupational groups projected by the proponent to be required during the construction phase of the proposed project are tradesperson bricklayers, engineers, managers, foremen and office staff followed by trade assistants/labourers, Plant/crane operators and skilled metal trade workers. Details of the specific occupations that make up these summary figures are listed in Table 6.3. If 40% of workers are sourced locally, and assuming even spread across all categories, this would equate to approximately 292 tradespersons, 100 labourers and 80 managers and other skilled staff. This equates to approximately 5.6%, 2% and 1% respectively of the relevant labour pool categories in this region.

Table 6.3 Project Construction Phase Employment

Occupation	% of total	Approx peak	40% sourced locally
Bricklayers – tradespersons	16.9	200	80
Plant/ crane operators	10.2	120	48
Carpenters	4.2	50	20
Concrete workers/ steel fixers	8.5	100	40
Electricians – tradespersons	4.2	50	20
Instrument tradespersons	1.7	20	8
Metal trades/ welders/ pipefitters	10.2	120	48
Riggers/ dogmen/ scaffolders	6	70	28
Trades assistants/ labourers – bricklaying	8.5	100	40
Trades assistants/ labourers – general	12.7	150	60
Engineers, managers, foreman, office staff	16.9	200	80
TOTAL	100	1180	472

Table 6.4 illustrates the occupational groups required for the operational phase of the proposed project. Comprising some 40% of the total labour requirement, the greatest skill requirement for this phase is clearly tradespersons and related workers. This is followed by labourers at 20.5%, intermediate production and transport workers at 12% and professionals and associate professionals at 10% and 10.5% respectively.

Table 6.4 also illustrates the proportion of the local labour force needed to supply the operational stage of the project. The results suggest the impact on the local labour market will not be too significant, with most pressure expected in the tradesperson and related workers, and intermediate and production workers classes. While there will be a significant proportion of labourers required, the current surplus of labourers in the regional job market means these demands should be easily satisfied.

Table 6.4 Project Operational Phase Employment

Occupation	% of total	Approx peak	If 40% sourced locally	% of local workforce
Managers and Administrators	1.0	3	1	0.04
Professionals	10.0	25	10	0.17
Associate professionals	10.5	26	10	0.17
Tradespersons and related workers	43.0	108	43	0.21
Advanced clerical and service workers	1.0	3	1	0.09
Intermediate Production and Transport workers	12.0	30	12	0.38
Elementary clerical and service workers	2.0	5	2	0.05
Labourers and related workers	20.5	50	20	0.4
TOTAL	100	250	99	

DEWR labour force statistics for the March quarter 2005 report a state-wide shortage of carpenters, bricklayers, plumbers, electricians, skilled metal workers and fitters. The skill shortage across Queensland is particularly evident for civil engineers experienced in water, roads and structural engineering (DEWR, 2005). The DEWR assesses skill shortages through statistical information on demand, supply and trends in conjunction with information obtained through contact with employers, industry, employer and employee organisations and education and training providers.

Although this information does not provide a clear indication of the current skill shortages, the data provided identifies the project's significant need for skilled labour. Consultation with local employment agencies further supports that the state-wide shortage of trade skilled persons as outlined by DEWR is evident in this region. The greatest proportion of the direct employment impacts reported in this analysis will be net additions to the regional workforce. However, flow-on employment is likely to occur, particularly in the construction sector, as necessary to support consequential growth in the region. It is important to recognise that the current skill shortage is a pre-existing issue. A key challenge exists for government and training providers to build partnerships with the industry sector to develop a co-ordinated approach to addressing skill shortage problems facing industries in the region. The provision of co-ordinated, efficient strategic actions that address these skill shortages in a timely matter will be a key factor in the capacity of the region to realise continued economic growth and development.

Existing Strategies reported by the Department of State Development and Innovation

The CQ Manufacturing Region Initiative
Over three years the Queensland Government will invest $3M in practical initiatives to accelerate key drivers of growth:
• Productivity improvements
• Skills and training
• Technology enhancement
• Supporting industry investment

Productivity improvements
A full-time manufacturing specialist, based in Rockhampton and servicing the Central Queensland region, will be appointed to deliver technical expertise and help industry respond to specific needs. The specialist will be available to assist firms improve performance through such methods as "lean manufacturing" and adoption of relevant technologies. Through this appointment Central Queensland manufacturers will also be able to access the technological resources and experience of specialists based at QMI Solutions (previously known as the Queensland Manufacturing Institute).

Technology enhancement
A technology enhancement program, in collaboration with the Welding Technology Institute of Australia and the Central Queensland Institute of TAFE, will be introduced to upgrade welding capabilities to international standards. A welding technology manager, based in Gladstone and servicing the Central Queensland region, will be appointed to work with small and medium-sized manufacturers to improve performance through measures such as: telephone and on-site technical support; technology development; group technology; and best practice demonstrations.

Skills and training
To secure a greater number of apprentices and trainees, new iniatives will be introduced in association with Fitzroy Industry Regional Skills Training, including training to increase school students' exposure to manufacturing careers through industry and school partnerships in Gladstone and Rockhampton. A program will also be investigated to identify possible trades

mentors to supervise in-house training of apprentices at small and medium-sized manufacturers. This will free up the time for qualified tradespeople and help them focus on improving productivity. Ongoing training activities implemented by the Department of Employment and Training will continue to be supported through the Central Queensland Training Employment Strategy and the Government's $1B SmartVET initiative.

Supporting industry investment

Central Queensland has world-class capabilities in base metals, light metals, coal, industrial minerals and agribusiness. Together with the region's infrastructure capabilities, access to competitively priced industrial land serviced with power, gas, water, transport and waste disposal, Central Queensland presents a strong business case for potential new investors. A detailed Business Case and profile outlining the region's competitive advantages has been developed and will be marketed domestically and internationally. Funding will also be provided to assist to identify emerging industry development and investment opportunities, including feasibility studies for attracting new investment.

Skilled Migration

To assist in overcoming a shortage of skilled workers in regional Queensland, the Queensland Government offers sponsorship under the Skilled Independent Regional (Provisional) visa for highly skilled and educated individuals who wish to live and work in regional Queensland DSDTI, 2005). The Skilled Migration Program will link directly to initiatives under the Government's agenda such as the Department of State Development's *Queensland Government Trade Strategy: Export Solutions, and World Class Manufacturing Queensland,* and the Department of Employment and Trainings *Skilling Queensland* and Education Queensland's *Education 2010.*

7. Housing

A key issue to consider in relation to the demographic impacts of the project is effects on the local housing market. The direct demands on housing in the Rockhampton region from the project are anticipated as follows:

- Construction stage – 350 rental and sale houses needed
- Operation stage – 200 sale or new houses needed

There will also be a number of indirect and induced demands for housing as the downstream effects of the project are realised.

There is potential for additional demands on the housing market to increase rents and house prices. While those consequences would have some beneficial effects in terms of increasing wealth and stimulating investment back into the housing market, there may also be some cost-pressure impacts on lower socio-economic groups who are renting, and the potential for a housing 'bubble' to emerge. These issues are explored in this section.

7.1. Current status of rental and house markets

A review of the Rockhampton and surrounding local government authority (LGA) housing and rental markets indicates a tightening market in 2004/2005 not too dissimilar to the rest of Queensland. For the December quarter of 2004, the vacancy rate for all types of residential rental accommodation in Queensland was 2.6%. Brisbane and its surrounds had the highest residential vacancy rate, whilst the Gold Coast had the lowest rate (OESR 2004).

A telephone survey of Rockhampton property managers undertaken by the authors in April 2005 suggests the Rockhampton rental housing market is approaching capacity with an average vacancy rate of approximately 2.2%. Units and flats are slightly higher at 3% while housing is around 2%. The vacancy rate 12 months previous was 3.5% for houses and 6% for units as compared to 2.5% and 7% respectively 24 months previous. At the time of the survey,

no rental properties were available in Gracemere and only one in Mount Morgan, indicating housing is already tight in these areas.

The rental market has also experienced moderate growth from March 2003 to March 2005 with the median rent on three bedroom housing increasing from $155 / week to $170 / week in Rockhampton (10% increase) and $170 / week to $185 along the Capricorn Coast (9%). The median rent on four bedroom houses increased from $200 / week to $240 / week (20% increase) in Rockhampton and $220 - $240 / week along the Capricorn Coast. Whilst significant, these increases are still smaller than the increases experienced in Mackay and Brisbane. Table 7.1 contains the median weekly rents paid for the Rockhampton, Livingstone, Mackay and Brisbane local government areas from March 2003 – March 2005.

Table 7.1 Median Weekly Rents

Local Government Authority	Type of Housing	Median Weekly Rent Mar Qtr 03	Median Weekly Rent Mar Qtr 04	Median Weekly Rent Mar Qtr 05	% Change 03-05
Rockhampton	4 bedroom house	200	210	240	20%
	3 bedroom house	155	160	170	10%
	3 bedroom unit	170	175	180	6%
	2 bedroom unit	120	125	135	13%
Livingstone	4 bedroom house	220	230	240	9%
	3 bedroom house	170	180	185	9%
	3 bedroom unit	150	165	225	50%
	2 bedroom unit	140	140	165	18%
Mackay	4 bedroom house	240	260	310	29%
	3 bedroom house	185	200	250	35%
	3 bedroom unit	190	190	240	26%
	2 bedroom unit	130	140	160	23%
Brisbane	4 bedroom house	265	290	310	17%
	3 bedroom house	225	245	260	16%
	3 bedroom unit	250	270	290	16%
	2 bedroom unit	205	220	240	17%

Source: Queensland Rental Tenancy Authority 2005

Table 7.2 presents an extract from the Queensland Residential Tenancies Authority (RTA) activity statement for April 2005. The data indicates a significant increase in the monthly number of new rental bonds being received in Queensland from 2003 – 2004 to May 2005 and a much smaller increase in the number of bonds being finalised, indicating an increase in demand and reduction in rental vacancies throughout Queensland. The data also indicates a significant increase in the comparative number (monthly average) of dispute resolution requests received by the RTA, phone calls and web hits from 2003 – 2004 to 2004 – 2005. As the rental market in Rockhampton and surrounding LGAs tightens, similar trends of increased conflict between landlords and tenants are expected as is an increase in the demand for the RTA's services including dispute resolution services.

Table 7.2 Queensland Residential Tenancies Authority Activity Summary

ACTIVITY	**03/04 Monthly Average**	**May 05 Total**
RENTAL BONDS		
New bonds lodged		
- RTA94	17,992	**21,108**

- RSA2002 (from 23/8/02)	*176*	***339***
Bonds finalised		
- RTA94	16,513	**17,820**
- RSA2002 (from 23/8/02)	*87*	***186***
OTHER RTA ACTIVITY		
Compliance Complaints received	129	**98**
Investigations Commenced	49	**44**
Dispute Resolution Requests Received	1,175	**1,406**
Incoming phone calls received by the RTA Information Call Centre	23,983	**27,046**
Website User/Visitor Sessions	29,414	**48,760**

Source: Queensland Rental Tenancy Authority 2005

In line with the housing boom across Australia, house prices within the project area have substantially increased from 2000 – 2004. The level of increases range from 40% in the Rockhampton and Fitzroy LGAs to 72% in the LGA of Mount Morgan (Table 7.3). It is interesting to note that the annual increase in the median sale price for houses peaked in 2003 in the Gladstone, Livingstone, Mount Morgan and Calliope LGAs. In Rockhampton and Fitzroy Shires, the single largest annual increase in median sale prices for housing (21 and 14% respectively) occurred in 2004, and house price increases are more modest, suggesting that the demand for housing in Rockhampton may not yet have peaked.

Table 7.3 Median Sale Price for Housing from 2000 to 2004

Local Government	Year	Number of Sales	Median Sale Price	Annual Increase (%)	Cumulative Annual Increase
Gladstone	2000	429	$110,000	n/a	n/a
	2001	708	$115,000	4%	4%
	2002	1000	$136,000	15%	20%
	2003	930	$173,000	21%	41%
	2004	807	$197,000	12%	53%
Livingstone	2000	445	$121,000	n/a	n/a
	2001	561	$132,000	8%	8%
	2002	681	$156,000	15%	15%
	2003	744	$205,000	24%	39%
	2004	492	$265,000	23%	62%
Mount Morgan	2000	55	$25,000	n/a	n/a
	2001	79	$25,000	0%	0%
	2002	87	$30,000	17%	17%
	2003	150	$43,000	30%	47%
	2004	144	$57,500	25%	72%
Rockhampton	2000	1026	$90,000	n/a	n/a
	2001	1341	$94,000	4%	4%
	2002	1447	$105,000	10%	15%
	2003	2272	$110,000	5%	19%
	2004	2057	$139,000	21%	40%
Calliope	2000	188	$126,000	n/a	n/a
	2001	351	$132,000	5%	5%
	2002	408	$158,000	16%	21%
	2003	388	$208,325	24%	45%
	2004	290	$250,000	17%	62%
Fitzroy	2000	65	$95,000	n/a	n/a
	2001	116	$100,000	5%	5%
	2002	137	$109,500	9%	14%
	2003	243	$125,000	12%	26%
	2004	256	$145,000	14%	40%

Source: Real Estate Institute of Queensland (2004)

As is the case for most of Queensland, demand for housing within the project area is experiencing a period of strong growth. Historically low vacancy rates (estimates ranging from 0-2% for housing) have contributed to significant increases in both median weekly rent and median house sale prices between 2000 and 2004. The introduction of an addition 1,200 workers as part of a construction workforce for the Queensland Coke and Energy Pty Ltd Project would be expected to further increase the demand for housing within the project area. These pressures are likely to be felt most in the LGAs of Rockhampton and Fitzroy where the demand for housing remains strong.

Estimates from the Queensland State and Regional Household Projections 2001 – 2026 (Wilson 2005) suggests strong demand for housing is likely to persist for some time as a result of significant increases in the total number of households in Queensland regions over the next 20 years. The Queensland State and Regional Household Projections are a set of household projections for the state and Statistical Divisions to the year 2026. The projections demonstrate

that changing family structures are going to impact on available housing in addition to regional population projections and interstate net migration patterns.

The household projections show a 67% increase in the number of Queensland households in the period from 2001 to 2026, from 1.383 million to 2.303 million, with the largest increase projected to occur in lone person households (projected growth of 109%), followed by family couple without children households (projected growth of 93%). Within the Fitzroy Statistical Division the total number of households is expected to increase by an estimated 47% from 2001 to 2026. Table 7.4 provides the projected change in household type for the Fitzroy region.

Table 7.4 Projected change of household type by region 2001-2026

Household Type	Households 2001 ('000s)	Households 2026 ('000s)	Change 2001-2026 (%)
Family couple with children	22.8	23.3	2
Couple without children	17.7	30.5	72.6
One parent family	7.5	10.7	43.6
Other family	0.8	0.9	12.8
Group	2.3	3.3	42.7
Lone Person	15.8	29.5	86.4
Total	66.9	98.2	46.8

The data in Table 7.4 suggests dramatic increases in the number of single couples, single parent families and lone persons will substantially increase demand for housing between now and 2026.

7.2. Housing Supply

Queensland private sector house approvals have risen from March to May 2005 following a fifteen month decline that brought the level of approvals towards cyclical lows (see Figure 7.1). Dwelling construction activity as measured in the Queensland State Accounts continues to increase, supported by a large volume of building work in the pipeline including residential renovation activity (Queensland Treasury 2005).

