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25. ECONOMIC ENVIRONMENT AND MANAGEMENT OF IMPACTS

This section addresses Chapter 5 of the ToR. It describes the existing economy in which the Nathan Dam and Pipelines Project (the Project) is located and the economies potentially impacted by the Project and discusses the types and extent of impacts qualitatively and where possible quantitatively. The potential project impacts are discussed on the assumption of developing the dam and pipeline in parallel as soon as possible. The timing is described in more detail in Section 25.3.1.

25.1. Methodology

The existing economy is described in terms of the economic production, employment, infrastructure, industries and key markets. Beneficial and adverse impacts are identified and discussed for the construction and operations phases of the Project. These impacts include loss of area for agricultural production, impacts on labour markets and suppliers for construction materials. There are very large on-going potential benefits linked to the Project's completion, the bulk of these benefits are not included in this impact assessment as they are subject to additional and separate investment decisions (such as mine and gas extraction expansion plans) and are not part of the terms of reference for the economic assessment for this project.

The economic impact assessment provides a qualitative analysis primarily on the impacts and benefits of the Project, with some quantitative analysis of the flow-on (or multiplier impacts) of the construction process to the local, regional and State economies. Primary data sources include:

- description of Project information provided by SunWater (Chapter 2) and supporting reports;
- economic and demographic data from the Australian Bureau of Statistics (ABS) and other government sources;
- Queensland Government information (Office of Economic and Statistical Research (OESR));
- regional economic development committees; and
- multipliers sourced from Queensland Treasury and ABS.

The economic impact assessment considers impacts both locally and more broadly as a potential consequence of the Project. The impacts considered for the Project include temporary impacts across the broader region and beyond during the construction and the operation phases and permanent impacts in terms of inundation of properties within the water storage area. The pipeline component will largely involve temporary impacts during construction with limited on-going impacts after commissioning.

The Project will affect a range of communities and areas in different ways. Consistent with the definitions outlined in Chapter 2, the following are used:

- dam construction footprint – the dam wall footprint, embankments, spillway, site offices, associated facilities and immediate downstream works area;
- water storage area – the area inundated at FSL plus the flood margin;
- pipeline – including pipeline, pipeline infrastructure such as valves, surge tanks, standpipes, scour points and access easement covering construction and operational requirements;

- associated infrastructure footprint – the location of all proposed road works, resource extraction areas and realignment of any associated infrastructure;
- downstream – the Dawson River and Fitzroy River downstream of the Project ending at the Great Barrier Reef Marine Park;
- potential benefited areas, being areas that receive water from the Project:
  - downstream areas (Dawson Valley Water Supply Scheme, Bowen Basin mining and industrial areas, Lower Fitzroy Water Supply Scheme, State Water Grid; and
  - potential pipeline lateral access areas (Surat Basin mines, urban areas, power stations, other industry).

The assessment includes the impact of the necessary ancillary development support facilities such as construction camps, resource extraction sites and pipe and materials lay down areas.

From a local perspective, the focus of the dam impact during construction and operation is primarily the landholders around Taroom while the impacts of construction of the pipeline will occur temporarily along the pipeline.

The benefits from the construction of the Project will occur across a broader area as it includes industries and communities that supply construction labour and materials and services. In the operation phase the benefits will be provided across the potential benefited areas, based on a range of factors including access to more and increased reliability of water. There may be specific local benefits from the Project including but not limited to recreation and tourism opportunities created by the water storage area and the ability to provide water for local use along the pipeline, although the provision of lateral connections for this use is not part of the Project.

From a statistical perspective, the 'local community area' incorporates the local government areas (LGAs) of the Banana Shire Council and the Western Downs Regional Council. Prior to the council amalgamations the Taroom LGA was the basis for statistical data collection. The Taroom LGA now falls in the broader Banana Shire Council LGA. The area overseen by Western Downs Regional Council includes the Chinchilla, Dalby, Murilla-Wandoan, Tara and Wambo statistical local areas (SLA).

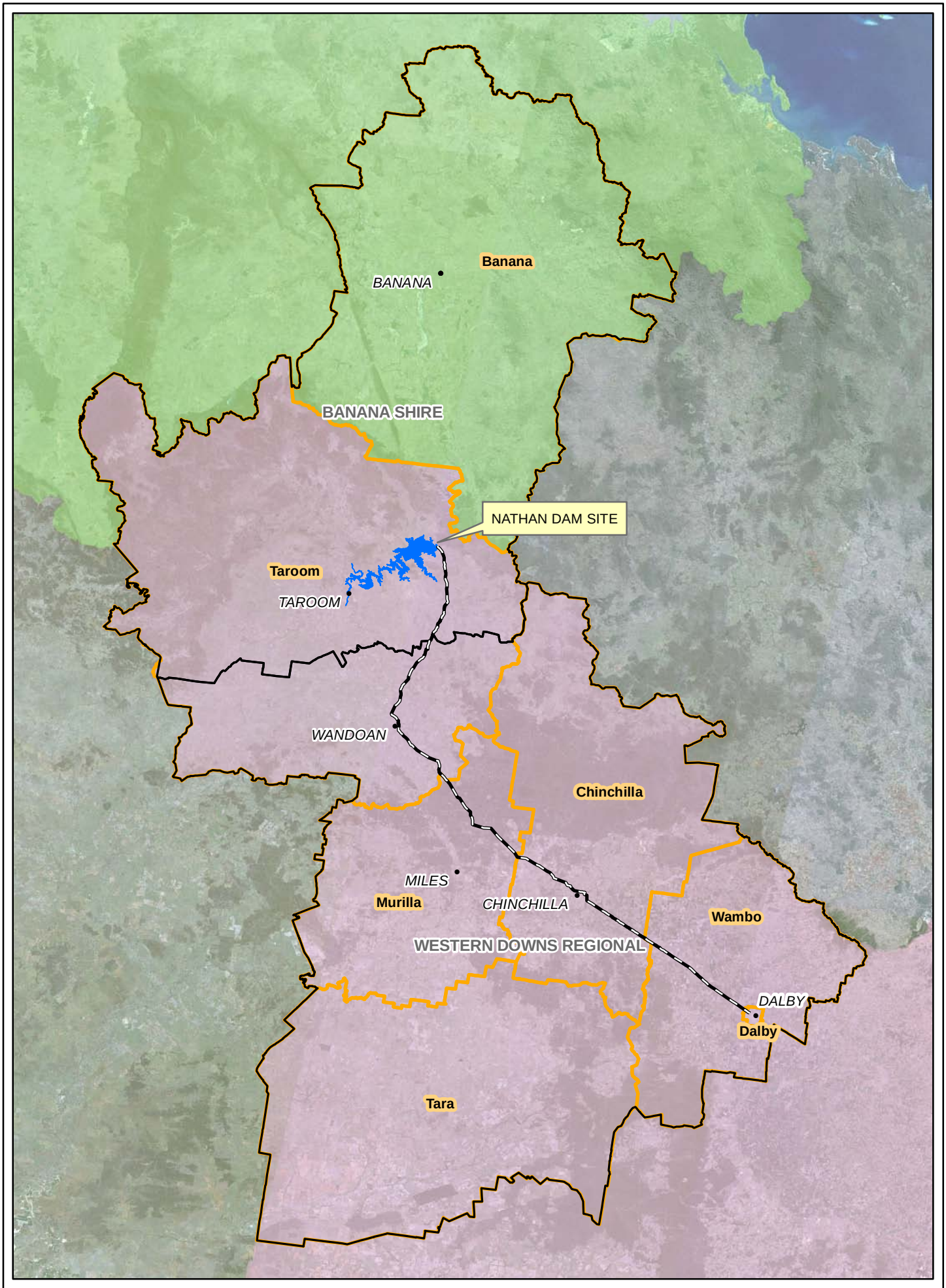
As noted above, the Project will provide benefits beyond this area including some downstream areas. As such, the impacts are considered at a regional level as defined in Table 25-1. As the proposed project also has implications beyond these areas, explicit account is also taken of State-level issues and impacts. The study areas for the economic impact assessment are defined in Table 25-1.