Figure 7.1 Queensland Private Sector House Approvals (trend)

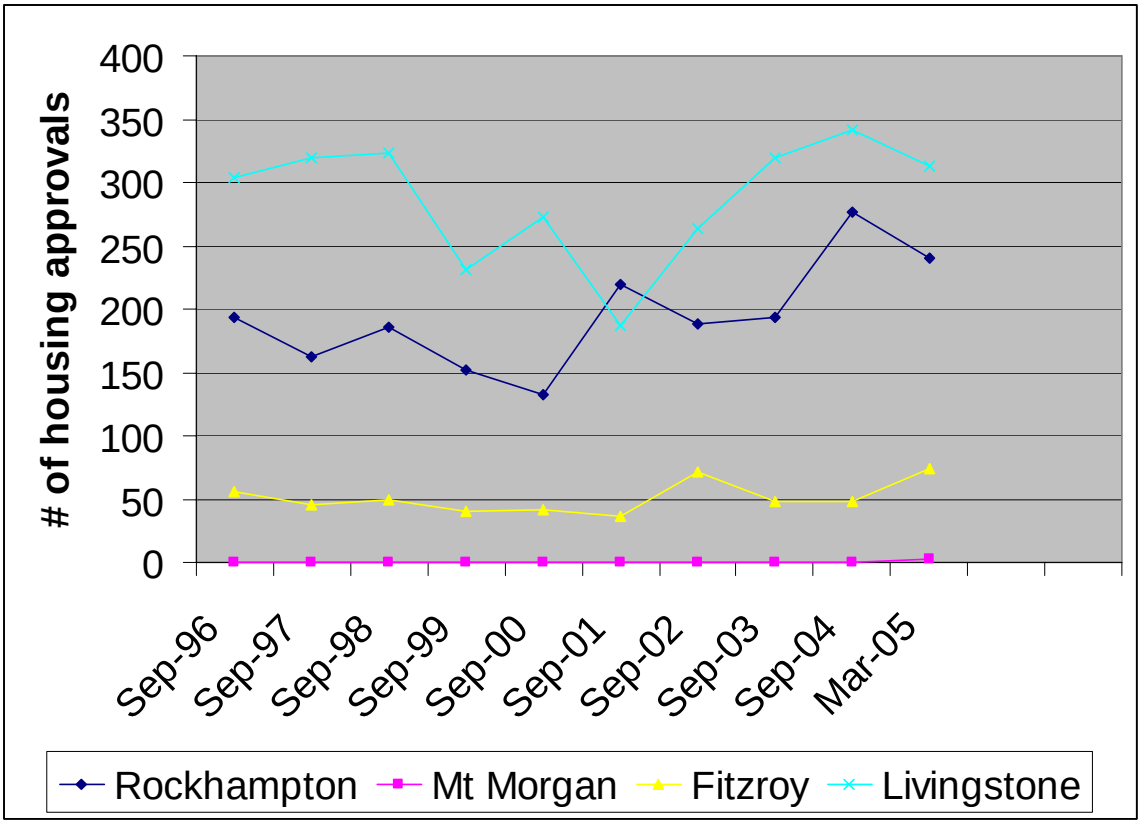
Source: Queensland Treasury Building Approvals Brief, May 2005.

Regionally the number of new building approvals recorded for the LGAs of Livingstone, Fitzroy, Mt Morgan and Rockhampton remain slightly below the peaks experienced during 2004. Table 7.5 provides a summary of the number and cumulative value of new residential dwelling units approved for each LGA for the year ending March 2005, while Figure 7.2 shows housing approvals since 1995. The data in Table 7.5 indicates a total number of 629 approved residential dwelling units valued at $123.5m. Rockhampton City and Livingstone Shire accounted for 89% of these new dwellings and 90% of their total value.

Table 7.5 Private Dwelling Approval Numbers and Value

LGA	**Total Residential Dwelling Units Approved for year ended March 2005**	**Total Value of Dwelling Unit Approvals for Year Ended March 2005 ($m)**
Rockhampton City	240	44.4
Mt Morgan	2	0.5
Livingstone	313	66.8
Fitzroy	74	11.8
Total	629	123.5

Figure 7.2 Numbers of Housing Approvals over Time



Source: Qld. Planning Information and Forecasting Unit (PIFU) fact sheets.

Each of the local government authorities in the region was asked about the availability of land should additional population relocate to the area. In each case, the response was that there are enough existing approvals or approvals close to completion to ensure that land for housing is readily available:

- Fitzroy Shire Council (Harman, L pers comm., 2005) has approximately 200 residential blocks available for people to submit plans to Council;
- Rockhampton City Council has approximately 2,500 allotments "on the books" (Palmer, R, Upton, T & Steel, G pers comm., 2005) and house and land packages available in North Rockhampton;
- Calliope Shire Council has five areas with potential for 20 housing lot divisions, and the potential to accommodate 200 families (Schuller, R pers comm., 2005).
- Mt Morgan Shire Council anticipates having around 200 residential blocks, including 3-5 acre blocks, ready for development in the near future (Hinch, G & Swindle, P pers comm., 2005). These blocks will have water supply, but no sewage service.

Despite the availability of land in the region for new housing, the initiation of the Queensland Coke project could trigger a surge in the rental and house price market. There are timing, cyclical and structural reasons for this. The timing reasons relate to the very short turnaround between project approval and the start of construction, which makes it difficult for private investors to meet any shortfall.

The cyclical issues relate to the current upturn in the housing market, which is driven by the current upturn in the mining industry, the relocation of people to the Capricorn Coast, and the spill-over effects from south-east Queensland. These factors mean that the project development might come at the peak of a substantial demand for property, where rental and housing markets are already tight.

The structural factors mean that rents may have to increase further before a stimulus for private investors to increase housing stocks is effective. For example, the average cost of a standard four bedroom house in Rockhampton is approximately $300,000 ($100,000 for the land and $200,000 for the house). However, at a median rent of $240 per week for a four bedroom house (Table 7.1), there is little incentive for investors to invest in new housing. Instead, most of the focus in investment activity is on older housing, which is cheaper than the cost of new housing (Table 7.3).

During the construction stage, it is likely that many outside workers would look for rental accommodation rather than at purchasing new housing. Increased demand will push rents up. As additional demand for housing emerges with downstream economic development, a sustained increase in rental prices may result. A similar pattern may emerge with the project operating stage, where the direct demands for housing will put some pressure on the market, and subsequent economic development may cause more sustained demands.

There are two key social impacts emerging as a result of the region's strong housing market that require further discussion. These impacts have been identified through direct stakeholder interviews and a desktop review of available housing data and related literature. These comprise:

- A shortage of affordable and crisis housing for low income families; and
- Altered regional migration patterns contributing to community dislocation and social isolation;

7.3. Affordable and Crisis Housing

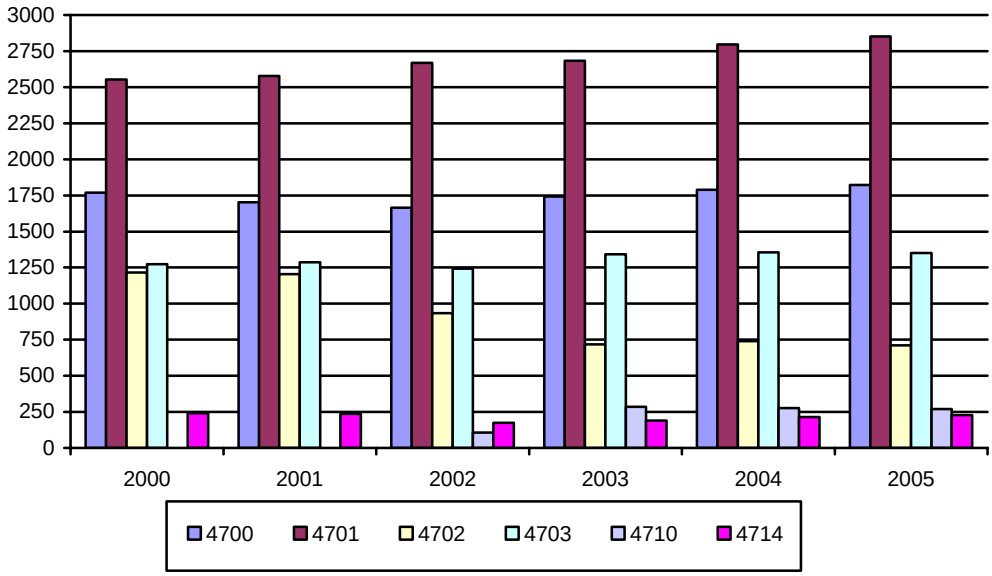
The Rockhampton rental housing market has traditionally been one of the most affordable in the central Queensland region. Rapid population increases in response to regional mining and industrial growth combined with regionally high levels of disposable income in Gladstone, Mackay and the Central Highlands has forced many low income families and retirees to move to centres offering affordable housing. For those wishing to remain in central Queensland, Rockhampton has been the only real affordable housing alternative during the last five years. As a result affordable housing in Rockhampton and along the Capricorn Coast is at capacity. Housing stakeholders engaged during the review process have expressed concern that an additional 1,200 people moving to the project area as a result of the QCE project will only exacerbate the problem.

Housing Queensland (O'Rourke, B pers comm., 2005) has reported a 30% increase in the number of families seeking subsidised housing in Rockhampton from January 2005 to April 2005. During the same period the number of vacant Departmental houses in central Queensland dropped from approximately 100 to 30. Many of the vacant houses were undergoing refurbishment. Requests for crisis housing through the Department's Rockhampton office have increased to ten families per week. At the time of interview (April 2005) the Department had no available crisis housing and was referring families to local caravan parks with sufficient funds to secure temporary housing (e.g. self contained cabins).

The Department has indicated that it has no immediate plans to construct any additional dwellings in response to Rockhampton's increased demand for affordable housing. At the time of interview, 40 units under construction were the only major capital works reported by Departmental staff (O'Rourke, B pers comm., 2005). Another scheme available through the Department is a bond loan scheme designed to get low income families into the private rental market.

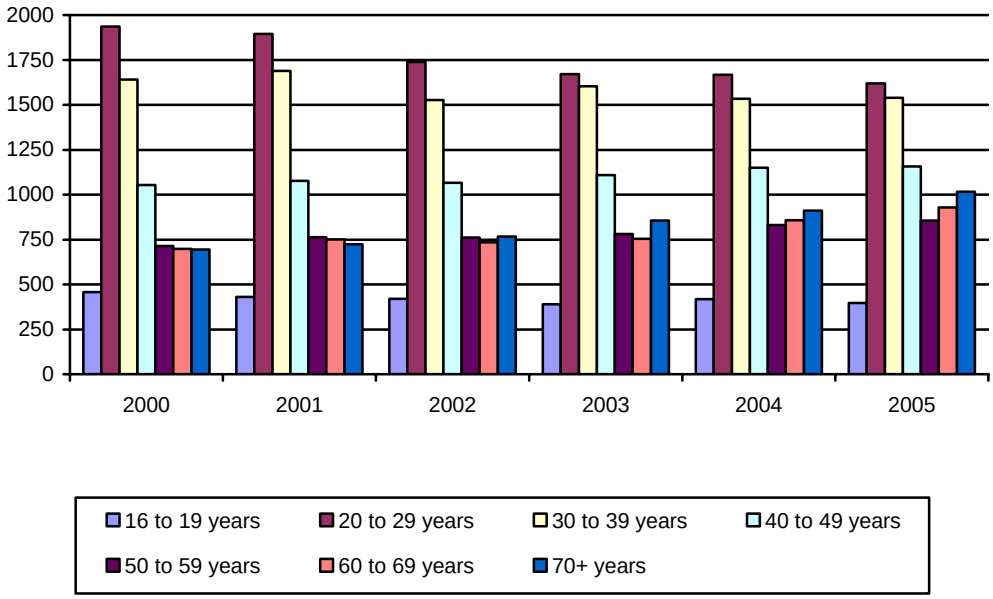
The trends can be indicated in the official statistics for rental assistance (Figures 7.3 and 7.4). Demands for rental assistance have been increasing slightly over time as rents have gone up, with most increases occurring for Rockhampton residents and for older people. (Support for younger people has dropped, possibly because this group has increased employment).

Figure 7.3 Residents in the region with rent assistance (by postcode)



Source: Centrelink, 2005

Figure 7.4 Residents by age group with rent assistance in the Region



Source: Centrelink, 2005

ing Strategies

e shortage of affordable housing in Rockhampton were identified by stakeholders. These include:

- Development of a whole-of-government housing plan for Rockhampton similar to that developed for Gladstone (i.e. the Gladstone Coordination Group Housing Action Plan) during its housing crisis. Stakeholders from Livingstone Shire Council, Rockhampton

City Council, Department of Communities and Housing Queensland promoted the need for this model during stakeholder interviews;

- Development of an affordable housing trust/conglomerate involving Housing Queensland and the Rockhampton, Fitzroy and Livingstone Councils. The suggestion was that the trust would operate in a similar fashion to the Brisbane Housing Company Ltd (http://www.brisbanehousingcompany.com.au/). Essentially the trust would operate two housing businesses. The first would provide houses to the private rental market in strategic locations. The profits from this business would be used to subsidise housing for low income families and pensioners elsewhere in the Rockhampton, Livingstone, Fitzroy and Mount Morgan region; and
- The construction of single persons' quarters in such a way (e.g. modular housing) that these facilities could be used/converted to aged care units once construction was completed. One suggestion put forward was that the participants in a housing trust could be responsible for the refurbishment and relocation of these facilities to a more desirable location on completion of construction.

7.5. Community Dislocation and Social Isolation

The second potential major social impact resulting from the regions' strong housing market growth is altered regional migration patterns leading to community dislocation and social isolation. Evidence has emerged during stakeholder interviews to suggest that recent regional migration of families in search of affordable housing has resulted in increased community dislocation and social isolation within central Queensland. Community dislocation is occurring as families move from one town/city to another in search of affordable housing and in some instances as families move from one suburb to another within Rockhampton.

Education Queensland (Foley, L pers comm., 2005) has indicated that as rent increases from $130/week to $150/week, low-income families are forced to move. In Rockhampton over the last six months (October 2004 – March 2005) an increasing number of families pulled their children out of south Rockhampton state schools and placed them in north Rockhampton state schools where the housing is more affordable. Education Queensland is expecting this trend to continue as rentals in south Rockhampton continue to increase.

Families that are moving also experience social isolation. Social isolation manifests itself in a number of ways. Interviews with project stakeholders identified the following examples all of which are linked to community dislocation and affordable housing. They include:

- Increased levels of anxiety in parents and children struggling to establish new social and support networks;
- Learning difficulties in children as they adjust to new schools, friends and routines;
- Increased incidence of abusive parents identified during parent/teacher meetings;
- Eroded levels of social capacity within communities e.g. decreased parent participation in sporting events or parent and citizens meetings;
- Increased incidence of hungry children at school as struggling families become more isolated from extended families that would normally provide assistance during difficult periods. Education Queensland reports that charity groups now operate ten breakfast clubs across Rockhampton state schools in response to hungry kids arriving at school; and
- Families where the primary income earner is forced to work away from home for long periods of time.

7.6. Strategies to Combat Community Dislocation and Social Isolation

A number of strategies were identified by stakeholders to minimize the incidence of community dislocation and social isolation. These include:

- The development of a coordinated whole of government approach to assist families in coordinating and planning moves within the region. This might involve trying to direct families to areas where employment opportunities and affordable housing coincide;
- Expanding community service provision to under-resourced regions. A successful model promoted by Livingstone Shire Council (Jeffers, N. pers comm. 2005) was the establishment of the Department of Community, Development and Support (DCDS). The DCDS is a partnership between the Queensland Department of Communities and Livingstone Council and is intended to strengthen family connections particularly amongst families suffering community dislocation and/or social dislocation;
- Providing moving families with a list of key community contacts for the region they are moving to;
- Encouraging large employers within regions to offer employee assistance packages where counselling services are provided to employees through private providers such as relationships Australia as part of their employment package; and
- A concerted effort by government and community service providers to monitor demographic shifts within regional communities to ensure sufficient social support mechanisms are in place to satisfy changing community demands.

8. Direct Community Impacts

There are a number of potential community impacts that need to be considered in more detail. These are potential impacts on specific community groups. There are two main groups of impacts to consider. The first are potential economic and social impacts on indigenous people, while the second are potential impacts on people in close proximity to the site of the Plant.

8.1. Potential Impacts on Indigenous People

This project is likely to have several positive impacts on indigenous people, which will largely be transmitted through increased employment opportunities (section 6). Because the project will create a number of semi-skilled jobs in the local area, it will be much more accessible than previous developments have been. However, employment and training programs may still be necessary to ensure that indigenous people are able to access the opportunities.

There is also potential for social impacts on indigenous people as a result of the project. The most important of these will be the potential for increases in the rental and housing market to reduce effective income for families on welfare. While this would be a secondary impact not directly related to the project, some advance planning to minimise potential impacts may be warranted.

8.2. Potential Impacts on the Local Communities

There are a small number of people who live close to the Plant site. These include the residents of Stanwell and Kabra, and a number of rural residents on surrounding land. Any adverse impacts on these people could be expected to reduce their standard of life, and may also potentially impact on property values. For this reason, several potential direct impacts need to be considered in more detail.

8.2.1. Noise emissions

The potential for noise and vibration impacts have been reported in section 9.7. The project is expected to comply with all noise level goals, as measured by noise sensitive receptors, apart from a small area to the south of the Capricorn Highway and to the west of Stanwell. When background creep is accounted for, the three buildings within the small area may have noise levels higher than the recommended limit.

The results predict that noise is not likely to be a significant impact on communities. There are no vibration impacts expected from the projects.

8.2.2. Pollution emissions

The potential for air emissions impacts have been reported in section 7. The project is expected to comply with all ambient air quality guidelines, apart from the possibility that there may be one exceedance of the 10-minute air quality guideline for SO_2 within a twelve month period. The 1-hour and annual average guidelines are met at existing residential locations

The consultation process with the local community revealed that people are sensitive to potential impacts relating to pollution issues. Any perceived impacts of the project on water or air quality in the area are likely to generate interest, and a comprehensive communication, information and negotiation process may be needed if impacts do emerge.

8.2.3. Dust emissions

The potential for air emissions impacts have been reported in section 7. The project is expected to comply with ambient air quality guidelines for dust emissions. The consultation process with the local community revealed that people are sensitive to potential impacts relating to pollution issues. Any perceived impacts of the project on air quality in the area are likely to generate interest, and a comprehensive communication, information and negotiation process may be needed if impacts do emerge.

8.2.4. Odour emissions

The potential for air emissions impacts have been reported in section 7. The project is expected to comply with all ambient air quality guidelines for odour related emissions. The predictions for odour emissions show that there will be some impacts at the closest residential locations but that the Project by itself will not cause exceedances of the guidelines for aesthetic enjoyment and local amenity.

The consultation process with the local community revealed that people are sensitive to potential impacts relating to odour issues. Any perceived impacts of the project on air quality in the area are likely to generate interest, and a comprehensive communication, information and negotiation process may be needed if impacts do emerge.

8.2.5. Water related issues

The potential impacts of the project on water related issues have been reviewed in a specific part of the EIS process. That review indicates that a substantial volume of water supply may be required for the operation of the plants, and that there is potential for emissions to be included in water releases. Specific water management strategies and infrastructure will be required to minimise the potential for this to occur.

The consultation process with the local community revealed that people are sensitive to potential impacts relating to water issues. Any potential impacts of the project on the availability of water or water quality in the area are likely to generate interest, and a comprehensive communication and information process may be needed if impacts are likely to emerge.

8.3. Specific Impacts on Wider Communities

8.3.1. Traffic Intensity

One area where social impacts can occur is through increased traffic, with associated effects of noise, congestion, time delays and increased risks of accidents. Traffic impacts have been assessed in section 14. While there will be increases in vehicle movements, the existing road network has capacity available, and major impacts are not expected. There will be slightly more congestion at key intersections over time, which may bring forward the desired timelines for development works.

8.3.2. Visual Amenity

The completed project will have a low profile, and will be shielded from the highway and local Stanwell community by a low ridge. The most visible part of the plant are likely to be the cooling towers and the rail access. Given the proximity to the Stanwell Power Station with its larger and more visible structures, it is unlikely that impacts on visual amenity will be noticeable. No concerns about such impacts were suggested by residents in the local area in the consultation process conducted as a part of this review.

9. The Impact of Coke and Power Station Development Projects on the Rockhampton, Fitzroy and Queensland Economies: An Application of Input-Output Analysis

9.1. Overview of the Direct Impacts

The direct impacts of the Coke and Power station project can be identified by both the construction and operating stages. Here, each is discussed in turn.

9.1.1. Direct impacts of the construction phase

The Coke and Power Station project will involve a construction cost of approximately $1.766 Billion, with expenditure in four key areas:

- Construction of the Coke Plant,
- Construction of the Power Station,
- Construction of additional port facilities,
- Construction of rail loop facilities

A summary of planned expenditure for the two projects is shown in table 9.1.

Table 9.1 Summary of planned expenditure for the coke and power station projects

	Coke project ($M)	Power project ($M)
Year 1	726	99
Year 2	337	66
Year 3	269	0
Year 4	269	0
Total	1,601	165

The extent of the direct impacts of the construction phase on the local, regional and state economies will depend on several factors, including:

- Where labour supplies have been sourced and located (see section 9.3),
- The extent to which work is subcontracted to local, regional and state businesses, and
- The proportion of materials and supplies that are sourced from local, regional and state businesses.

In the construction phase, not all of the required labour is expected to be sourced locally because of the specialist nature of some construction activities and the restricted pool of available labour in the region. It is likely that some of the labouring and semi-skilled positions can be filled by locals, and the use of Local Industry Participation Plans will help to increase local participation. However, some firms will bring their own labour supplies from outside the region, and some construction positions will be filled by specialists who move between projects around the country. This means that while some expenditure on labour will remain in the local and regional area, a larger proportion is expected to flow to households elsewhere in Queensland and interstate, depending where labour is sourced from.

The flow of income from construction will also depend to some extent on the capacity of businesses at the local, regional and state level to win contracts. If the construction activities are disaggregated into a number of smaller contracts, it will make it easier for smaller firms at the local and regional levels to be involved. If the construction contracts are large packages, then it is more likely that only firms at the state or national level will be capable of tendering for the services. While these firms will tend to sub-contract out smaller work packages locally, the proportion of overall business flowing to firms in the area could vary.

Not all of the materials and supplies for construction will be sourced from the local, regional or state level. Some materials for construction are likely to be imported, with some of the balance likely to come from interstate. This means that some of the economic impacts from construction will flow to interstate and international sites.

The construction stage is anticipated to occur over four years, with stage 1 construction flowing into stage 2. The extended time period of construction is likely to generate much larger local impacts than a shorter, intense period of construction. This is because:

(a) there is more incentive for outside construction workers to relocate with their families to the area,
(b) there is more incentive for supply firms to establish and upgrade facilities in the local region, and
(c) local supply firms have a longer period to ramp up production and generate viable business operations.

In summary, the direct economic impacts of the construction stage of the project at the local, regional and state level will be large and positive. This is because of:

(a) the level of capital expenditure involved ($1.766B)
(b) the number of construction jobs created (an average of 1,200 jobs in Year One)
(c) the length of the construction period (four years), and
(d) the demand for supplies and services from local businesses.

9.1.2. Direct impacts of the operating phase

The total annual operating expenses of the combined coke and power plants are expected to be $493M. The highest expense will be the purchase of coal for input into the coke process, with transport, labour services, manufacturing supplies and finance being other key expenses. The total annual expenditure on labour services is expected to be $14M, most of which will flow to the local region. Much of the remaining expenditure on operations is expected to flow to businesses within the region and state. As well, there will be additional income flows for taxes, profits and dividends, which will tend to accrue at the state and national levels.

While there will only be a limited number of jobs directly related to the operation of the coke and power plants, average salary levels will be high. The level of income and expenditure for both the coke and power plants will directly impact on economic activity at local, regional, state, national and international levels.

In summary, the direct economic impacts of the operating stage of the project at the local, regional and state level will be large and positive. This is because of:

a) the level of annual revenue involved (approximately $798M per annum)
b) the level of annual operating expenditure involved ($493M per annum)
c) the number of operating jobs created (up to 145 new positions)
d) the payment of taxes, dividends and profits.

9.2. Introduction to Modelling Total Impacts

While the direct impacts of the projects at the local, regional and state level are important, they do not capture the full impacts. The direct expenditures will stimulate a range of 'ripple' effects in the local, regional and state economies. These need to be estimated to provide an assessment of the total economic impacts. In this report, the use of an assessment technique

called Input-Output Analysis is used to predict the full range of Initial, Direct, Indirect and Induced economic impacts from the projects.

The estimation of the 'ripple' effects is never precise because of the complexity and variability of economic patterns, and the difficulty of modeling these with any precision. As well, it is often difficult to apportion these 'ripple' effects between different regions. For these reasons, the primary emphasis in terms of measuring economic impacts should be on the initial direct impacts, and the estimation of the full set of 'ripple' effects should be conducted with some caveats about the accuracy of results.

This section presents a summary of the project's economic impacts which is modelled using Input-Output (IO) analysis. Input-Output (IO) analysis involves the division of the economy of the region into industrial sectors and tracing out the monetary flows between the sectors for a given year. Industries sell their goods and services to other industries and to final users, and buy their inputs from other industries and primary sources. These flows of goods and services are captured in the framework of input-output analysis. Once the transaction table of such flows is completed, simple mathematical operations are used to derive output, income and employment multipliers (Mandeville and Jensen 1978). A particular strength of input-output analysis is that it can be used to assess the impact of one influence or several influences on the economy. For this reason, it is often used in economic impact assessments for major projects, helping to identify the direct and indirect impacts that such projects have on regional economies. Further details of IO analysis are outlined in Mandeville and Jensen (1978).

The Input-Output tables to be used in this study were constructed using the Generation of Regional Input-Output Tables (GRIT) system, provided by the Centre for Economic Policy Modelling (CEPM) at the University of Queensland. GRIT uses a series of non-survey steps to produce prototype regional tables from the national table, but provides the opportunity at various stages for the insertion of "superior data". As with any economic impact analysis of this type where final expenditure figures have not yet been confirmed, the results in this section should be regarded only as preliminary and as order-of-magnitude estimates.

This study was commissioned by Stanwell Corporation Limited and Queensland Coke and Energy Pty Ltd, both of which were concerned to provide information on potential impacts at the local, regional and state levels. Stanwell Corporation Limited requested that the impact of the Power Station on the local, regional and state economy be assessed separately.

The economic impacts of the operational stage of both projects are measured on three levels: the Rockhampton Region (including the four local authority areas of Fitzroy, Livingstone, Mount Morgan and Rockhampton), the Fitzroy Statistical Division, and the State of Queensland. The impacts have been measured for the construction and operational phases. Ivanova and Rolfe (2005) have drawn attention to the significant difference that can exist in the structure of local, regional and state economies. Therefore, it is expected that the impact of a new large development will have significantly different effects on each level of the economy under study. A development project can be highly significant on the regional level but have only a small effect on the state economy.

There are 11 sectors of the economy considered in the analysis following the methodology of Mandeville and Jensen (1978). The sectors are:

1) Agriculture, Forestry and Fishing;
2) Coal, Gas and Oil Mining;
3) Other Mining;
4) Manufacturing;
5) Electricity, Gas and Water;
6) Building and Construction;
7) Trade, Accommodation and Restaurants;

8) Transport and Communication;
9) Finance;
10) Government Administration, Defence and Education; and
11) Entertainment, Recreation, Community Services and Other Services.

Three final demand sectors are households, other final demand and exports. Three primary input sectors are household (e.g., wages and salaries), other value added, and imports.

The project terms of reference concerning the economic impact analysis can be summarised as follows:

1) generate an 11-sector input-output table, associated sector output, income and employment multipliers for Queensland, Fitzroy Statistical Division, and Rockhampton region using GRIT methodology;

2) using methodology from Mandeville and Jensen (1978), estimate and analyse the impact on the relevant economies of the following projects:

   a). Coke Plant; and

   b). Power station.

Where input coefficients were provided by Queensland Coke and Energy Pty Ltd or Stanwell Corporation Limited, those coefficients were used. Otherwise, coefficients from the national economic models provided by the Australian Bureau of Statistics (ABS 2004) were employed for the analysis of the two projects.

9.3. Regional Economic Impact Analysis: Concepts and Methodology

9.3.1. Concepts of the Regional Economic Impact Analysis

Impact is a term that could also be explained by words such as effect, result, incidence, consequence and contribution (Jensen and West, 2002). This study treats an economic impact as "a measured effect on the economy of a region of any difference or change attributable to an impacting agent" (Mandeville and Jensen, 1978, p. 32). The economy can be defined as the network of industries, organisations and individuals involved in production, consumption and distribution activities in a particular area.

With relation to this study, economic impact analysis is applied to the estimation of the total economic stimulus provided by:

- the development of a new coke plant in the region of interest,
- the development of a new power station in the region of interest, and
- the combined impacts of developing both the coke plant and power station in the region of interest.

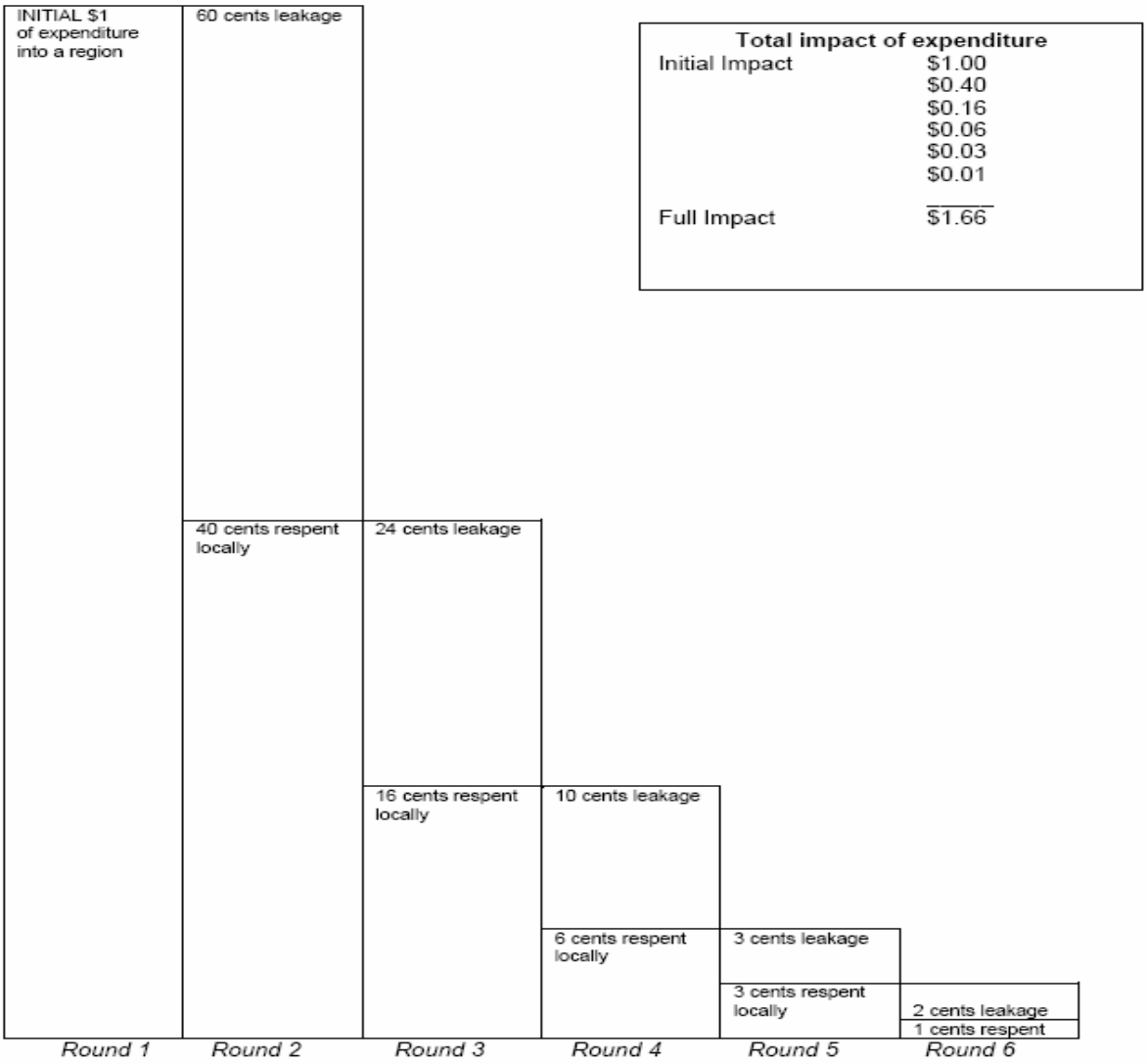
In general, an economic impact analysis allows two key groups of predictions to be made about development activities in a particular region or area:
The direct economic stimulus provided by the development (the amount of inputs, including labour, purchased from the local or regional economy); and
The indirect economic stimulus provided by the development (the size and structure of the upstream and downstream effects in the local or regional economy).