Table 25-1 Study area definitions

Area	Definition
Region	Darling Downs, Fitzroy regions (statistical division) and the Surat Basin. The Surat Basin is covered by part of the Darling Downs region plus the Maranoa Regional Council area which is the eastern part of the South West region. The construction area of the Project does not impact directly on Maranoa Regional Council Area although there will be benefits. The project does not impact on the economy of the whole south west region and the total economy of the region is small compared with Darling Downs and Fitzroy. On this basis the region is defined as the Darling Downs and Fitzroy regions only.
Local Community Area	Banana Shire Council (LGA), comprising the former local government area (LGA) of Taroom. Western Downs Regional Council (LGA), comprising the statistical local area (SLA) of Chinchilla, Dalby Town, Murilla-Wandoan, Tara and Wambo.

Note: data is not provided at the Census Collector districts as this level of information is not considered relevant to this section. The Australian Bureau of Statistics (ABS) reports data for the 'Western Downs Regional Council' LGA as the 'Dalby Regional Council' LGA. Throughout this report 'Western Downs Regional Council LGA is used to describe this area even where ABS data is used. Where possible data for Taroom LGA is presented in place of the Banana Shire Council LGA to highlight the local community impact of the Project.

The areas included in the economic impact assessment are shown in Figure 25-1.



LEGEND

- Towns
- Proposed Pipeline
- Full Supply Level (183.5m AHD)
- Local Government Area Boundary
- Statistical Local Area Boundary

Statistical Division

- Darling Downs
- Fitzroy

Projection: GDA94 Zone 56

Figure 25-1

0 10 20 40
Kilometres

N

Scale 1:2,000,000 (at A4)

SKM SunWater Making Water Work

NATHAN DAM AND PIPELINES EIS

Economic study area

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25.2. Description of affected local and regional economies

This section describes the economies potentially impacted by the proposed project.

25.2.1. Gross regional product

Gross Regional Product (GRP) is the total market value of goods and services produced within a region within a given period after deducting the cost of goods and services used up in the process of production but before deducting allowances for the consumption of fixed capital.

The value of GRP for the Queensland economy and its regions between 2000/01 and 2005/06 is detailed in Table 25-2. According to OESR the Queensland economy recorded average annual growth of 4.8% over the period in real terms. GRP is also shown for the Fitzroy and Darling Downs Region at just over $23.2 billion in 2005-06. Extrapolation of this in line with the growth in Queensland's Gross State Product (GSP) (equivalent measure to GRP but at the state level) suggests that the region as defined could have a GRP of some $26.4 billion in the 2009-10 financial year. Given the extent of development of mining in recent years in the region, this may underestimate the current GRP.

The South West regional GRP is relatively small at some $1.7 billion in 2005-06 (some 7% of the Darling Downs and Fitzroy combined GRP). As noted in Table 25-1, based on the relative size of the South West region GRP and the fact that the Maranoa Regional Council is not directly impacted by construction activity and only forms a small portion of the defined 'region', the region is assumed to include only Darling Downs and Fitzroy combined. The Darling Downs region experienced the higher annual average economic growth when compared with Fitzroy with a change in GRP of 4.3% and 3.2% respectively in the five years to 2005-06. Average annual growth was below the State average for both regions however the Darling Downs region was the fourth fastest growing in Queensland. However both regions outperformed the average economic growth of the rest of Australia.

Table 25-3 presents estimates of real GRP per capita. Over the five years reported, per capita output increased in the Darling Downs region by 2.8% which was above the State average while per capita output in Fitzroy increased by 1.4% on average. This shows the impact population growth had on aggregate output in each region over the period when compared with real GRP growth. Population is discussed further in Section 25.2.2.

Table 25-2 Real gross regional product ($m, 2005–06)

Region	2000–01	2005–06	Average annual growth (%)
Brisbane	65,482	85,317	5.4
Gold Coast	n.a.	18,340	n.a.
Sunshine Coast	n.a.	9,375	n.a.
West Moreton	n.a.	1,642	n.a.
Moreton	20,745	29,357	7.2
Wide Bay-Burnett	6,545	7,815	3.6
Darling Downs	**7,385**	**9,119**	**4.3**
South West	1,876	1,663	–2.4
Fitzroy	**12,041**	**14,126**	**3.2**

Region	2000–01	2005–06	Average annual growth (%)
Central West	774	557	–6.4
Mackay	10,468	13,698	5.5
Northern	7,526	8,557	2.6
Far North	8,042	9,055	2.4
North West	4,745	4,719	–0.1
Total Queensland	**145,629**	**183,983**	**4.8**
Rest of Australia	**674,929**	**783,471**	**3.0**

Source: OESR, Experimental Estimates of Gross Regional Product 2008

Table 25-3 Real gross regional product per capita ($m, 2005–06)

Region	2000–01	2005–06	Average annual growth (%)
Brisbane	40,054	47,313	3.4
Darling Downs	35,359	40,526	2.8
Fitzroy	66,499	71,256	1.4
Total Queensland	**40,506**	**45,495**	**2.4**
Rest of Australia	**44,266**	**49,118**	**2.1**

Source: OESR, Experimental Estimates of Gross Regional Product 2008

25.2.2. Population

The residential population of the local community area is 47,666 estimated at June 30 2010 (Table 25-4). The average annual growth (from June 2004) for the area, made up of Western Downs Regional Council and the Banana Shire Council LGA, was around 1.1% per annum. The area accounts for around 1.1% of the total Queensland population. Further details on population data is provided in Section 24.2.3. Some small differences in the data relates to forecasting differences between sources.

Table 25-4 Estimated resident population for impacted local community area

	Persons - Total						
Area	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Western Downs Regional Council	**29,468**	**29,756**	**30,180**	**30,425**	**30,973**	**31,469**	**32,071**
Chinchilla	6,119	6,167	6,302	6,393	6,648	6,795	7,070
Dalby	10,112	10,282	10,405	10,459	10,621	10,846	11,097
Murrilla-Wandoan	3,973	3,982	4,051	4,076	4,125	4,134	4,132
Tara	3,929	3,929	3,896	3,890	3,874	3,870	3,960
Wambo	5,335	5,396	5,526	5,607	5,705	5,824	5,812
Banana Shire (LGA)	**15,374**	**15,385**	**15,572**	**15,382**	**15,481**	**15,597**	**15,595**
Total	**44,842**	**45,141**	**45,752**	**45,807**	**46,454**	**47,066**	**47,666**
Queensland	**3,900,910**	**3,994,858**	**4,090,908**	**4,195,981**	**4,308,570**	**4,425,103**	**4,513,850**
As % of Queensland	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%

Source: ABS catalogue number 1379.0.55.001 National Regional Profile

Population projections indicate that by 2016 the resident population of Western Downs Regional Council will increase to 33,551 (Figure 25-2 Low). In 2031 this will further increase to 37,292 which equates to an average growth of 0.8% per year from 2010. This figure does not include non-resident workers.

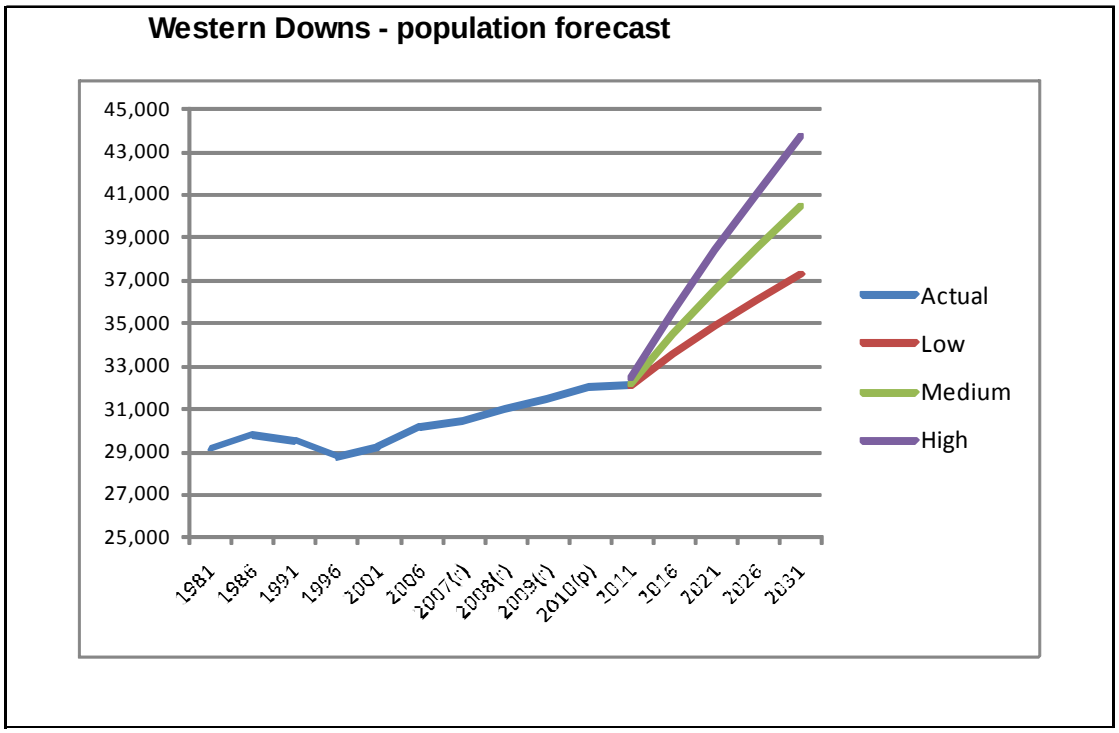

Figure 25-2 Western Downs Regional Council (LGA) population forecast

Source: Planning Information and Forecasting Unit (PIFU) Queensland's Future Population 2011 edition

Population growth for the Banana Shire Council LGA is expected to be below that of Western Downs Regional Council LGA. In 2016 the population of Banana Shire Council LGA is forecast at 16,428 (Low series forecasts) with a moderate increase to 17,105 persons by 2031. This equates to average per annum population growth of 0.45%. Low, medium and high series forecasts for the Banana Shire Council LGA are provided in Figure 25-3 .

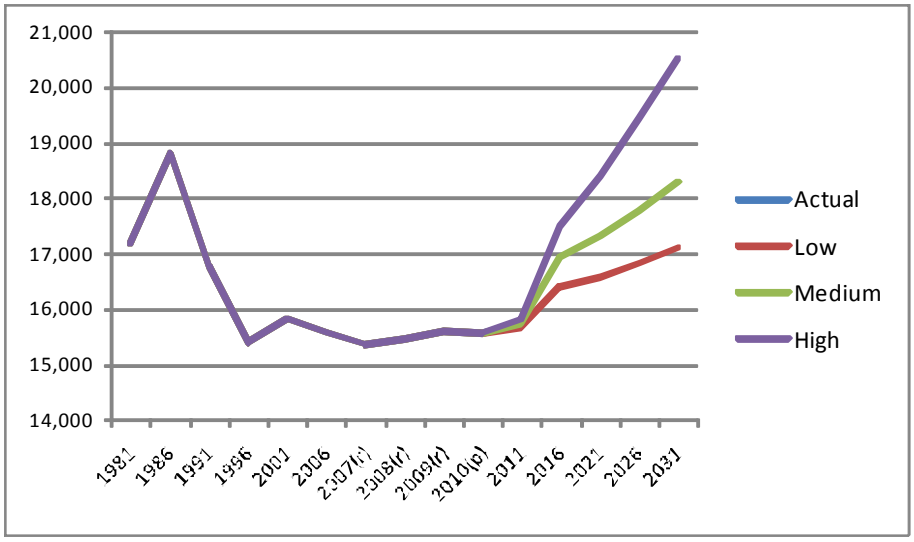

Figure 25-3 Banana Shire Council LGA population forecast

Source: Planning Information and Forecasting Unit (PIFU) Queensland's Future Population 2011 edition

Like many communities in the Surat Basin, the Western Downs Regional Council LGA has a relatively high proportion of non-resident workers. Western Downs Regional Council LGA accounts for around 50% of the non-resident workforce in the Surat Basin (Table 25-5). This appears to be lower than the proportion at the earlier report in 2008 (65%) but reflects the inclusion of Toowoomba in the Surat Basin. Non-resident workers live in single person quarters (SPQ), worker accommodation villages (WAV), hotels/motels, caravan parks and other accommodation. In Western Downs Regional Council LGA, 67% of non-resident workers lived in commercial accommodations or in SPQ/WAV clocated near townships. The non-resident workforce is driven by the large number of mines that source fly-in fly-out workers.

Table 25-5 Non-resident workers in the Surat Basin

Local Government Area	Non-resident workers living in SPQs or WAVs			Total non-resident workers
	Located in or near to towns	Located on resource lease or private land	Hotels/motels/ caravan parks	
Maranoa (R)	0	490	440	930
Western Downs (R)	350	420	490	1,250
Toowoomba (R)	0	0	360	360
Surat Basin	350	910	1,280	2,540

Source: Planning Information and Forecasting Unit (PIFU) 2010 *Surat Basin Population Report*

* other includes houses and flats head leased from the private market for company accommodation.

* Where single person quarters (SPQ) accommodation is located on a mining lease or outside of designated localities, the non-resident worker occupants have been allocated to the nearest population centre.

25.2.3. Labour force statistics

One measure of relative contribution to the local economy is given by employment statistics. The local authority expected to benefit most from development of the pipeline is the Western Downs Regional Council LGA. The Western Downs Regional Council LGA already has a reasonably robust and diversified economy and is well positioned to capitalise on the opportunities expected to stem from further regional development. The existing Western Downs Regional Council LGA workforce broken down by industry is given in Table 25-6. About 12,812 or 57% of the total persons employed in Western Downs Regional Council LGA in 2006 were male. The Taroom LGA has a small workforce of only 1,337 persons, of which 54.7% were employed in 'agriculture and forestry'. Most of the workforce (56%) was male persons.

Table 25-6 Persons in full-time employment by industry and Local Government Area

	Taroom (LGA)	Western Downs Regional Council (LGA)					
		Chinchilla	Dalby	Murilla	Wandoan	Tara	Wambo
Agriculture, forestry & fishing	732	560	224	426	184	637	1,009
Mining	18	41	83	25	11	23	50
Manufacturing	31	163	496	73	24	27	191
Electricity, gas, water & waste services	5	42	87	9	6	10	17
Construction	44	377	391	74	12	81	145
Wholesale trade	30	75	255	37	10	35	77
Retail trade	65	370	609	117	25	94	197
Accommodation & food services	42	157	295	53	12	57	95
Transport, postal & warehousing	46	113	190	54	15	61	98
Information media & telecommunications	0	19	24	5	0	3	7
Financial & insurance services	10	43	116	20	0	6	24
Rental, hiring & real estate services	0	23	51	0	0	3	13
Professional, scientific & technical services	11	78	180	18	7	7	64
Administrative & support services	10	29	80	12	5	9	19
Public administration & safety	94	94	243	83	29	103	94
Education & training	77	203	336	100	33	129	146
Health care & social assistance	74	234	366	110	13	85	154
Arts & recreation services	6	12	36	7	0	0	0
Other services	21	97	219	19	3	33	42
Inadequately described/Not stated	21	82	104	31	8	50	50
Total	**1,337**	**2,812**	**4,385**	**1,273**	**397**	**1,453**	**2,492**

Source: ABS 2006 Census of Population and Housing (Note: Murilla-Wandoan reported separately as per the 2006 census)

The largest employment industry in Taroom LGA is in agriculture which employs more than half of the labour force (Figure 25-4). The second largest employment industry is public administration & safety followed by education & training. Mining accounts for 1.3% of the labour force.