The first stage of analysis is focused on the amount of direct injection of money into the local or regional economy that can be sourced from a particular project. The second stage of analysis is focused on the extent to which that initial injection is multiplied through the economy by secondary expenditure. Initial expenditure flows become revenue and income to the people and

firms providing labour, goods and services to the project operator. Those people and firms can then spend that revenue and income, creating secondary economic impacts. In this way, an initial injection of expenditure can be multiplied into a larger economic effect on a region (Rolfe et al. 2003).

The multiplier effect of an initial injection of expenditure into a regional economy is depicted in Figure 9.1 for illustration only. This show the impacts of expenditure when the regional economy can capture 40% of each round of expenditure for subsequent spending.

Figure 9.1 An illustration of the multiplier effect of an initial dollar spend in the region on the economy (not to scale).



Source: Adopted from Jensen and West (2002) and Rolfe et al. (2003).

In each round, 60% of expenditure goes out of the region, or is diverted for other purposes such as taxation or savings. The remaining expenditure (40% in each round), is reinvested into the local economy, becoming income to local suppliers of labour, goods, and services. After six rounds, the economic impact of the initial injection of expenditure falls close to zero, and the net secondary effect of the $1 injection of funds is $0.66. The total economic impact can be assessed as a multiple of 1.66 times the initial injection of money. In regional economies that do not attract much secondary expenditure, multipliers can be expected to be low, while in regional economies that do not have much "leakage" of expenditure, multipliers will be much higher (Jensen and West, 2002).

The analysis of economic impact using Input-Output method has some limitations, which are outlined in Ivanova and Rolfe (2005). These include:

- It is often difficult to get good quality primary data about initial impacts;
- A consistent relationship is assumed to exist between broad sectors, even though they might vary at the micro level;
- The IO tables are based on older macro-economic data at the state or national level, and may not accurately reflect new structural changes in the economy.

Each of these limitations is applicable in this case study, which means that the estimated model result should be treated as precise estimates. The model predictions provide order-of-magnitude type estimates rather than definitive predictions about the impacts of the project.

9.4. A Methodology to Measure State-Regional-Local Impacts

9.4.1. The Development Considered

As indicated in the earlier parts of this report, two developments have been included in the analysis:

1). the proposed coke Plant; and
2). the proposed power station.

The proposed extension of the port and links to the rail network are included in the impact of the coke Plant development on the respective regions in the transport and communication sector. Only preliminary estimates were available for those parts of the projects.

9.4.2. Outline of the Methodology

In this study, the construction and operation stages are examined separately. For each development the economic impacts are identified for three separate regions:

- Area 1: Rockhampton Region
- Area 2: Fitzroy Statistical Division
- Area 3: State of Queensland.

The relative importance of impacts will tend to be lower in a larger economy compared to a smaller economy. For example, impacts of the coke plant and the power station on the Rockhampton region may be quite large, but be relatively minor at the State level. However, since leakages decline as the size of economy increases, the corresponding multipliers will be higher for Queensland than for the Rockhampton region. This means that at the state level compared to the local level there is a much higher likelihood that inputs to the project, including skilled labour, can be sourced. While the relative impact may be smaller at the State level compared to the Rockhampton Region, the State will capture a larger overall share of the economic impacts.

The impacts of the construction phase were measured for each year of the construction period. Due to data limitations, the construction impacts were measured using existing building and construction multipliers. Since more than one industry is expected to undertake development at the same time in the region, the impact of developments has been measured simultaneously.

9.4.3. Construction stage – Key assumptions

- The economic models are based on the input-output tables for the Australian economy in 1997/1998 (ABS 2004) with minor adjustments to account for regional characteristics,
- All estimated impacts are presented in 2004 dollars,
- Impacts are only measured at state and regional levels (this includes port construction costs at Gladstone within the Fitzroy Statistical Region),
- The existing Building and Construction sector in the National Input-Output table (ABS 2004) was assumed to be representative of construction activity associated with the new developments,
- 30% of the construction workforce is based in the Fitzroy region, and
- 80% of the construction workforce is based in Queensland.

9.4.3.1. Construction of the Coke Plant – Key Assumptions

Data about the detail of potential investment in construction has been provided by the project proponent. At the time the study has been undertaken, the final design of the plant has not been completed and no contractors have been employed. The estimates of the size and distribution of construction costs therefore represent very preliminary assessments. The following assumptions have been made to facilitate the analysis:

- Total construction cost is estimated at $1,601M,
- The period of construction is four years,
- All expenditure data provided represent inputs directly to the building and construction industry,
- An average construction year for the coke plant will involve a labor force of 1,000 persons providing an estimated $135.2m in wages and salaries,
- The apportionment of construction costs over time and across regions can be represented as in Table 9.2

9.4.3.2. Construction of the Power Plant – Key Assumptions

Data about the detail of potential investment in construction has been provided by Stanwell Corporation Limited. At the time the study has been undertaken, the final design of the power plant has not been completed and no contractors have been employed. The estimates of the size and distribution of construction costs therefore represent very preliminary assessments. The following assumptions have been made to facilitate the analysis:

- Total construction cost is estimated at $165M, with an expenditure of $99m in the first year and $66m in the second year,
- The period of construction is twenty months,
- All expenditure data provided represent inputs directly to the building and construction industry,
- The average construction year will involve a labor force of 217 persons,
- The apportionment of construction costs over time and across regions can be represented as in Table 9.3.

Table 9.2 Apportionment of construction costs over time for Coke Plant.

Major commodities purchases		**%**	**$'000**	Fitzroy Region %	Rest of Qld %	Rest of Aust. %	Internat %	Total %
Stanwell site: land, coal & coke handling, and services - non recurrent	All in year 1	7.2%	114,950	50%	25%	25%	0%	100%
Stanwell site: rail modifications - non recurrent	All in year 1	0.6%	8,800	50%	25%	25%	0%	100%
Stanwell site: coke plant - non recurrent	35% in year 1, 25% in year 2, 20% in year 3, and 20% in year 4.	84.1%	1,346,400	25%	25%	25%	25%	100%

Gladstone port: land, handling system - non recurrent	All in year 1	6.2%	99,330	50%	25%	25%	0%	100%
Gladstone port: wharf - non recurrent	All in year 1	1.9%	31,130	50%	25%	25%	0%	100%
Total Expenditures		100.00 %	1,600,610	463,705	400,153	400,153	336,600	100%

Table 9.3 Apportionment of construction costs over time for Power Plant.

	$M	% of Expenditure
Year 1	99	60 %
Year 2	66	40 %
Year 3	0	0 %
Year 4	0	0 %
Total	165	100 %

The combined direct stimulus in 2004 dollars of the construction of the Coke and Power plants can be summarized as follows (Table 9.4):

Table 9.4 Apportionment of construction costs over time for both plants.

	$M	% of Expenditure
Year 1	824	47 %
Year 2	403	23 %
Year 3	269	15 %
Year 4	269	15 %
Total	1,765	100 %

9.4.3.3. Operating Phase

The transactions modeled in the IO table have to be consistent with the GRIT procedure. Transactions were valued at producers' prices. Gross sector output was valued at Plant head price, i.e., free on board (f.o.b.). In the case of coke and electricity the value of the final product was confidential and therefore has been estimated indirectly. The value of coke was estimated using average prices over the past few years, projections and some estimates obtained from the Queensland Coke and Energy Pty Ltd. In the case of electricity, the nominal value of electricity to the State grid from the Stanwell Power Station at Plant head was estimated at the average cost of the National Electricity Market in 2004.

For the purpose of this study, the following key assumptions about the operating stage[5] were generated:

[5] These assumptions are based on the full operating capacity of the plant, incorporating both stages of construction.

- The value of annual output of the Coke Plant was estimated at $747M,
- The value of annual output of the Power Plant was estimated at $50M,
- The number of employees for the Coke Plant was estimated to be 125 persons,
- The number of employees for the Power Plant was estimated to be 20 persons,
- The total cost of salaries and wages for the Coke Plant was assumed to be $12M per annum,
- The total cost of salaries and wages for the Power Plant was assumed to be $2.4M per annum.

9.5. The Economic Impact of the Projects on the Economies of the Rockhampton Region, Fitzroy Statistical Division and Queensland.

In this part of the report the Input-Output model that has been developed to perform the impact analysis is outlined. Model summaries are reported in terms of the multipliers that have been generated. Different Input-Output models have been generated for the construction and operating stages of the projects. The full impacts of the projects on each of the regions of interest are then reported in the following section.

9.5.1. Input-Output Multipliers

Multiplier tables are framed in terms of an initial $1 value of output production. The first-round actions of the business in terms of expenditure, income and employment are known as the **initial** impacts. The subsequent demands by the firms receiving this impact from all other intermediate sectors per each dollar of output is termed the **direct multiplier**. There is also a series of successive purchases, in following expenditure rounds, that occurs when firms in the intermediate sectors increase their production to satisfy the first-round increase in business demands. The sum of these effects is known as the **indirect multiplier**. As well, the effect of increased salaries to households leads to increased consumption (known as **induced demand**). The ratio of the sum of the multipliers on business outputs (initial, direct and indirect impacts) compared to the initial impact is termed the Total Output Multiplier (Closed Model). If the effect of induced demands is added as well to the sum of multipliers, the ratio is known as the Total Output Multiplier (Open Model).

In this section, the modelled impacts on the local, regional and state economies using IO multipliers are reported. The analysis was conducted accepting the potential income and expenditure data provided. A sensitivity analysis is included in the modeling exercise to account for different potential levels of induced demand. This could occur if different proportions of the workforce were based in the local area (30%, 40%, 50%, 100%), or the state (80%, 100%). Different models were calculated for each year of construction, with results summarized in Table 9.5.

The model outcomes are discussed for Year 1 which is the peak year of construction, assuming local employment rates in the Fitzroy and Queensland regions are 30% and 80% respectively. The impacts can be understood in Table 9.5 by adding to the initial impact (identified first in each section) the range of followup impacts (direct, indirect and induced impacts). The sum of the initial impact and the followup impacts provides an estimate of the total impact on the relevant economy.

Output Effects

Each dollar invested in the construction of new projects can be expected to produce a direct effect of $0.30 on the output of other intermediate sectors for industries in Fitzroy region and Queensland. The total (initial, direct, indirect and induced) impact of each dollar invested in new developments is expected to be $1.70 in the Fitzroy region and $2.31 in Queensland. That

means that each dollar invested can be expected to result in additional $0.70 in output of industries in the Fitzroy region and $1.31 in additional output in Queensland.

Income Effects

Income multipliers from each dollar invested in the construction stage of the proposed projects in the first year would initially increase household income in the Fitzroy region and Queensland through payments to the construction workforce of $0.06 and $0.17 respectively. After followup effects are considered, the total income multipliers for the two regions are expected to be $0.21 and $0.46 respectively.

Type I and Type II multipliers illustrate a relationship between initial or own sector income effects and flow-on income effects. Type I and Type II multipliers show respectively that for each dollar change in household income of construction employees, there will occur at the Fitzroy region and Queensland a change of $2.50 and $1.68 respectively (direct and indirect only) and $3.27 and $2.70 respectively (direct, indirect and induced effects).

Employment Effects

Employment multipliers from each $10m invested in the construction stage of the proposed projects would directly result in employment of 15 persons in each of the Fitzroy region and Queensland in both the initial and direct impact stages, 10 persons through indirect industrial support in the Fitzroy region (14 persons in Queensland), and 13 persons from the induced effect in the Fitzroy region (44 persons in Queensland). This gives a total possible employment effect of 52 persons in the Fitzroy region and 88 persons in Queensland for each $10m spent on construction.

Type I and Type II employment multipliers can be used to summarize these impacts. Type I multipliers (direct and indirect effects only) show that for each person employed in the construction stages, an additional 1.7 persons will be employed in the Fitzroy region and 2 persons in Queensland. The Type II multipliers (direct, indirect and induced effects) show that for each person employed in the construction stages, an additional 2.5 persons will be employed in the Fitzroy region and an additional 4.9 persons will be employed in Queensland.

Table 9.5 Output, Income and Employment Multipliers, Construction Phase of Developments: Fitzroy Statistical Division and Queensland regions, 2004.

Year 1	**$825m**					
Multipliers	**Fitzroy Statistical Division**				**Queensland**	
Output	**100%**	**30%**	**40%**	**50%**	**100%**	**80%**
Initial	1	1	1	1	1	1
First Round (Direct)	0.3044	0.3044	0.3044	0.3044	0.3047	0.3041
Industrial Support (Indirect)	0.1954	0.1955	0.1955	0.1955	0.2856	0.2850
Consumption (Induced)	0.3922	0.2023	0.2294	0.2565	0.8223	0.7187
Total	**1.8920**	**1.7022**	**1.7292**	**1.7563**	**2.4126**	**2.3078**
Total Output Multiplier (Closed Model)	1.4998	1.4998	1.4998	1.4998	1.5903	1.5891
Total Output Multiplier (Open Model)	1.8920	1.7022	1.7292	1.7563	2.4126	2.3078
Income						
Initial	0.2121	0.0636	0.0848	0.106	0.2103	0.1695
First Round (Direct)	0.0585	0.0583	0.0584	0.0584	0.0591	0.0590
Industrial Support (Indirect)	0.0375	0.0371	0.0372	0.0372	0.0566	0.0564