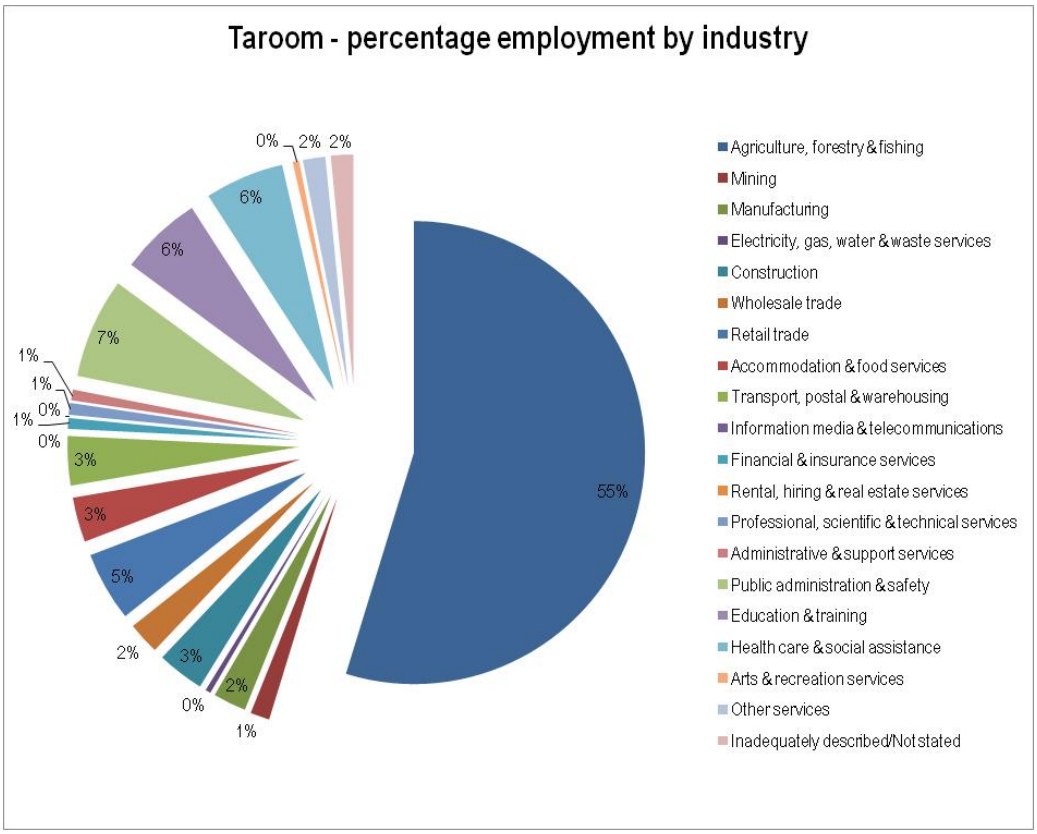

Figure 25-4 Employment by industry – Taroom LGA

Source: ABS 2006 Census of Population and Housing

The agricultural industry also employs the majority of the labour force in the Western Downs Regional Council LGA with the industry accounting for 23.7% of the total labour force. As expected in a larger and more diverse regional economy, employment is spread more widely across each industry than in Taroom LGA with retail trade and the construction industry the second and third largest employment industries respectively. This indicates a relatively robust employment sector in the Western Downs Regional Council LGA that is better able to service the broader community. Mining accounts for 1.8% of the work force. A breakdown of the labour force share across each industry is shown in Figure 25-5.

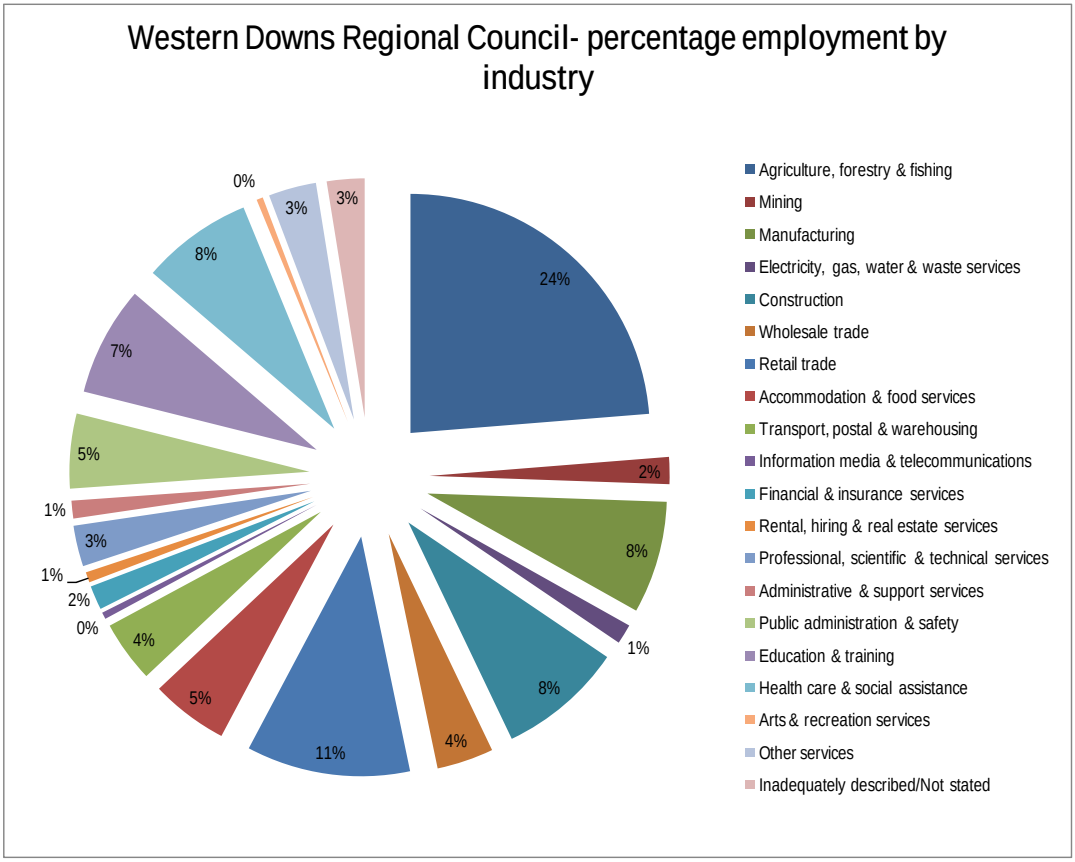

Figure 25-5 Employment by industry – Western Downs Regional Council LGA

Source: ABS 2006 Census of Population and Housing

Compared with the Taroom LGA economy (where more than half the workforce is employed in agriculture), Western Downs Regional Council LGA has less than one quarter of its workforce employed in agriculture. Despite this difference, agriculture is still far-and-away the largest single employer in Western Downs Regional Council LGA. Agricultural workers tend to have a range of skills that relate to construction projects and in some cases have appropriate equipment for hire. Given a preference to employ local labour where appropriate and the expected competition for labour from a range of projects in the region, farmers and farm workers with relevant skills and experience may be a source of workers and contractors for the Project.

Whilst the official census figures suggest that the region only employs 1-2% of mining employees, this figure only applies to the employees who usually reside in the region. In recent years, the region's mining sector has attracted a large transient non resident population. In 2010 it was estimated that around 4.6% of full time equivalent (FTE) workers in the region (Western Downs Regional Council LGA and Maranoa Council LGA) were not residents, with around double this percentage in a number of localities across the region. This is generally a sign of rapid industry growth as labour resources are drawn to areas of high growth (Table 25-7).

Table 25-7 Full time equivalent population for the Surat Basin as at 30 June 2010

LGA	UC/L	2010p ERP	Total non-resident workers	FTE population estimate	Per cent of non-resident workers
		— number —			%
Maranoa (R)	Injune (L)	370	40	420	9.5%
	Mitchell (L)	1,030	50	1,080	4.6%
	Roma	6,520	300	6,820	4.4%
	Wallumbilla (L)	300	30	330	9.1%
	LGA remainder	5,150	510	5,660	9.0%
Total		13,370	930	14,300	6.5%
Western Down	Chinchilla	4,450	360	4,800	7.5%
	Dalby	11,100	290	11,380	2.5%
	Miles	1,260	80	1,330	6.0%
	Tara (L)	810	20	830	2.4%
	Wandoan (L)	420	40	460	8.7%
	LGA remainder	14,040	470	14,510	3.2%
Total		32,070	1250	33,320	3.8%
Toowoomba (R	Oakey	3,960	60	4,020	1.5%
	Pittsworth	2,840	30	2,870	1.0%
	Toowoomba	106,740	230	106,970	0.2%
	LGA remainder	48,510	40	48,550	0.1%
Total		162,060	360	162,420	0.2%
SURAT BASIN TOTAL*		207,500	2540	210,040	1.2%

(R) – Regional Council (L) – Locality p = preliminary

Figures in table have been rounded to the nearest 10; internal discrepancies are due to rounding.

* The total FTE population shown for the Surat Basin represents the aggregate FTE populations of all LGAs in the region. This total may include a small number of non-resident workers in each LGA who live elsewhere within the Surat Basin.

Note: Non-resident worker populations shown for UC/Ls represent all non-resident workers living within these centres. UC/Ls with fewer than 20 non-resident workers are included in the LGA remainder. Non-resident workers shown in LGA remainder are those living in WAV accommodation near mines or gas fields, or in commercial accommodation in smaller centres.

Source: Table 10 OESR Surat Basin Population Report, 2010.

25.2.4. Infrastructure

Infrastructure is the basic framework or underlying foundation of an area to support human settlement, economic development and growth. The key infrastructure impacted by the Project during construction will be the roads infrastructure required to supply construction materials and workers to the proposed dam and pipeline construction sites. During operation power to supply the pumping stations will also be important. In addition, Nathan Dam will inundate Glebe Weir which is currently an important water resource for agriculture, mining and recreational uses. An upgrade of Glebe Weir to support the Wandoan Coal Mine has been approved and it is important that the effects of inundation of the Weir is considered in terms of meeting the agriculture, mining and recreational needs during and post construction of the dam.

Transport infrastructure is already under pressure. The *Queensland coal transport, planning for growth* (2009) document outlines planned developments to provide capacity to cater for 218 Mt/a of coal exports in 2009-10. This represents a 42% increase over 2006-07 exports. Long terms plans aim to provide capacity for up to 306 Mt/a of coal exports by 2015 and 388 Mt/a by 2020. This will require increased investment in transport infrastructure in the region in the short to medium term.

25.2.5. Key industries and contribution

This section discusses the regional importance of the key industries in both the Banana Shire Council LGA and Western Downs Regional Council LGA and the implications for water supply and demand.

The industry composition of nominal gross value added (GVA) in the Fitzroy region for the years 2000/01 and 2005/06 is presented in Table 25-8. It is clear that mining is the prominent industry in Fitzroy accounting for 39.3% of GVA in 2005/06. This is a significant contribution which is up 18.0 percentage points from 2000/01. Also of note was the decline in output share of agriculture, forestry and fishing (down 3.8 percentage points) and electricity, gas and water (down 3.7 percentage points) from 2000-01. The decline in electricity, gas and water share of regional value add was partly due to increases in coal prices and a decrease in the pool price of electricity over the period.

The contribution of each industry to GRP in the Darling Downs is shown in Table 25-9. Agriculture, forestry and fishing were the most significant industry in the region, making up 15.4% of nominal GVA which remains unchanged from 2000/01. However the largest change in composition was seen in the mining industry. The mining industry increased by 2.5 percentage points from 2000/01. Starting from a meagre share of 0.7% in 2000/01, the contribution of mining to nominal output increased to 3.2% in 2005/06. This reflects an average annual volume growth of 51.1% over the five year period. Given the development potential of the Surat Basin this growth can be expected to continue.

Table 25-8 Composition of industry gross value add, Fitzroy (%)

Industry	Composition		Change in composition
	2000–01	2005–06	
	— % —		(percentage points)
Agriculture, forestry and fishing	7.4	3.6	–3.8
Mining	21.3	39.3	18.0
Manufacturing	13.0	10.2	–2.8
Electricity, gas and water	9.6	5.9	–3.7
Construction	5.3	6.8	1.5
Wholesale trade	4.1	2.7	–1.4
Retail trade	5.4	4.2	–1.2
Accommodation, cafes and restaurants	2.3	1.7	–0.6
Transport and storage	5.6	4.8	–0.8
Communication services	1.5	0.9	–0.6
Finance and insurance	2.2	2.0	–0.2
Property and business services	5.1	4.3	–0.8
Government administration and defence	2.2	1.9	–0.3
Education	4.2	3.2	–1.0
Health and community services	3.9	3.1	–0.8

Industry	Composition 2000–01	Composition 2005–06	Change in composition (percentage points)
	— % —		
Cultural and recreational services	0.5	0.4	–0.1
Personal and other services	1.6	1.2	–0.4
Ownership of dwellings	5.0	3.9	–1.1
Gross value added	100.0	100.0	

Source: OESR, Experimental Estimates of Gross Regional Product, 2008.

Table 25-9 Composition of industry gross value add, Darling Downs (%)

Industry	Composition 2000–01	Composition 2005–06	Change in composition (percentage points)
	— % —		
Agriculture, forestry and fishing	15.4	15.4	0.0
Mining	0.7	3.2	2.5
Manufacturing	11.5	10.7	–0.8
Electricity, gas and water	1.3	2.8	1.5
Construction	6.5	7.1	0.6
Wholesale trade	5.8	4.5	–1.3
Retail trade	8.4	8.2	–0.2
Accommodation, cafes and restaurants	2.5	2.2	–0.3
Transport and storage	5.3	4.7	–0.6
Communication services	2.8	2.1	–0.7
Finance and insurance	3.9	5.7	1.8
Property and business services	7.2	5.6	–1.6
Government administration and defence	4.7	5.2	0.5
Education	6.6	6.1	–0.5
Health and community services	7.2	7.1	–0.1
Cultural and recreational services	0.7	0.7	0.0
Personal and other services	1.9	1.8	–0.1
Ownership of dwellings	7.4	7.0	–0.4
Gross value added	100.0	100.0	

Source: OESR, Experimental Estimates of Gross Regional Product 2008

Discussion on the economic contribution of each of the indentified key industries in terms of project impact is provided in the following sections. These industries are identified as mining, agriculture and tourism. While manufacturing also forms a reasonable portion of gross value add, it is not specifically included in the analysis as it is likely associated with the mining and agricultural sectors.