Consumption (Induced)	0.0950	0.0488	0.0554	0.062	0.1967	0.1719
Total	**0.4030**	**0.2079**	**0.2357**	**0.2635**	**0.5227**	**0.4569**
Type I	1.4526	2.5015	2.127	1.9023	1.5501	1.6813
Type II	1.9004	3.2697	2.7806	2.4872	2.4856	2.6958
Employment						
Initial	1.4736	1.4737	1.4737	1.4737	1.4761	1.4732
First Round (Direct)	1.4863	1.4864	1.4864	1.4864	1.5088	1.5059
Industrial Support (Indirect)	0.9466	0.9467	0.9467	0.9467	1.4194	1.4166
Consumption (Induced)	2.4345	1.2557	1.4238	1.592	4.9846	4.3567
Total	**6.3411**	**5.1626**	**5.3307**	**5.4988**	**9.3890**	**8.7524**
Type I	2.6510	2.651	2.651	2.651	2.9837	2.9837
Type II	4.3031	3.5031	3.6172	3.7313	6.3605	5.9409
Year 2	**$403m**					
Multipliers	**Fitzroy Statistical Division**				**Queensland**	
Output	**100%**	**30%**	**40%**	**50%**	**100%**	**80%**
Initial	1	1	1	1	1	1
First Round (Direct)	0.3044	0.3043	0.3043	0.3043	0.3041	0.3038
Industrial Support (Indirect)	0.1943	0.1942	0.1942	0.1942	0.2849	0.2846
Consumption (Induced)	0.3913	0.2026	0.2297	0.2569	0.8256	0.7214
Total	**1.8899**	**1.7010**	**1.7282**	**1.7553**	**2.4146**	**2.3098**
Total Output Multiplier (Closed Model)	1.4986	1.4985	1.4985	1.4985	1.5890	1.5884
Total Output Multiplier (Open Model)	1.8899	1.7010	1.7282	1.7553	2.4146	2.3098
Income						
Initial	0.2121	0.0640	0.0853	0.1066	0.2118	0.1707
First Round (Direct)	0.0586	0.0584	0.0585	0.0585	0.0590	0.0590
Industrial Support (Indirect)	0.0373	0.0372	0.0372	0.0372	0.0564	0.0564
Consumption (Induced)	0.0950	0.0491	0.0557	0.0623	0.1975	0.1726
Total	**0.4030**	**0.2087**	**0.2366**	**0.2646**	**0.5248**	**0.4586**
Type I	1.4526	2.4946	2.1215	1.8977	1.5451	1.6757
Type II	1.9006	3.2625	2.7748	2.4822	2.4775	2.6870
Employment						
Initial	3.0177	3.0167	3.0167	3.0167	3.0226	3.0193
First Round (Direct)	1.4911	1.4907	1.4907	1.4907	1.5060	1.5043
Industrial Support (Indirect)	0.9492	0.9489	0.9489	0.9489	1.4169	1.4153
Consumption (Induced)	2.4403	1.2633	1.4326	1.6019	5.0056	4.3741
Total	**7.8982**	**6.7195**	**6.8888**	**7.0582**	**10.9511**	**10.3131**
Type I	1.8087	1.8087	1.8087	1.8087	1.9670	1.9670
Type II	2.6173	2.2274	2.2835	2.3397	3.6231	3.4157

Year 3 / Year 4	**$269m**					
Multipliers	**Fitzroy Statistical Division**				**Queensland**	
Output	**100%**	**30%**	**40%**	**50%**	**100%**	**80%**
Initial	1	1	1	1	1	1
First Round (Direct)	0.3166	0.3164	0.3164	0.3164	0.3159	0.3159
Industrial Support (Indirect)	0.2017	0.2016	0.2016	0.2016	0.2960	0.2959
Consumption (Induced)	0.3557	0.1951	0.2182	0.2412	0.7598	0.6683
Total	1.8740	1.7131	1.7362	1.7592	2.3716	2.2801
Total Output Multiplier (Closed Model)	1.5183	1.5180	1.5180	1.5180	1.6119	1.6118
Total Output Multiplier (Open Model)	1.8740	1.7131	1.7362	1.7592	2.3716	2.2801
Income						
Initial	0.1805	0.0543	0.0724	0.0906	0.1813	0.1450
First Round (Direct)	0.0610	0.0608	0.0608	0.0608	0.0613	0.0613
Industrial Support (Indirect)	0.0388	0.0386	0.0387	0.0387	0.0586	0.0586
Consumption (Induced)	0.0864	0.0474	0.0530	0.0586	0.1818	0.1599
Total	0.3666	0.2011	0.2249	0.2486	0.4830	0.4249
Type I	1.5528	2.8299	2.3730	2.0988	1.6616	1.8270
Type II	2.0317	3.7017	3.1041	2.7456	2.6644	2.9296
Employment						
Initial	3.8560	3.8537	3.8537	3.8537	3.8573	3.8571
First Round (Direct)	1.5530	1.5521	1.5521	1.5521	1.5644	1.5643
Industrial Support (Indirect)	0.9878	0.9872	0.9872	0.9872	1.4719	1.4718
Consumption (Induced)	2.2211	1.2185	1.3624	1.5063	4.6069	4.0522
Total	8.6178	7.6115	7.7553	7.8992	11.5004	10.9454
Type I	1.6589	1.6589	1.6589	1.6589	1.7872	1.7872
Type II	2.2349	1.9751	2.0124	2.0498	2.9815	2.8377

9.5.2. The Operating Phase of the Projects

Detailed breakdowns of output, income and employment multiplier effect relating to the operational stage of the projects in each of three economies are presented in Tables 9.6 and 9.7[6].

The Coke Plant

Output Effects

Each dollar of the output of the Coke Plant project (the initial effect) can be expected to produce a direct effect of $0.10 on the output of other intermediate sectors on industries in the Rockhampton region, $0.58 on industries in the Fitzroy region and $0.59 in Queensland. The total (initial, direct, indirect and induced) impacts of each dollar of the output of the Coke Plant project is expected to be $1.21 in the Rockhampton region, $2.11 in the Fitzroy region and $2.49 at the state level. That means that each dollar of the output can be expected to generate an additional 21 cents in output of industries in the Rockhampton region, $1.11 for industries in the Fitzroy region and $1.49 for industries in Queensland.

Income Effects

Income multipliers from each dollar of the output of the Coke plant project would initially increase household income in the Rockhampton region through payments to employees of $0.016, a direct impact on supplier employees of $0.018, indirectly through industrial support linkages locally by $0.01, with an induced effect of $0.02, for a total effect of $0.07.

Type I and Type II multipliers show respectively that for each dollar change in household income of Coke plant employees, there will occur at the Rockhampton Region level a change of $2.81 (direct and indirect only) and $4.02 (direct, indirect and induced effects).

Income multipliers from each dollar of the output of the Power Plant project would directly increase household income in the Fitzroy region through initial payments to employees of $0.016, first round direct payments of $0.08, indirectly through industrial support linkages by $0.06, with an induced effect of $0.04, for a total effect of $0.20. In the Fitzroy region. The Type I and II income multiplier ratios are respectively 9.78 (direct and indirect only) and 12.55 (direct, indirect and induced effects).

Income multipliers from each dollar of the output of the Coke Plant project would directly increase household income in Queensland through initial payments to employees of $0.016, direct round payments to supplier employees of $0.09, indirectly through industrial support linkages locally by $0.08, with an induced effect of $0.11, for a total effect of $0.30. In Queensland, the Type I and II income multiplier ratios are respectively 11.54 (direct and indirect only) and 18.50 (direct, indirect and induced effects).

[6] The following analysis is based on the assumption that all inputs in the intermediate quadrant for the Coke plant and the Power plant are the same for Rockhampton, Fitzroy and Queensland. That means that the local (Rockhampton region) industry is fully capable to meet the demand of these projects for maintenance, services, etc. The exception is the Finance Sector – it is treated mostly as an "import" for the Rockhampton and Fitzroy regions but it is assumed that on the Queensland level it is in the intermediate quadrant (i.e. that finance is supplied at the state level).

The employment multipliers are based on the national coefficients for the coal industry. This means that the assumed labor intensity may be higher than what is realistic for the Fitzroy Statistical Division.

Table 9.6 Output, Income and Employment Multipliers, Coke Plant: Rockhampton, Fitzroy Region and Queensland, 2004

Multipliers	**Rockhampton Region**	**Fitzroy Region**	**Queensland**
Output			
Initial	1	1	1
First Round (Direct)	0.0863	0.5825	0.591
Industrial Support (Indirect)	0.0517	0.2998	0.4265
Consumption (Induced)	0.0751	0.2255	0.4674
Total	**1.2131**	**2.1078**	**2.4849**
Total Output Multiplier (Open Model)	1.1379	1.8823	2.0176
Total Output Multiplier (Closed Model)	1.2131	2.1078	2.4849
Income			
Initial	0.0161	0.0161	0.0161
First Round (Direct)	0.018	0.0845	0.0862
Industrial Support (Indirect)	0.0111	0.0566	0.0831
Consumption (Induced)	0.0194	0.0444	0.1118
Total	**0.0646**	**0.2016**	**0.2972**
Type I ratio	2.8113	9.7839	11.538
Type II ratio	4.0207	12.5468	18.501
Employment			
Initial	0.1673	0.1673	0.1673
First Round (Direct)	0.4095	0.9448	0.986
Industrial Support (Indirect)	0.2734	1.2527	1.8879
Consumption (Induced)	0.4977	1.0913	2.834
Total	**1.3479**	**3.4560**	**5.8753**
Type I ratio	5.0819	14.1316	18.1787
Type II ratio	8.0568	20.6528	35.1184

Employment Effects

Employment multipliers from each additional $10m of the output of the Coke Plant project would result in the initial employment of 1.7 persons, direct employment by suppliers of 4 persons in the Rockhampton Region, 3 persons through indirect industrial support, and 5 persons from the induced effect. This gives a total possible employment of 13 persons for each $10m of output of Coke plant.

Type I and Type II multipliers show respectively that for each person employed in the Coke plant an additional 5 persons will be employed (direct and indirect only) and 8 persons (direct, indirect and induced effects) in Rockhampton Region.

In the Fitzroy region, employment multipliers from each additional $10m of the output of the Coke Plant project would generate initial employment of 1.7 persons, direct employment by suppliers of 9 persons, 12.5 persons through indirect industrial support, and 11 persons from the induced effect. This gives a total possible employment of 35 persons for each $10m of output of Coke plant. The Type I and II employment multiplier ratios are respectively 14 (direct and indirect only) and 21 (direct, indirect and induced effects).

In Queensland, employment multipliers from each additional $10m of the output of the Coke Plant project would generate initial employment of 1.7 persons, direct employment by suppliers

of 10 persons in Queensland, 19 persons through indirect industrial support, and 28 persons from the induced effect. This gives a total possible employment of 59 persons for each $10m of output of Coke plant. In Queensland, the Type I and II employment multiplier ratios are respectively 18 (direct and indirect only) and 35 (direct, indirect and induced effects).

The Power Plant

Output Effects

Each dollar of the output of the Power Plant project can be expected to produce an indirect effect of $0.11 on the output of other industries in the Rockhampton region, $0.40 on industries in the Fitzroy region and $0.48 on industries in Queensland.

The total (initial, direct, indirect and induced) impacts of each dollar of the output of the Power Plant project is expected to be $1.76 in the Rockhampton region, $2.08 in the Fitzroy region and $2.36 for industries in Queensland. That means that each dollar of the output can be expected to result in additional 76 cents in output of industries in the Rockhampton region, $1.08 for industries in the Fitzroy region and $1.36 for industries in Queensland.

Income Effects

Income multipliers from each additional dollar of the output of the Power Plant project would directly increase household income in Rockhampton Region through payments to employees of $0.05, payments to direct supplier employees $0.03, indirectly through industrial support linkages locally by $0.02, with an induced effect of $0.04, for a total effect of $0.14. Type I and Type II multipliers show respectively that for each dollar change in household income of Power Plant employees, there will occur at the Rockhampton Region level a change of $2 (direct and indirect only) and $3 (direct, indirect and induced effects).

Income multipliers from each dollar of the output of the Power Plant project would directly increase household income in Fitzroy region through payments to employees of $0.05, payments to direct supplier employees $0.03, indirectly through industrial support linkages locally by $0.07, with an induced effect of $0.04, for a total effect of $0.18. In the Fitzroy region, the Type I and II income multipliers are respectively $3 (direct and indirect only) and $3.90 (direct, indirect and induced effects).

Income multipliers from each dollar of the output of the Power Plant project would directly increase household income in Queensland through payments to employees of $0.05, payments to direct supplier employees $0.03 indirectly through industrial support linkages locally by $0.08, with an induced effect of $0.10, for a total effect of $0.26. In Queensland, the Type I and II income multipliers are respectively $3 (direct and indirect only) and $5 (direct, indirect and induced effects).

Table 9.7 Output, Income and Employment Multipliers, Power Plant: Rockhampton, Fitzroy Region and Queensland, 2004.

Multipliers	**Rockhampton Region**	**Fitzroy Region**	**Queensland**
Output			
Initial	1	1	1
First Round (Direct)	0.4808	0.4808	0.4808
Industrial Support (Indirect)	0.1094	0.3952	0.4759
Consumption (Induced)	0.1665	0.2033	0.4002
Total	**1.7567**	**2.0793**	**2.3569**
Total Output Multiplier (Open Model)	1.5901	1.8759	1.9567
Total Output Multiplier	1.7567	2.0792	2.3569

(Closed Model)			
Income			
Initial	0.0469	0.0469	0.0469
First Round (Direct)	0.0294	0.0292	0.0292
Industrial Support (Indirect)	0.0238	0.0657	0.0826
Consumption (Induced)	0.043	0.04	0.0958
Total	**0.1431**	**0.1818**	**0.2545**
Type I ratio	2.134	3.0219	3.3844
Type II ratio	3.052	3.8752	5.4268
Employment			
Initial	0.3907	0.3908	0.3907
First Round (Direct)	0.6590	0.6536	0.6544
Industrial Support (Indirect)	0.5709	1.1141	1.5225
Consumption (Induced)	1.103	0.9839	2.427
Total	**2.7236**	**3.1424**	**4.9947**
Type I ratio	4.1476	5.5233	6.5713
Type II ratio	6.9703	8.0410	12.7824

Employment Effects

Employment multipliers from each additional $10m of the output of the Power Plant project would result in the initial employment of 3.9 persons, direct employment of 6.6 persons in the Rockhampton Region, 5.7 persons through indirect industrial support, and 11 persons from the induced effect, giving a total possible employment of 27 for each additional $10m of output of Power plant. Type I and Type II multipliers show respectively that for each person employed in the Power plant an additional 4 persons will be employed (direct and indirect only) and 7 persons (direct, indirect and induced effects) in the Rockhampton Region.

In the Fitzroy region, employment multipliers from each additional $10m of the output of the Power Plant project would result in the initial employment of 3.9 persons, direct employment of 6.6 persons, 11 persons through indirect industrial support, and 10 persons from the induced effect. This gives a total possible employment of 31 for each additional $10m of the output of the Power plant. The Type I and II employment multipliers are respectively 5.5 persons (direct and indirect only) and 8 persons (direct, indirect and induced effects).
In Queensland, employment multipliers from each additional $10m of the output of the Power Plant project would result in the initial employment of 3.9 persons, direct employment of 6.6 persons, 15 persons through indirect industrial support, and 24 persons from the induced effect. This gives a total possible employment of 50 for each additional $10m of output of Power plant. The Type I and II employment multipliers are respectively 7 persons (direct and indirect only) and 13 persons (direct, indirect and induced effects).

9.5.3. The Aggregate Effects of the Projects

The multipliers presented earlier display the outcomes of the models built to predict economic impacts of construction and operational stages on the three economies of interest. In this section, those models are used to predict actual changes in output, income and employment.

It should be stressed that multipliers can not be mechanically applied but require consideration of limitations of Input-Output method (Ivanova and Rolfe 2005) and careful interpretation based on how realistically they predict real world economic impacts (Mandeville and Jensen 1978).

9.5.3.1. The Construction Phase of the Projects

The effect of the construction stage on the regional and state economy is summarized in Table 9.8. The assumptions stated earlier in the analysis are relevant to the predictions made. Results

have been estimated for 30%, 40% and 50% of construction workers living in the region, and 80% of workers living within Queensland[7].

The increase in final demand for the output of the building and construction industry is shown in the row labeled "Final Demand". Figures in rows "Direct", "Indirect" and "Induced" were obtained by multiplying the initial increase in final demand by the appropriate multipliers from Table 9.5. Figures in rows labeled "Total" were obtained by summing the appropriate rows in this table. Income and employment were estimated based on the local industry coefficients in order to have consistent estimates within the building and construction industry regarding wages and employment.

[7] In order to do this, a separate "construction industry for the project" category has been created in the input output table in the Fitzroy region and Queensland region to make the manipulation more transparent. Based on the same relationship as the local coefficient, the income and employment entries were changed to reflect "local" assumptions. The income of the workers from the new industry has been reduced to the appropriate percentage, the rest of income added as imports to reflect flows out of the region. The employment figure was left the same, reflecting that all these workers actually live in the region for the period of the construction (e.g. in a work camp).
The employment for years 3 and 4 and the respective proportion of wages and salaries was reduced by 217 persons who were employed only for the first two years (20 months) of the Power Plant construction.