25.2.5.1. Mining industry

- Coal

The Nathan Dam Initial Advice Statement (IAS) (SunWater, 2008a), estimated the annual value of production from Queensland's minerals and energy sectors at $23 billion. This is approximately 14% of Queensland's economy. The IAS also indicates that the Surat Coal Basin has the potential to produce at least four billion tonnes of high quality steaming coal which will provide a significant economic contribution to the State's economy. In order for this to occur, substantial capital investment is required for major supporting infrastructure such as dams, railways and power stations. Figure 25-6 shows the extent of coal mines and advanced projects in the region as at July 2011.

In order to service this demand, the Queensland Coordinator-General announced in April 2008 that the Government had renewed its commitment to a $19.3 billion package for coal-related industries spanning from 2005 to 2015 and beyond. This commitment specified 28 advanced coal projects in Central Queensland, comprising 17 new mines and 11 expansion projects within the next 5-10 years.

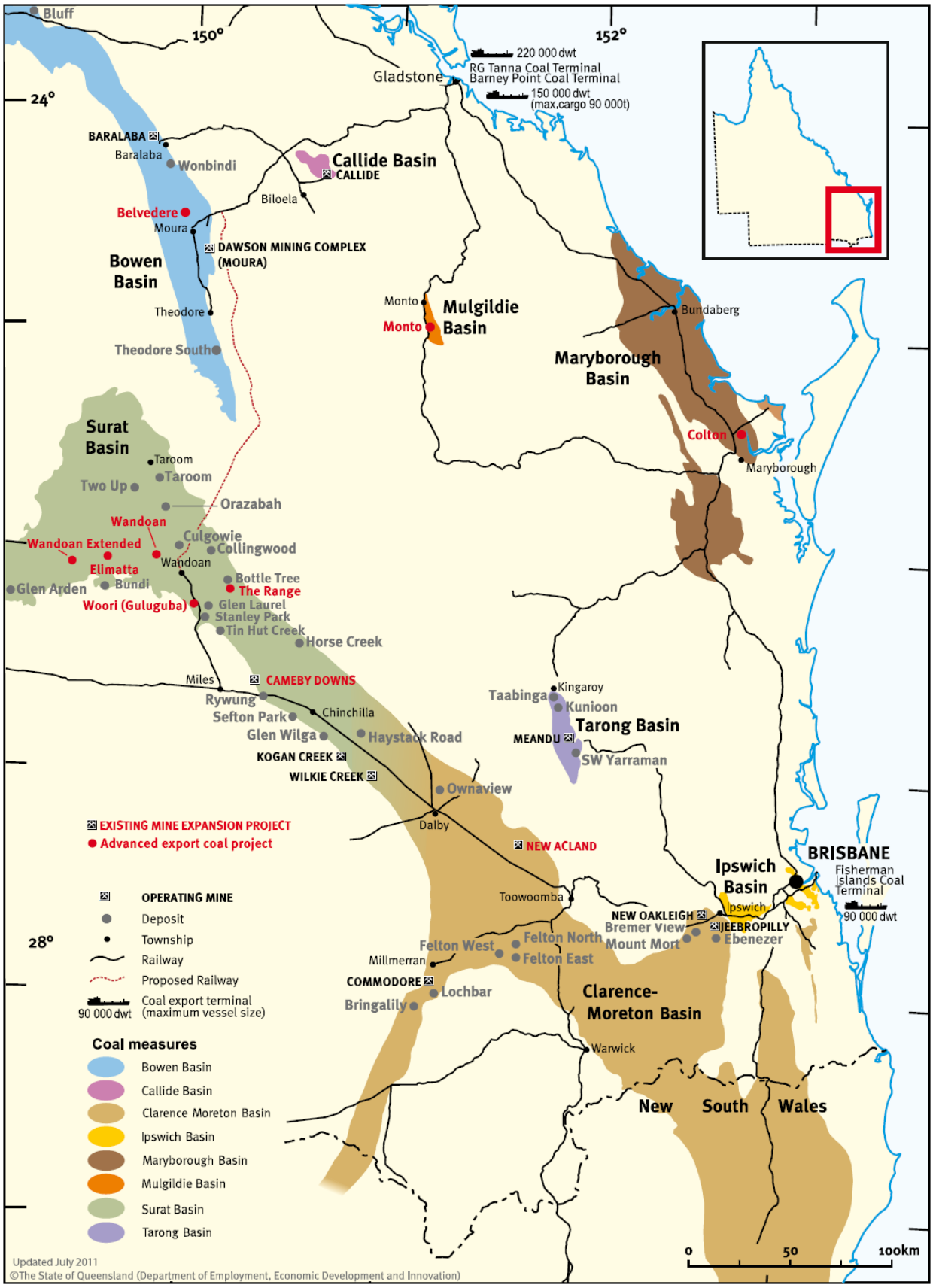

Figure 25-6 Queensland coal map – South-east

Source: DEEDI 2011

Coal Seam Gas

Other processes such as Coal Gasification and Liquefaction technologies are in the early stages of development and the potential demands for water are likely to be low in the short-medium term (SunWater, 2008b).

However, the industry has experienced remarkable growth over the last 15 years (DEEDI February 2011). During this period the number of wells drilled has increased from 10 in the early 1990s to over 600 in 2009-10. As at the 30 June 2010, proved and probable reserves reached 27,992 petajoules (PJ), with production of 212 PJ up from 151 PJ in 2008-09. This represents more than 70% of the Queensland gas production.

The Project is located in the Surat Basin which is and will be increasingly an important supply source for coal seam gas (CSG). Further growth is expected for the industry with coal seam gas the proposed feedstock for an export liquefied natural gas (LNG) industry based mainly at Gladstone in central Queensland. By June 2009, there were eight proposals for LNG plants in Queensland which at full capacity would represent a potential export market of about 50 million tonnes per annum (DEEDI February 2011).

By the end of February 2011 three of these proposals had been awarded state and federal government environmental approvals to proceed. The future of some of the projects is less certain following the merger of some of the proponents.

More than 4000 km of gas transmission lines have been constructed, with additional links proposed to markets interstate and for the supply of gas to the Gladstone LNG plants

The Queensland Government is encouraging a transition from coal to gas, as an effective measure to reduce greenhouse gas emissions, with the Smart Energy Policy requiring 15% of all electricity sold in Queensland to be sourced from gas fired generation from 2010, with the prospect of increasing the percentage in the future.

Commercial production in the Surat Basin began in January 2006 with operations in several areas from Dalby to Chinchilla along part of the route of the Nathan Dam Pipeline. Certified reserves in the Surat Basin overtook reserves in the Bowen Basin by mid 2008.

As the environmental impact statements for the relevant LNG projects have outlined, CSG production in the Surat Basin will result in the extraction of water from the coal seam (APLNG 2010).

The amount of water generated varies from region to region and also over the life of a project with production peaking within the first 6-18 months of a project's start and gradually declining over the Project's life. The water quality can also vary from region to region and even from well to well. In some cases the water can be used for irrigation with little or no treatment but in other cases uses may involve treatment such as reverse osmosis.

Whilst the absolute volumes of water that will be produced are difficult to predict, forecasts produced by DEEDI for a 'mid sized' LNG industry producing 28 Mtpa of LNG would result in the extraction of around 196 GL of water annually (DEEDI 2010c). Assuming that CSG companies can successfully manage any impacts that may be associated with the water extraction process, there is an opportunity to beneficially use this water through consumption by towns, industry, and agriculture in the region.

- Other mining and extractive

Commodity prices in other extractive industries are also increasing. Exploration for gold, copper, iron ore and uranium is occurring in the region to the north of the Surat Basin. The likelihood that some of these mines will enter production is high and these mines will require water, potentially from the proposed dam. The Cracow Gold Mine is the nearest operating mineral extraction facility, some 25 km to the north east of the proposed dam.

Section 2.4.1.3 outlines a number of resource extraction areas to supply whole-of-project requirements. A range of suppliers will be required to satisfy demand.

25.2.5.2. Agriculture

The regional economy is driven by the agricultural industry through cotton production, wheat, sorghum, barley, oats, maize, mung beans, soybeans, sunflowers, peanuts and cereals production; and the pastoral industry through livestock production (both breeding and fattening).

The total value of agricultural production within the Taroom LGA and Banana LGA for the year ending 30 June 2006 was $339.1 million (Table 25-10). Of the $339.1 million, 84.4% was from livestock slaughtering, 15.2% from cropping and the remaining 0.3% was from livestock products. This accounted for approximately 3.9% of Queensland's total value of agricultural production.

Table 25-10 Gross value of agricultural production

Local government area	Total value of crops ($ millions)	Total value of livestock products ($ millions)	Total value of livestock slaughtering ($ millions)	Total value of agriculture ($ millions)
Taroom	6.4	0.0	140.9	147.4
Banana	45.3	1.1	145.4	191.8
Total of both regions	51.7	1.1	286.4	339.1
Queensland	4,167.9	415.8	4,125.2	8,708.9
Region as % of Queensland	1.2%	0.3%	6.9%	3.9%

Source: ABS Agricultural Census 2005/06

25.2.5.3. Tourism

The Leichardt Highway and the Warrego Highway transect the region, and are recognised touring routes. Tourism is not significant in the Western Downs Region with an estimated 281,000 visitors in the year to March 2010 which comprises only 2% of total domestic tourism in Queensland, and only 1% of international tourism although if the key tourist destinations of Brisbane, Gold Coast, Sunshine Coast and tropical North Queensland are left out, the proportion of domestic visitation is some 6.5% and of international visitors it is 7.3%.

A large proportion of tourism through the region comprises 'grey nomads' on driving holidays, usually en route to other areas (Section 24.4.5). Glebe Weir is an attractor in the local area for 'grey nomads' although there is limited quantitative data on the extent of this. The Weir recreational area usually has two to three caravans/mobile homes

overnight although the number is significantly more at key holiday times. This is confirmed by data from the Banana Shire Council LGA which indicated about 124 campers put money in the honesty box (a likely under estimate of use) from April to October 2010. This does not include day visits or overnight stays on the weekends. Glebe Weir is also an important recreation area and is used for boating and fishing.

Section 24.4.5 also indicates a range of other attractions for other visitors to the region including National Parks and the Dawson River. The Project includes development of recreation areas at the proposed dam including a camping area. Given the likely increase in the grey nomad market and the touring market more generally this provision should ensure that there is no longer term adverse impact on regional tourism or on opportunities for local and regional recreation. Depending on the extent and quality of the recreation areas and their management the Project could provide a positive benefit for regional tourism.

The transition from the current situation to the new will require management to minimise any short term transitional impacts on tourism and recreation.

25.2.6. Resource endowment, competitive advantage and future growth

The region is located in an area covered by the Central Queensland Regional Growth Management Framework (CQRGMF 2002). The regional plans highlight the natural resources of the region and how these have contributed to the mining, agriculture and tourism prosperity of the region.

In particular "these regions possess natural assets of State and national significance including native forests and vegetation, estuarine and freshwater wetlands, fauna and flora, marine parks, and coastline. While these areas provide a wide range of diverse habitats and ecosystems to support biodiversity, the regions are also rich in natural resources and are major contributors to the nation's export economy through coal, beef, sugar and grain production" (CQRGMF2002).

The substantial mining sector in the region highlights the natural resources available. In particular the Surat Basin contains a large number of oil and gas fields as well as thermal coal mines which were described in Section 25.2.5.

25.2.7. Key regional markets relevant to the Project

The following section outlines the labour, housing and land, and construction services and building inputs markets in the area.

25.2.7.1. Labour market

In the September quarter 2011 Taroom LGA had an unemployment rate of 0.8% down from 1.0% in September 2010. In the September 2011 quarter the unemployment rate in Taroom LGA approached full employment level. In practice, in most locations, full employment would occur at unemployment rates higher than those recorded for Taroom LGA based on such factors as allowance for people who have left one job and have another but are waiting to start. In rural areas unemployment rates tend to be lower than urban areas even where there is a shortage of work. This is because unemployed and underemployed workers continue to work on some non formal wage basis and/or temporarily or permanently leave the area. On this basis, rural unemployment rates may not tell the whole story in terms of tightness of the labour market. However, despite such low unemployment rates, there is likely to be increased pressure placed on wages, particular for low skilled workers, and the number and proportion of fly-in fly-out and non-resident workforce required for new projects such as the proposed Project.

In Western Downs Regional Council LGA the unemployment rate at September 2011 ranged from 3.4% in Chinchilla to 7.0% in Tara. These rates are considerably higher than unemployment rates in September 2009 when unemployment was as low as 1.7% and 1.4% in Murilla and Chinchilla respectively but lower than earlier in 2011 when they may have been impacted by the floods. The increased unemployment rate may be somewhat explained by the impact of the global financial crisis and the delay of some mining projects and possibly reduced agricultural activity due to a long period of drought compounded by the impact of the floods earlier in 2011 (see Table 25-11).

In Queensland unemployment was steady at around 5.5% throughout 2011 down a little on 2010 but up a little on 2008 and 2009. The unemployment data indicate that the region has not been entirely shielded from the increased unemployment for Queensland and Australia.

Table 25-11 Employment rates in study area

	Unemployment (persons)			Unemployment rate (%)			Labour force		
Area	**Sep-09**	**Sep-10**	**Sep-11**	**Sep-09**	**Sep-10**	**Sep-11**	**Sep-09**	**Sep-10**	**Sep-11**
Taroom (S)	9	17	14	0.5%	1.0%	0.8%	1617	1694	1711
Dalby (T)	116	245	296	2.0%	4.2%	5.1%	5510	5773	5829
Tara (S)	63	122	138	3.2%	6.2%	7.0%	1872	1963	1983
Murilla (S)	27	54	49	1.7%	3.3%	3.0%	1554	1629	1646
Wambo (S)	60	123	142	1.9%	3.8%	4.3%	3089	3237	3296
Chinchilla (S)	61	111	124	1.7%	3.0%	3.4%	3473	3640	3676
Queensland	117,100	135,400	137,000	4.9%	5.6%	5.5%	2,342,500	2,423,500	2,470,000
Australia	615,100	629,100	610,800	5.3%	5.3%	5.1%	11,397,300	11,780,400	12,034,800

Source: DEEWR Small Area Labour Data (Mar 2010)

25.2.7.2. Housing and land markets

Table 25-12 provides a summary of new residential and land values for locations within Western Downs Regional Council LGA as part of the land valuations undertaken by the State Valuations Services. Median residential land prices are the highest for Chinchilla, although higher prices would be expected in Dalby. The price movement indicates the change in price between the last valuation (2004 and part of 2006) and 1 October 2009 which took effect on 30 June 2010. The entire area experienced an increase in the residential land value of 95%.