Table 9.8 Output, Income and Employment Multipliers, Construction Phase of Developments: the Fitzroy region and Queensland, $M, 2004.

Year 1				
	Fitzroy SD			**Queensland**
Multipliers	**30%**	**40%**	**50%**	**80%**
Output ($ Million)				
Final Demand	824	824	824	824
First round (Direct)	251	251	251	251
Industrial Support (Indirect)	161	161	161	235
Consumption (Induced)	167	189	211	593
Total	1,403	1,426	1,448	1,903
Income ($ Million)				
Final Demand	52	70	87	140
First round (Direct)	48	48	48	48
Industrial Support (Indirect)	31	31	31	47
Consumption (Induced)	40	46	51	142
Total	171	194	217	377
Employment, persons				
Final Demand	1,215	1,215	1,215	1,215
First round (Direct)	1,225	1,225	1,225	1,242
Industrial Support (Indirect)	781	781	781	1,168
Consumption (Induced)	1,035	1,174	1,313	3,592
Total	4,256	4,395	4,533	7,216
Year 2				
	Fitzroy SD			**Queensland**
Multipliers	**30%**	**40%**	**50%**	**80%**
Output ($ Million)				
Final Demand	403	403	403	403
First round (Direct)	123	123	123	123
Industrial Support (Indirect)	78	78	78	115
Consumption (Induced)	82	92	103	290
Total	685	696	707	930
Income ($ Million)				
Final Demand	26	34	43	69
First round (Direct)	24	24	24	24
Industrial Support (Indirect)	15	15	15	23
Consumption (Induced)	20	22	25	69
Total	84	95	107	185
Employment, persons				

Final Demand	1,215	1,215	1,215	1,216
First round (Direct)	600	600	600	606
Industrial Support (Indirect)	382	382	382	570
Consumption (Induced)	509	577	645	1,761
Total	2,705	2,773	2,842	4,152
Year 3				
	Fitzroy SD			**Queensland**
Multipliers	**30%**	**40%**	**50%**	**80%**
Output ($ Million)				
Final Demand	85	85	85	85
First round (Direct)	54	54	54	80
Industrial Support (Indirect)	53	59	65	180
Consumption (Induced)	461	468	474	614
Total	653	666	678	959
Income ($ Million)				
Final Demand	15	20	24	39
First round (Direct)	16	16	16	16
Industrial Support (Indirect)	10	10	10	16
Consumption (Induced)	13	14	16	43
Total	54	61	67	114
Employment, persons				
Final Demand	1,038	1,038	1,038	1,039
First round (Direct)	418	418	418	421
Industrial Support (Indirect)	266	266	266	396
Consumption (Induced)	328	367	406	1,091
Total	2,050	2,088	2,127	2,947
Year 4				
	Fitzroy SD			**Queensland**
Multipliers	**30%**	**40%**	**50%**	**80%**
Output ($ Million)				
Final Demand	85	85	85	85
First round (Direct)	54	54	54	80
Industrial Support (Indirect)	53	59	65	180
Consumption (Induced)	461	468	474	614
Total	653	666	678	959
Income ($ Million)				
Final Demand	15	20	24	39

First round (Direct)	16	16	16	17
Industrial Support (Indirect)	10	10	10	16
Consumption (Induced)	13	14	16	43
Total	54	61	67	114
Employment, persons				
Final Demand	1,038	1,038	1,038	1,039
First round (Direct)	418	418	418	421
Industrial Support (Indirect)	266	266	266	396
Consumption (Induced)	328	367	406	1,091
Total	2,050	2,088	2,127	2,947

Output Effects

Year 1

The peak construction spending is in Year 1. The direct impact of investment can be expected to be $251m on industries in the Fitzroy region if only 30% of the workforce is living and spending in that area. The total (direct, indirect and induced) impact of the construction of the new developments is expected to be $1,403m in the Fitzroy region. That means that construction stage investments can be expected to result in additional $579m in output of industries in the Fitzroy region.

At the Queensland level, under the assumption that about 80% of the workers will be living and spending in Queensland, a total output effect of $1,903M is expected, thus bringing $1,079M in additional output in the Queensland region.

Year 2

In Year 2, the total impact on construction activities is expected to be $685M in the Fitzroy region and $930M in Queensland. This means that construction stage investments can be expected to result in additional $282M in output of industries in the Fitzroy region and $527m in Queensland.

Year 3

In Year 3, the total impact on construction activities is expected to be $653M in the Fitzroy region and $959M in Queensland. That means that construction stage investments can be expected to result in an additional $568m and $874m output respectively.

Year 4

The effect of the construction stage in Year 4 is expected to be similar to year three under the modeling assumptions used.

Income Effects

Year 1

If the regional income coefficients are used for calculating the income multipliers, then the construction stage of the proposed projects would directly increase household income in the Fitzroy region and Queensland through payments to the construction workforce of $48m and indirectly through industrial support linkages locally by $31m to Fitzroy and $47 to Queensland, with an induced effect of $40m and $142m respectively, for a total effect of $171m and $377m respectively.

Year 2

The total (direct, indirect and induced) impact of investment in new developments is expected to be $84m in the Fitzroy region and $185m in Queensland. This means that construction stage investments can be expected to result in additional $58m in output of industries in the Fitzroy region and $116m in Queensland.

Year 3 / 4
The total (direct, indirect and induced) impact of investment in new developments is expected to be $54m in the Fitzroy region and $114m in Queensland (additional $39m in output of industries in the Fitzroy region and $75m in Queensland).

Employment Effects

Year 1
The construction stage of the proposed projects (following an initial average stimulus of 1,215 extra persons employed for construction of the projects) would directly result in employment of 1,225 persons in the Fitzroy region, 781 persons through indirect industrial support, and 1,035 persons from the induced effect, giving a total possible employment of 4,256 persons. The effect on employment in Queensland will be higher, with an induced effect of 3,592 people to give total additional employment of 7,216 persons.

Year 2
The effect on employment in Year 2 of the construction stage will be lower than in Year 1 due to reduction in the construction activity. The changes are expected to be an induced effect of 509 people for a total of 2,705 persons in the Fitzroy region and an induced effect of 1,761 people for a total of 4,152 persons in Queensland.

Year 3
The effect on employment in Year 3 of the construction stage will be lower than in Year 2 due to the completion of the construction of the Power Plant. The total effects are expected to be an induced effect of 328 people giving the total of 2,050 persons in the Fitzroy region and an induced effect of 1,091 people with the total of 2,947 persons in Queensland.

9.5.3.2. The Operating Phase Effects

The economic impact of the construction phase is non-permanent in nature but the economic impact of the operational phase is. The economic impacts of each of three developments on Rockhampton Region and Fitzroy Statistical Division are illustrated in Tables 9.9 and 9.10. Each table has the same format as the aggregate impact tables in previous section.

Thus, in the Rockhampton region the total (direct, indirect and induced) impacts of operational phase of Coke plant on industry output, household income and employment is expected to be $906 m, $48m and 1,007 jobs respectively. At the Fitzroy Statistical Division level, these effects become larger: $1,574 m, $150m and 2,582 jobs respectively. The impacts are increased at the State level: $1,856 m, $222m and 4,389 jobs respectively.

Table 9.9 Economic Impact of the Coke plant, Operational Phase of Developments, 2004.

	Industry Output, $M	**Household Income, $M**	**Employment , persons**
Rockhampton Region			
Initial	747	12	125
First Round (Direct)	64	13	306
Industrial Support (Indirect)	39	8	204
Consumption (Induced)	56	14	372
Total	**906**	**48**	**1,007**
Fitzroy Region			

First Round (Direct)	435	63	706
Industrial Support (Indirect)	224	42	936
Consumption (Induced)	168	32	815
Total	**1,574**	**150**	**2,582**
Queensland			
First Round (Direct)	441	64	737
Industrial Support (Indirect)	319	62	1,410
Consumption (Induced)	349	84	2,117
Total	**1,856**	**222**	**4,389**

Table 9.10 Economic Impact of the Power plant, Operational Phase of Developments, 2004.

	Industry Output, $M	**Household Income, $M**	**Employment , persons**
Rockhampton Region			
Initial	50	2	20
First Round (Direct)	24	1	33
Industrial Support (Indirect)	5	1	29
Consumption (Induced)	8	2	55
Total	**88**	**7**	**136**
Fitzroy Region			
Initial	50	2	20
First Round (Direct)	24	1	33
Industrial Support (Indirect)	20	3	56
Consumption (Induced)	10	2	49
Total	**104**	**9**	**157**
Queensland			
Initial	50	2	20
First Round (Direct)	24	1	33
Industrial Support (Indirect)	24	4	76
Consumption (Induced)	20	5	121
Total	**118**	**13**	**250**

The impact of the Power Station at full capacity is expected to increase output, income and employment in the Rockhampton region by $88 million, $7 million, and 136 jobs respectively.

The combined impacts of both developments at full capacity are expected to increase output, income and employment in the Rockhampton region by $994 million, $55 million, and 1,143 jobs respectively. At the Fitzroy Statistical Division level, the impact will be an increase in output, income and employment by $1,678 million, $160 million, and 2,739 jobs respectively and in Queensland: an increase in output, income and employment by $1,974 million, $235 million, and 4,639 jobs respectively.

9.6. Discussion

9.6.1. Sensitivity Analysis

A sensitivity analysis can be performed in different ways to test whether the estimated effects are over- or under- estimated due to the limitations of the input-output method and the data used. One level of the sensitivity analysis has already been reported in Tables 9.5 and 9.8, where the effects of different proportions of workers living in the local region were modeled.

A comparison of productivity coefficients obtained from the project data provided by the proponents with productivity coefficients estimated from the national Input-Output tables showed that the proposed projects were much more efficient than comparable national industries. The results, summarized in Table 9.11 below, showed very low employment to output ratios, and low wages and salaries to output ratios, for both the Coke and Power projects. This is likely to be the result of more intensive and better technology being applied in industrial processes.

Table 9.11 Productivity comparisons between the projects and National Industry Sectors

	Petroleum and Coal products (National)	Qld Coke project	Electricity supply (National)	Power project
Output/employee ($M/person)	1.7585	7.47	0.4954	2.55
Employees/output (person/$M)	1	0.13	2	0.39
Wages/employee ($thous/person)	58	120	57	120

These results raise the possibility that improved productivities and efficiencies within the economy more generally may mean that increased demands for business inputs and consumer items can be met with lower increases in economic activity. In this case, the predicted impacts of the construction and operating stages of the projects may be overstated. In particular, the predicted changes in income and employment may be higher than what would occur in a more efficient economic system.

A rough sensitivity analysis has been performed for the Operating stage by increasing the productivity of output in the Coal sector in the Input-Output model by 2.2 times. This is a rounded average of the comparison between project and national productivity ratios reported in Table 9.11. In the modeling exercise, the output of the coal industry was adjusted by increasing it by 2.2 times, the compensation of employees was used from the official data, and the Gross Operating Surplus was increased to $10b for Queensland and $3.3b for Fitzroy. The results should be treated with caution because only coal prices were adjusted as a surrogate for increased productivity.

The results (Table 9.12) show that while the output effects remain similar, the previous analysis may have overestimated the income and employment effects: about 25% for the income effect and around 20% for the employment effect. The ratios of multipliers were obtained by dividing the multiplier estimated with the adjustment by the multiplier estimated without the adjustment. This suggests that the results of the earlier analysis can be best considered as the upper limit to the expected impacts. The impacts of improved productivity mean that the ‘ripple’ impacts on local businesses and population are likely to be smaller. However, returns from a more efficient process are likely to be higher, meaning that there will be other positive impacts through such mechanisms as profits and dividends.

Table 9.12 The difference in total multipliers if adjusted for productivity changes.

Ratio of Multipliers	**Fitzroy Region, 100%**	**Queensland, 100%**
Output	0.970	0.955
Income	0.741	0.772
Employment	0.801	0.818

9.6.2. Factors that influence the economic 'ripple' effects.

The distribution of the subsequent 'ripple' effects in the local, regional or state economy is dependent on a number of factors. One key issue is the extent to which local firms have the capability and capacity to provide goods and services, while a second issue is the extent to which opportunities exist for the new development to facilitate further service and industrial development in the region. Both of these issues are considered in turn.

9.6.2.1. The capability and capacity of local firms

The central Queensland region has a strong and diversified economy, as shown by employment levels in key sectors relevant to the project.

Table 9.13 Employment by industry in key sectors

		Manufacturing	Electricity, Gas and Water Supply	Construction	Wholesale Trade	Transport and Storage
Fitzroy LGA		394	85	268	261	340
	%	9.7	2.1	6.6	6.4	8.3
Rockhampton LGA		2374	540	1440	1388	1,566
	%	9.8	2.2	5.9	5.7	6.5
Livingstone LGA		832	141	808	414	450
	%	8.2	1.4	7.9	4.1	4.4
Mt Morgan LGA		52	9	44	22	38
	%	8.4	1.5	7.1	3.6	6.1
Calliope LGA		1543	99	562	227	362
	%	24.2	1.6	8.8	3.6	5.7
Gladstone LGA		2229	330	1019	640	973
	%	18.5	2.7	8.5	5.3	8.1
Central Qld. region		7424	1204	4141	2952	57582
	%	16.3	2.6	9.1	6.5	8.2
Queensland		167380	12359	111209	79718	77,587
	%	10.7	0.8	7.1	5.1	4.9

Source: 2001 Census, Australian Bureau of Statistics.

Proportionally, there is more labour involved within key construction sectors in the local and regional area than there is within the state. This suggests that there is the capability within the region to satisfy a proportion of the construction and operating requirements.

The capacity of businesses within the region to satisfy construction and operating demands is dependent to some extent on other economic factors. A major boom in the coal industry has occurred since mid-2004, with a number of coal mines ramping up production since that period. There has been substantial project construction in the region, with the development of the Rolleston Coal Mine and the Minerva Mine near Springsure, the expansion of the Ensham Mine at Emerald, and the construction of new washplant and conveyor facilities at the Curragh Mine near Blackwater. There have also been flow-on impacts in the transport sector, with additional

construction occurring in rail and port facilities. At the same time, developments in the housing market have meant there has been substantial activity in that sector.

The capacity of regional businesses to engage with the Coke and Power plants will depend to some extent on the timing of construction and service demands from other industries within the region. However, the level and diversity of growth in the area means that it will become easier to develop new businesses in the region. Spreading the construction period for the Coke plant over two stages will make it more attractive for service and construction businesses to establish in the regional area.

9.6.2.2. Opportunities for further developments

It is likely that infrastructure will be developed to allow additional businesses to locate in the region. When there were proposals to build the AMC plant at Stanwell, general plans were developed to build an industrial corridor between Gracemere and Stanwell. Some key advantages in locating industrial growth in this area are the proximity to power and transport services, the relative isolation from population areas, and the potential for synergies between industrial processes to be achieved.

The Fitzroy Industry and Infrastructure Study (FIIS) was initiated to facilitate major industry development in the Rockhampton-Fitzroy area by planning for the infrastructure needs of strategic development opportunities. The FIIS is driven and funded by the Project Partners which include the Queensland Government (via a partnership between the Coordinator-General and the Department of State Development Trade and Innovation); the Rockhampton City Council; the Fitzroy and Livingstone Shire Councils; Rockhampton Regional Development Limited; and the Stanwell Corporation (DSDTI, 2005).

The FIIS has identified two major corridors in which future development opportunities are most likely to occur:

1). the '*Stanwell-Gracemere Industrial Corridor'*, which is focussed on a mix of large scale, energy intensive industries, light and medium manufacturing enterprises, and stockfeed, stock-waste, meat and meat by-products processing; and
2). the '*Fitzroy Agricultural Corridor*' (FAC) between the McKenzie-Dawson River junction and the lands around the Eden Bann Weir which will be focussed on intensive animal husbandry (predominantly cattle) and associated feed cropping, with some opportunistic irrigated horticulture.

DSDTI (2005) report the FIIS will provide greater certainty for strategic infrastructure provision, and encourage the development of high value industries in sectors in which the region has a clear comparative advantage. The Industry corridor will be an attractive location to major investment projects due to the reliable supply of low cost energy from the Stanwell Power Station, access to strategic transport routes and availability of appropriately sized and zoned parcels of land.

While the industrial park between Gracemere and Stanwell remains a long-term goal, there are other areas available (principally at Gracemere and North Rockhampton) for industrial development. Many of the drivers for further development will come from the growth in the mining sector. The Rockhampton City Council has initiated a CQ Mining Growth Project to encourage more of the mining supply and service industry to locate in Rockhampton. Industry sectors targeted by that initiative to locate in Rockhampton include:

Heavy industrial equipment	Mining education and training	Hardware and safety equipment
Equipment fabrication	Steel	Drilling
Electrical repairs	Information technology	Industrial services
Commercial products	Concrete products	Manufacturing
Hydraulic specialists	Safety services	Engineering
Soil technology	Human resource consultants	Industry communication

The existing industrial development and the expanding coal mines of Central Queensland have developed a significant market for engineering firms in the region. A range of local, national and international consulting engineers are represented in the area, offering the expertise and technical support to manage projects from the smallest residential and commercial developments through to major industry expansions and Greenfield locations. There are over 30 engineering workshops, ranging from small specialist machine shops to large fabrication firms undertaking construction and maintenance for new and existing industry. The Regional Engineering Group – Rockhampton (REG) has been formed to pursue significant components of relevant work from current and proposed major industrial projects (RRDL, 2005). With strong underlying objectives in employment, training and apprenticeships, a major aim of REG is to enhance regional engineering to its full potential.

9.6.2.3. Dealing with labour market shortages

One particular impact of the development of the Coke and Energy plants is that it is likely to exacerbate shortages of skilled labour in the region. At the same time, the creation of additional jobs in the labouring and semi-skilled trades areas will create further economic opportunities in the area, and help to move people in the area into full-time work.

An analysis of the workforce requirements relative to the existing labour market has been provided in the social impact assessment for both the construction and operating stages (Tables 3.1 and 3.3 respectively). The results show that the construction stage of the project will require a modest proportion of the local force, while the operating stage will take a small proportion of the available workforce. The areas where the largest proportion of the available workforce in the Rockhampton Statistical Division would be needed for construction are:

- Tradespersons and related workers (15% of the available workforce)
- Labourers and related workers (11% of the available workforce).

These are also the areas where the largest pool of unemployment exists (see discussion in section 2.3), so there is strong potential for the development of the projects to help move people into full-time employment.

However, it is likely that construction of the project will exacerbate skill shortages in the region because of the existing developments in the mining sector and associated transport services, and the strong growth in residential building. Sourcing all skilled workers from the local area would be likely to drain available skills away from existing businesses, and make labour more expensive in the local region. To limit these potential impacts, it will be important, at the regional level, to:

a) engage in training programs to develop skill sets in the regional area, and
b) attract workers with appropriate skills to move into the region.

There is a number of existing government programs to provide training and address skill shortages. Some of the more recent initiatives include:

(a) SmartVET - a three-year state government strategy investing more than $1 billion of government funding to provide skilled workers for key industries relevant to the Queensland economy,

(b) Skilling Solutions Queensland – a pilot program running from 2004/5 to 2006/7 to provide a customised face to face career information and assessment service, and

(c) Training in Communities Program – a program operating from July 2005 to provide training and related assistance to people who are least competitive in the labour market.

It is recommended that a close relationship be established between the project proponents, local and state governments, and the labour training and supply sector so that training and importation of labour proceeds smoothly and efficiently. Further use of existing apprenticeship, worker training and support services for disadvantaged groups is recommended to ensure that a range of people within the region further develop skills and move towards full-time employment.

9.6.3. Capturing and capitalizing on the benefits of economic growth

The projects have the potential to deepen the economic base of the region and to create economic opportunities by stimulating business activity and employment. Many of the economic impacts of the project may be spread more widely, as expenditure and profits flow to interstate and overseas areas. These wider economic benefits help those areas to develop, which in turn, are likely to stimulate more demands for products from central Queensland, including those from agricultural, mining and tourism sectors. The benefits of an open economic system are that focusing on efficient supply of goods and services creates better economic opportunities and more sustained growth patterns.

Economic analysis and monitoring can help to identify where the benefits of a project have been distributed, as well as identifying further opportunities for growth to occur. Mechanisms for reporting and enhancing economic values include:

a. Longitudinal studies of economic impact that occur during and after project construction and operation,

b. Labour force studies that identify how the labour market dynamics change as development and other pressures occur, and

c. Infrastructure and regional growth studies that identify both potential constraints on economic development, and factors that would enhance regional development.

In each of these study areas, the use of economic analysis can help to track:

- the impacts of a project as it moves through development and operating stages,
- further opportunities for development and growth that emerge as a regional economy diversifies and deepens, and
- constraints and bottlenecks that might exist and which limit economic impacts at a regional level.

9.6.3.1. Other major projects in the region

OESR (2005) list major projects in Fitzroy Statistical Division being undertaken or planned as at 30 April 2004, in accordance with the Department of State Development and Innovation's publication *Projects Queensland, 2003-04*. Each project is categorised into one of the following six groups:

1. Projects completed – completed or began operations up until 30 April 2004
2. Projects under construction – commenced construction in the year up until 30 April 2004
3. Projects committed – developers have announced a definite commitment to proceed as at 30 April 2004
4. Projects under study – developers are evaluating to determine economic viability to proceed
5. Government projects – major government projects currently under construction or committed to proceed as at 30 April 2004
6. Research and development and education – major research and development and education projects currently under construction, committed or remaining under study as at 30 April 2004.

Projects completed

1. Mt Miller Pipeline – $17.2 million (Calliope Shire)
2. R G Tanna Coal Terminal – $80 million (Gladstone City)
3. Boyne Island Smelter – $20 million (Calliope Shire)
4. QAL Alumina Refinery Upgrade – $175 million (Gladstone City)
5. Theodore North (part of the Theodore – Dawson Mining Project) – (Banana Shire)
6. Gladstone Road Retail Development – $12 million (Rockhampton City)
7. Red Hill Homemakers Centre – $30 million (Rockhampton City)

Projects under construction

8. Comalco Alumina Refinery – $1.54 billion (Calliope Shire)
9. Stanwell Energy Park – $80 million (Fitzroy Shire)
10. Cracow Gold Project – $90 million (Banana Shire)
11. Grasstree Colliery Project – (Peak Downs Shire)
12. Great Barrier Reef International Resort – $500 million (Livingstone Shire)
13. Bauhinia Rail Project – $230 million (Bauhinia Shire)

Projects committed

14. Blackwater Mine Coal Handling and Processing Plant – $234 million (Duaringa Shire, Emerald Shire)
15. Curragh North (formerly Pisces Project) – $160 million (Duaringa Shire, Emerald Shire)
16. Rolleston Coal Mine – $291 million (Bauhinia Shire)
17. Keppel Views – Livingstone Shire
18. Seaspray – Livingstone Shire
19. The Strand Redevelopment – Livingstone Shire

Projects under study

20. Awoonga-Callide Pipeline Extension – $18 million (Banana Shire)
21. Nathan Dam – $150 million (Banana Shire, Duaringa Shire, also in Taroom Shire in Darling Downs SD)
22. QMAG Expansion Project – $20-30 million (Rockhampton City)
23. Stuart Oil Shale, Stage II – $600 million (Calliope Shire)
24. Teksid Automotive Component Manufacturing Foundry – $100 million (Stage I) (Calliope Shire)
25. Transpacific Industries Resource Recovery and Management Facility – $30 million (Calliope Shire)
26. Theodore Stage II (part of the Theodore–Dawson Mining Project) – (Banana Shire)
27. Togara North – (Bauhinia Shire)
28. Curtis Island Beach Resort – $80 million (Calliope Shire)

As well as these major projects that have been listed, there has been substantial activity in the coal, transport and agricultural sectors as a consequence of improved export demands, increased production and better seasonal conditions. Impacts of this increased economic activity have rippled through the local, regional and state economy. Many of the smaller mining communities such as Blackwater, Emerald and Moranbah are experiencing increased employment, housing shortages and high rental markets as a consequence. With this background of increased economic activity in the region, the impacts of the coke and energy projects are expected to be very visible in terms of impacts on local labour markets, impacts on housing markets, and increased economic activity from local businesses.

9.6.4. Regional growth management framework

In recognition of a need for regional co-operation that warranted a long term strategic approach towards planning for the ecological and economic sustainability of the region, a regional planning approach termed 'CQ A New Millenium' (CQANM) was formed in 1999. CQANM represented a collaborative planning process to develop a framework (Regional Growth Management Framework - RGMF) that provided an integrated approach to managing the future growth and development of the Central Queensland region. The RGMF was built around six guiding principles in the areas of: resource use, conservation and management, economic development, infrastructure, social and cultural development, education, training and research, planning and governance. The RGMF recognises the region's natural and economic diversity, potential benefits from an emerging industrial base of international significance and potential for further growth.

The RGMF recognises the Gladstone State Development Area (GSDA) and the Gracemere-Stanwell corridor as two areas expected to experience significant investment for industrial activity. It is identified in the RGMF that expansion in these areas together with support from elsewhere in the region will further the role of central Queensland as one of the State's and nation's prime economic generators. The attraction of large-scale industry projects such as the proposed Coke Plant to the Stanwell-Gracemere corridor is consistent within all aspects of the RGMF.

9.7. Summary and conclusions

The direct and indirect economic impacts of both the construction and operating stages of the Coke and Power projects will be large and positive at the local, regional and state level. There will also be further positive impacts on national and international economies.

In the first (and largest) year of construction, the total impacts expected on the Fitzroy region are expected to be $1,403M of output, $171M of income, and an additional 4,256 jobs. At the state level, the total impacts of the first year of construction are expected to be $1,903M of output, $377M of income, and an additional 7,216 jobs.

When the projects are operational, the total impacts expected for the Rockhampton region are $994M of output, $55M of income, and 1,143 jobs. The total impacts for the Fitzroy region are expected to be $1,678M in output, $160M in income, and an additional 2,739 jobs. The total impacts for Queensland are expected to be $1,974M in output, $235M in incomes and an additional 4,639 jobs.

The results should be treated with some caution due to the limitations of the input-output method, data used and assumptions made. The analysis is likely to overestimate the income and employment effects due to the nature of the projects and data used for constructing tables, e.g. the national coefficients were used where specific data was not available; prices in the input output table do not reflect the current changes in coal prices; the coke plant is mainly export oriented and the potential capacity of the local industries that can accommodate the needs for the support of such projects may not be high.

A rough sensitivity analysis has been performed to assess the impacts of improved productivity reducing the flow-on effects to employment and business industry. The results suggest that if very high productivity gains of more than two times were achieved across the relevant sectors, the predictions about output would need to be reduced by up to 10%, predictions about income changes would need to be reduced by up to 25%, and predictions about employment changes would need to be reduced by about 20%. These results suggest that the modelled predictions of the economic impacts of the proposed projects may be slightly high, but that the predictions are generally robust when modelling assumptions are changed.

The results provide some indication about the likely impacts on the local, regional and State economy of the plant development. In each case, the aggregate impacts are large, reflecting the opportunities available to the relevant communities and economies to generate flow-on effects. However, care should be taken in reporting total potential impacts of the projects, because there are often cases where impacts are double counted by successive project appraisals. This might occur for example if the stimulus from this project generates an application for a new coal mine development. The impacts of that development are partly counted in this analysis, and would also be included in a separate study about the coal mine. For these reasons, it is appropriate to report the direct economic impacts as the most relevant information, followed then by estimates of the potential flow-on effects.

9.8. References

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9.9. Appendix

9.9.1. Appendix I

9.9.1.1. The Input-Output Transaction Table

A summary structure of economic relationships is shown in Table 12. The table contains four major quadrants.

Quadrant I (the upper left quadrant of the IO table) is a "processing" or intermediate matrix. It shows the flows of transactions between the sectors. This quadrant represents the interdependency between the sectors or industries in the regional economy. It shows to which extent sectors depend on each other, i.e. linkages between sectors. The intermediate quadrant is the core of the IO approach.

Quadrant II (the upper-right quadrant) illustrates consumer behaviour, identifying consumption patterns of households and other local final consumers such as private investors and governments. It also includes an export column that represents sales to other industries and consumers outside the economy under investigation.

Quadrant III (the lower-left quadrant) illustrates the primary inputs in each industry that originate outside the regional production system, i.e. they are not purchased from firms within the region. It shows the income that households receive in exchange for their labour and services, depreciation, retained earnings, tax payables and payments to the industries outside of the economy under investigation.

Quadrant IV (the lower-right quadrant) identifies non-market transfers between sectors of the economy. These include savings, inter-government transfers, government surpluses/deficits and purchases by final demand from outside of the economy. This quadrant is normally sparse and is not used for the calculation of multipliers for impact estimation purposes.

Table 9.AI.1 The input-output table as a picture of an economy.

	Processing Sectors	Final Demand	
Processing Sectors	**Quadrant I** Inter-Industry Structure	**Quadrant II** Consumption Pattern	**Total Outputs**
Payment	**Quadrant III** Incomes	**Quadrant IV** Transfers	
	Total Inputs		

Source: Ung (1981)

Input-output tables are constructed to show the circular relationships that exist in economic patterns. These occur because the variety of inputs into an economic process is roughly equivalent to the variety of different outputs. The bulk of economic transactions within an economy occur between businesses, with households supplying labour and capital, and consuming final goods. This means that most economic transactions are both outputs (from businesses) and inputs (into businesses), and input-output tables are a way of reflecting these patterns. In the tables, transactions are summed vertically to identify the total inputs needed for a sector, and are summed horizontally to identify the total outputs for a sector.

Table 8 provides an illustrative example and shows a transactional table for a three sector economy. Each row indicates the flows from one sector to another. From Table 13, sector 1 consumes $25,000 of output internally, sells $20,000 of its output to sector 2 and $15,000 of its output to sector 3. The columns show the purchases of each sector from the other sectors.

Sector 3 purchases $15,000 of goods from sector 1, $10,000 of goods from sector 2 and $43,000 from firms in sector 3.

Table 9.AI.2 Hypothetical transactional table ($, 000).

Purchasing sectors / Selling Sectors	Intermediate Sectors Processing Matrix			Final Demand			**Total Output**
	1	2	3	Households	Others	Export	
1	25	20	15	30	5	5	**100**
2	14	6	10	5	5	10	**50**
3	20	12	43	5	5	15	**100**
Total	**59**	**38**	**68**	**40**	**15**	**30**	**250**
Households	20	4	5	2	3	2	**36**
Value added	15	4	15	1	1	1	**37**
Imports	6	4	12	1	-	1	**24**
Total Inputs	**100**	**50**	**100**	**44**	**19**	**34**	**347**

Source: Mandeville and Jensen (1978) and Ung (1981)

For labour input, sector 1 pays $20,000 in wages and salaries to the household sector and a further $6,000 for imports of other input factors. The value added, including allowances for depreciation, is $15,000. All "endogenous" sectors of the economy are included within the processing matrix of the table (shaded area) and all "exogenous" sectors are outside of it. Endogenous sectors are the sectors that are influenced by the internal structure of the economy, while exogenous sectors are driven by external independent influences. Thus exports and government expenditure are treated as exogenous since they are influenced primarily by factors external to the economy under investigation.

The household sector sells labour, managerial skills, privately owned resources and receives payments in the form of wages and salaries, dividends, and rents. Households acquire food, clothing, cars, housing, services, and other goods. The economic activity of households is complex and thus it usually can be represented in two ways. Household consumption can be treated as exogenous (so-called open model) but it also can be treated as endogenous (so-called closed model). The closed model allows the consumption to be induced by internal factors. For the purpose of this study, the closed model is more appropriate, since one of the objectives of the analysis is to determine the effect of community engagement in the process of the regional development. However, the results of open model will be presented as well.

The IO table is easy to understand if one pictures an economy under investigation as a barrel with money and goods flowing in and flowing out (Hustedde, Shaffer and Pulver 1984).The local economy produces and consumes goods and services, with money circulating accordingly. The interaction between the local economy and the rest of the world shows which (and how much of) local goods and services are sold into the rest of the world (as exports). These exports bring a money flow into the local economy. Money also flows into local economy in the form of government spending. That is shown as government sectors in the IO table. Money that is spent outside the local economy (including government taxes and charges) are 'leakages' or 'escape expenditures'. These expenditures are shown in the 'import from the rest of the world' category, where money flows out of the local economy.

The size of the import and export flows is important. It shows the degree of dependence of the local economy on the rest of the world. The IO tables can help to identify the industries that contribute to leakages, and to measure the extent of each contribution. Once the leakages are identified, the community can make a decision to reduce them. The reduction of leakages means that more money is retained in the local community.

9.9.1.2. Mathematics behind Input-Output Analysis

Mathematically, the transaction table can be presented as a serious of equations.

$$x_1 = x_{11} + x_{12} + x_{13} + ... + x_{1n} + y_1$$
$$x_2 = x_{21} + x_{22} + x_{23} + ... + x_{2n} + y_2$$
$$x_3 = x_{31} + x_{32} + x_{33} + ... + x_{3n} + y_3$$

.
.
.

$$x_n = x_{n1} + x_{n2} + x_{n3} + ... + x_{nn} + y_n$$

where

x_i = total output of intermediate sector i (column and row totals)

x_{ij} = output of sector i purchased by sector j (elements of processing quadrants)

y_i = total final demand for the output of sector i (elements of quadrant II).

The elements of the processing sector then are divided by the respective column totals to derive input-output (or direct) coefficients (α_{ij}) which represent the direct purchasing pattern of each sector. The direct coefficient indicates the direct (or first round) requirements from each sector following an increase in output of any sector.
The series of equations can then be rewritten as:

$$x_1 = a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + ...+ a_{1n}x_n + y_1 \; x_2 = a_{21}x_1 + a_{22}x_2 + a_{23}x_3 + ...+ a_{2n}x_n + y_2$$
$$x_3 = a_{31}x_1 + a_{32}x_2 + a_{33}x_3 + ...+ a_{3n}x_n + y_3$$

.
.
.

$$x_n = a_{n1}x_1 + a_{n2}x_2 + a_{n3}x_3 + ...+ a_{nn}x_n + y_n$$

where

$a_{ij} = \frac{x_{ij}}{x_i}$ is the input-output coefficient.

In matrix form:

X=AX+Y,

Where A is a matrix of Input Output coefficients, AX are the outputs required to satisfy sector inputs, and Y is the output required to satisfy final demand. Applying some matrix algebra, the X matrix can be defined as:

$$X = (1 - A)^{-1}Y$$

where $(1 - A)^{-1}$ is an inverse Leontief (1-A) matrix.

The critical assumption at this stage of the Input Output analysis is that the money or physical quantity of goods delivered by industry i to other processing sectors is a linear and homogenous function of the output level of the purchasing sector j. The main analytical purpose of the input-output model is to determine the effects of specific changes in final demand, given the direct coefficient matrix. Such effects include not only the direct impacts, but also the indirect effects of additional deliveries of these inputs on all industries in the economy. In the next section, the

multipliers that are widely used to estimate economic effects, such as output, income and employment multipliers, are described in more detail.

9.9.1.2.1. Sector Output Multipliers

To be able to relate changes in final demand to changes within sectors, the inverse Leontief (1-A) matrixes identified above are used:

Let $Z = (1 - A)^{-1} = [z_{ij}]$

Each element of a Z matrix indicates the total direct and indirect requirements by sector j from sector i as a result of increase in sales of one dollar to final demand. The coefficients z_{ij} measure the extent to which changes in the level of activity of an industry will affect the level of output of all other industries. The column sum of the inverse of the open model shows the total effect on all sectors in the table (i.e. the total output effect on the local economy) of the increase in sales by one dollar by sector j to final demand. This sum is called a simple output multiplier. When the model is closed with respect to the households (i.e. households consumption patterns are influenced within the local economy), the direct, indirect and induced effect on the output of each sector of an increase in sales to final demand by sector j is provided by the Z matrix.

The direct effect is estimated by a_{ij}. The indirect effect is the difference between z_{ij} and a_{ij}. Finally, the induced effect for any sector is estimated as a difference between Z matrix of closed and open models. One of the advantages of using Input Output modeling for impact analysis is that this approach allows the analyst to separate the direct, indirect and induced effects. Thus these different effects can be recognized and compared. This is especially valuable for measuring the effect of including households in the endogenous sectors.

9.9.1.2.2. Sector Income Multipliers

The direct effect is given by the households' row coefficient a_{Hi} for each sector, where a_{Hi} is the appropriate entry in the households' row of the A matrix. The direct and indirect effects of an increase in sales of any sector to final demand is a product of each element of Z matrix and a corresponding household row coefficient, e. g. $z_{ij} \times a_{Hi}$ for each element. The sectoral direct and indirect multiplier is obtained by summing these products, $\sum z_{ij} a_{Hi}$. The indirect effect is the difference between $z_{ij} a_{Hi}$ and a_{Hi}.

Finally, the induced income multiplier (total regional income multiplier) is obtained from the closed model, from the household row of the Z^* matrix (closed model matrix). The induced effect, due to inclusion of the household sector is estimated as a difference between Z matrix of closed and open models is $Z^*_{ij} - z_{ij} a_{Hi}$

9.9.1.2.3. Sector Employment Multiplier

The direct and indirect employment effects of an increase in sales to the final demand is a product of each element of Z matrix and a corresponding employment row coefficient, e. g. $z_{ij} \times a_{Ei}$ for each element. The sector's direct and indirect multiplier is obtained by summing these products, $\sum z_{ij} a_{Ei}$. The indirect effect is the difference between $z_{ij} a_{Ei}$ and a_{Ei}.

The induced effect, due to inclusion of the household sector is estimated as following:

$$\sum z^*_{ij} a_{Ei} - \sum z_{ij} a_{Ei}$$

9.9.2. Appendix I I

Table 9.AII.1 Transaction table, Queensland, $M, 2004

SECTOR	Agric, Forestr	Coal, gas oil	Other Mining	Manuf	**Coke project**	Electr, Gas	**Electr project**	Building Constru	Trade	Transport Commun	Finance	Gov Adm	Commun Serv	**Total Industry Uses**	Hh	OFD	Exports	**Total Supply**
Agriculture, Forestr	1,396	6	4	3,863	**0**	1	**0**	50	630	13	70	23	222	**6,278**	1,668	470	1,754	**10,171**
Coal, gas and oil	6	453	20	1,166	**370**	1,242	**0**	5	153	26	33	20	28	**3,523**	143	34	5,574	**9,273**
Other Mining	5	684	782	1,312	**0**	10	**0**	205	24	4	24	11	51	**3,112**	1	11	2,689	**5,813**
Manufacturing	863	495	375	7,706	**16**	208	**0**	3,758	4,989	1,719	1,423	1,059	1,058	**23,669**	10,506	2,512	4,042	**40,729**
Coke project	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**727**	**747**
Electricity, Gas and Water	133	151	113	819	**20**	590	**0**	37	665	256	599	204	225	**3,813**	2,210	184	12	**6,218**
Electricity project	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**3**	**1**	**0**	**47**	**51**
Building and Construct	79	140	255	15	**0**	18	**0**	32	305	282	683	375	25	**2,208**	2	15,566	1,819	**19,595**
Trade	695	349	312	2,841	**9**	311	**2**	1,403	4,089	3,090	2,551	561	1,385	**17,598**	24,149	1,980	4,581	**48,308**
Transport and Commun	437	823	190	2,470	**12**	161	**1**	402	4,834	2,955	2,286	1,163	1,101	**16,834**	3,978	1,532	2,036	**24,381**
Finance	390	354	349	2,344	**10**	474	**1**	1,958	7,996	2,271	11,828	1,433	1,881	**31,287**	19,781	2,147	666	**53,880**
Government Administr	24	52	46	269	**4**	36	**0**	71	343	495	810	1,179	258	**3,586**	2,746	11,987	3,178	**21,497**
Community Services a	28	4	11	203	**0**	10	**0**	13	559	80	647	144	679	**2,377**	10,221	6,303	2,057	**20,957**
Total Intermediate	**4,055**	**3,512**	**2,456**	**23,009**	**442**	**3,060**	**25**	**7,932**	**24,589**	**11,190**	**20,955**	**6,171**	**6,912**	**114,307**	**75,405**	**42,727**	**29,182**	**261,621**
Compensation of empl	1,173	1,259	696	6,447	**12**	667	**2**	4,161	13,977	5,616	9,845	10,987	9,931	**64,774**	0	0	0	**64,774**
Gross operating surp	4,250	4,014	2,221	5,813	**95**	2,170	**23**	5,867	5,434	5,364	18,812	3,346	2,713	**60,123**	0	0	0	**60,123**
Taxes	240	38	139	633	**0**	119	**0**	344	1,715	1,053	2,037	194	459	**6,971**	4,028	944	17	**11,960**
Imports	452	451	300	4,827	**199**	201	**1**	1,291	2,593	1,159	2,232	800	941	**15,446**	7,572	2,366	0	**25,385**
Qld production	**10,171**	**9,273**	**5,813**	**40,729**	**747**	**6,218**	**51**	**19,595**	**48,308**	**24,381**	**53,880**	**21,497**	**20,957**	**261,621**	**87,005**	**46,037**	**29,199**	**423,863**
Employment	58,037	10,352	10,196	166,187	**125**	12,235	**20**	127,579	410,607	111,407	217,606	218,125	260,624	**1,603,100**	0	0	0	**1,603,100**

Table 9.AII.2. Transaction table, Fitzroy Statistical Division, $M, 2004

SECTOR	Agric, Forestr	Coal, gas oil	Other Mining	Manuf	**Coke project**	Electr, Gas	**Electr project**	Building Constru	Trade	Transport Commun	Finance	Gov Adm	Commun Serv	**Total Industry Uses**	Hh	OFD	Exports	**Total Supply**
Agriculture, Forestr	114	2	0	200	**0**	0	**0**	2	31	1	2	1	10	**363**	0	0	465	**828**
Coal, gas and oil	0	151	1	60	**371**	161	**0**	0	7	1	1	1	1	**758**	0	0	2,340	**3,098**
Other Mining	0	198	37	59	**0**	1	**0**	9	1	0	1	0	2	**308**	0	0	8	**316**
Manufacturing	58	136	17	328	**16**	22	**0**	155	199	78	40	43	38	**1,130**	0	0	975	**2,106**
Coke project	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**727**	**747**
Electricity, Gas and Water	11	50	6	42	**20**	77	**0**	2	32	14	20	10	10	**295**	0	0	512	**807**
Electricity project	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**3**	**1**	**0**	**47**	**51**
Building and Construct	5	37	11	1	**0**	2	**0**	1	12	12	19	15	1	**116**	0	1	865	**982**
Trade	44	90	13	113	**9**	31	**2**	54	153	131	67	21	47	**776**	1	0	1,566	**2,343**
Transport and Commun	31	240	9	111	**12**	18	**1**	18	205	141	68	50	42	**946**	0	0	390	**1,337**
Finance	17	64	10	66	**3**	33	**1**	53	210	67	218	38	45	**825**	0	0	1,007	**1,833**
Government Administr	2	14	2	11	**4**	4	**0**	3	13	21	22	46	9	**149**	0	1	912	**1,062**
Community Services a	2	1	0	7	**0**	1	**0**	0	19	3	15	5	21	**75**	0	0	845	**921**
Total Intermediate	**284**	**984**	**107**	**999**	**435**	**350**	**25**	**298**	**883**	**471**	**473**	**231**	**226**	**5,765**	**3**	**2**	**10,661**	**16,430**
Compensation of empl	96	421	38	333	**12**	87	**2**	208	678	308	335	543	436	**3,496**	0	0	0	**3,496**
Gross operating surp	346	1,341	121	300	**95**	282	**23**	294	264	294	640	165	119	**4,284**	0	0	0	**4,284**
Taxes	20	13	8	33	**0**	15	**0**	17	83	58	69	10	20	**345**	0	0	0	**345**
Imports	84	340	43	441	**205**	73	**1**	164	436	207	316	113	119	**2,541**	1	1	0	**2,543**
Fitzroy production	**828**	**3,098**	**316**	**2,106**	**747**	**807**	**51**	**982**	**2,343**	**1,337**	**1,833**	**1,062**	**921**	**16,430**	**4**	**3**	**10,661**	**27,098**
Employment	4,726	3,458	554	8,589	**125**	1,588	**20**	6,392	19,912	6,106	7,400	10,773	11,450	**81,093**	0	0	0	**81,093**

Table 9.AII.3. Transaction table, Rockhampton Region, $M, 2004

SECTOR	Agric, Forestr	Coal, gas oil	Other Mining	Manuf	**Coke project**	Electr, Gas	**Electr project**	Building Constru	Trade	Transport Commun	Finance	Gov Adm	Commun Serv	**Total Industry Uses**	Hh	OFD	Exports	**Total Supply**
Agriculture, Forestr	21	0	0	63	**0**	0	**0**	1	12	0	1	0	5	**104**	27	10	71	**213**
Coal, gas and oil	0	0	0	0	**0**	0	**0**	0	0	0	0	0	0	**0**	0	0	0	**0**
Other Mining	0	0	16	25	**0**	1	**0**	4	1	0	0	0	1	**49**	0	0	93	**142**
Manufacturing	14	0	7	136	**16**	11	**0**	73	106	40	20	24	24	**472**	180	59	179	**889**
Coke project	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**20**	**0**	**0**	**727**	**747**
Electricity, Gas and Water	3	0	3	18	**20**	39	**0**	1	18	8	11	6	6	**134**	48	5	146	**333**
Electricity project	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**3**	**1**	**0**	**48**	**51**
Building and Construct	1	0	5	0	**0**	1	**0**	1	7	7	11	9	1	**44**	0	403	40	**487**
Trade	14	0	7	60	**9**	20	**2**	33	105	87	44	16	38	**435**	501	56	318	**1,310**
Transport and Commun	9	0	5	55	**12**	11	**1**	10	131	88	42	34	32	**429**	87	46	160	**722**
Finance	5	0	5	34	**3**	20	**1**	31	139	43	138	27	35	**480**	276	41	189	**985**
Government Administr	1	0	1	6	**4**	2	**0**	2	9	15	15	34	7	**97**	60	358	113	**628**
Community Services a	1	0	0	5	**0**	1	**0**	0	15	2	12	4	20	**60**	224	188	131	**602**
Total Intermediate	**69**	**0**	**51**	**403**	**64**	**106**	**25**	**156**	**545**	**290**	**294**	**155**	**168**	**2,327**	**1,403**	**1,167**	**2,213**	**7,109**
Compensation of empl	24	0	17	145	**12**	45	**2**	103	380	166	180	321	286	**1,682**	0	0	0	**1,682**
Gross operating surp	89	0	54	131	**95**	145	**23**	146	148	159	344	98	78	**1,510**	0	0	0	**1,510**
Taxes	5	0	3	14	**0**	8	**0**	9	47	31	37	6	13	**173**	88	28	0	**290**
Imports	25	0	16	196	**576**	29	**1**	73	190	76	129	48	57	**1,418**	410	179	0	**2,007**
Rocky production	**213**	**0**	**142**	**889**	**747**	**333**	**51**	**487**	**1,310**	**722**	**985**	**628**	**602**	**7,109**	**1,901**	**1,374**	**2,214**	**12,598**
Employment	1,212	0	250	3,733	**125**	819	**20**	3,173	11,162	3,300	3,980	6,373	7,501	**41,648**	0	0	0	**41,648**

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