Table 25-12 Residential land valuation report, Western Downs Regional Council LGA (2010)

Location	No. of residential lands valued	Range of new values	Movement (%)	Median new value
All of Western Downs Regional Council	5,935	$400–$320,000	95%	$75,000
Chinchilla	1,384	$45,000–$225,000	36%	$80,000
Dalby	3,082	$21,000–$265,000	133%	$75,000
Jandowae	309	$12,000–$71,000	1077%	$18,200
Miles	426	$25,000–$133,000	100%	$60,000
Tara	287	$20,500–$90,000	124%	$29,500

Source: State Valuations Services 2010 valuation locations – Western Downs Regional Council

Residential land values for the Banana Shire Council LGA are shown in Table 25-13. Growth in prices for residential land in the Banana Shire Council LGA is below that of the Western Downs Regional Council LGA. New valuations by the State Valuations Services unit show that price has increased by 65%, since the last valuation in 2006, with median prices of $70,000.

Table 25-13 Residential land valuation report, Banana Shire Council LGA (2010)

Location	No. of residential lands valued	Range of new values	Movement (%)	Median new value
All of Banana Shire Council	3,282	$440–$210,000	65%	$70,000
Biloela	1,796	$17,000–$202,500	60%	$70,000
Moura	739	$49,000–$210,000	50%	$70,000

Source: State Valuations Services 2010 valuation locations – Banana Shire Council

25.2.7.3. Construction services and building inputs market

Construction in the Western Downs Regional Council LGA area employed over 1,080 people and the industry as a whole directly contributed $647.4 million to gross regional product in 2005-06 in the Darling Downs SD. Construction in Taroom LGA employed only 44 people. However, the entire industry contributed around $960.5 million to the gross regional product of Fitzroy SD in 2005-06.

In the 12 months ending 31 March 2010, there were 310 dwelling units in new residential buildings approved in the Banana Shire Council LGA and Western Downs Regional Council LGA. These approvals were valued at $73.6 million and accounted for 1.0% of the total value of Queensland's new residential approvals over the period. Within the region, Western Downs Regional Council LGA recorded the largest value of new residential building approvals, valued at $68.4 million while the Banana Shire Council LGA residential building value was $5.1 million (Table 25-14).

Table 25-14 Residential and non-residential building approvals, 12 months ending 31 March 2010 ($,000)

Local Government Area	Dwelling units in new residential buildings (a)	Residential building value (a)	Total residential building value (b)	Total non-residential building value (b)	Total building value (b)	Proportion of total value that is residential (c) %
Banana Shire Council	26	5,140	6,128	7,206	13,333	46.0
Western Downs Regional Council	284	68,411	73,778	44,184	117,962	62.5
Queensland	31,039	7,568,587	8,797,497	8,909,153	17,706,650	49.7

Source: OESR

(a) Excludes alterations, additions and conversions.
(b) Includes alterations, additions and conversions.
(c) Represents total residential building value as a proportion of total building value.

The total value of non-residential building approvals in the Banana Shire Council LGA and Western Downs Regional Council LGA in the 12 months ending 31 March 2010 was $51.4 million, or 0.6% of the value of these approvals in the State. The largest value of non-residential approvals was recorded in the Western Downs Regional Council LGA at $44.2 million with non residential buildings valued at $7.2 million approved in the Banana Shire Council LGA.

25.2.8. Regional key industries and factor prices

The following section reviews key industry and key inputs to industry in the region.

25.2.8.1. Current demand and usage of water

According to the ABS Water Account (2004-05), Queensland consumed 4,361 GL of water in 2004–05 compared with 4,267 GL in 2000–01. The agriculture industry consumed the most water in 2004–05 with 2,916 GL or 67% of Queensland's water consumption. Sugar and cotton were the main consumers within the agriculture industry, with 1,116 GL and 857 GL respectively. The next largest consumers were Households, with 493 GL or 11% of Queensland's water consumption.

In 2004-05, agriculture was responsible for the majority (nearly 65%) of water use in the Fitzroy Basin. This is largely consistent with the agricultural sector's share of State water use. Mining was responsible for 12% of total water use in the basin; compared with only 2% of State water use (Figure 25-7 and Figure 25-8).

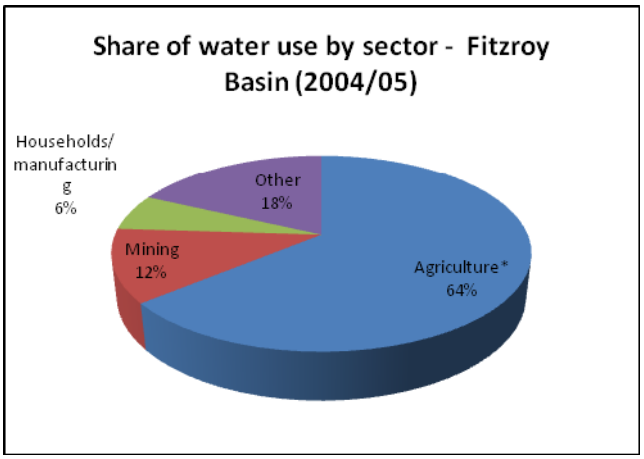

Figure 25-7 Share of water use – Fitzroy Basin

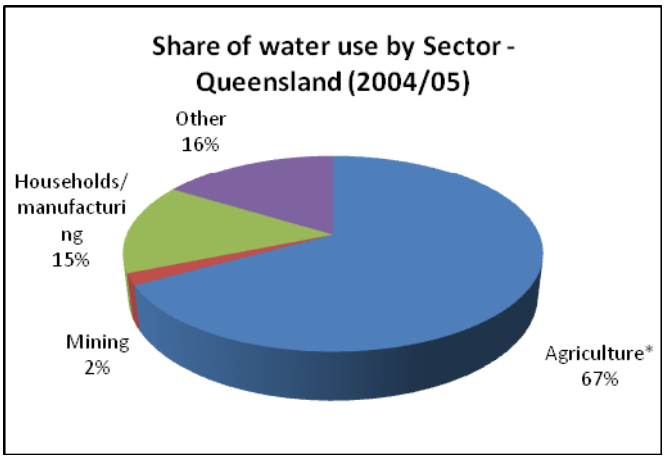

Figure 25-8 Share of water use – Queensland

Source: ABS Water Account 2004-05

In December 2006, the Queensland Government released the Central Queensland Regional Water Supply Strategy (CQRWSS). The Strategy provides an overview of current and future water demand in six sub regions (including the upper and lower Dawson sub region), and assesses the adequacy of current supplies meeting existing and future demands within each sub region. It is noted that the CQRWSS excluded the southern area of the Surat Basin as it fell outside the Fitzroy catchment.

The CQRWSS recognised agricultural (irrigation), urban and industrial (coal mining) demands in the sub-region and concluded that the preferred option was development of Nathan Dam. Chapter 14 provides more details on the current access to water resources. Water products are available as either supplemented or unsupplemented water entitlements. Supplemented water entitlement holders are supplied with water from water storages. Unsupplemented water entitlement holders access river flow on an opportunistic basis. Supplemented water is available in the Dawson

catchment as either high priority, medium priority or medium priority A. These products have different associated levels of security of supply. Access to water can be measured against the Water Allocation Security Objectives (WASOs), or in the case where these are not applicable the mean annual diversion (MAD) may be adopted as in indicator.

The Water Resource Plan (WRP) specifies WASOs for supplemented users in the Dawson Valley, Nogoa Mackenzie, Lower Fitzroy and Fitzroy Barrage Water Supply Schemes and for unsupplemented users in the Nogoa Mackenzie and Fitzroy Water Management Areas and for sections of the Comet River and Dawson River.

For supplemented users in the Dawson River and Lower Fitzroy the Water Resource Plan specifies a median monthly reliability of 95-100% for high priority users and 82-88% for medium A and medium priority users (although the Resource Operations Plan maintains a 20% differential of announced allocations for medium priority A).

In addition to supplemented water supplies, a number of agricultural users draw unsupplemented supplies, usually by waterharvesting of high flows. There are three performance indicators specified for unsupplemented water, these focus on the number of days of water harvesting opportunity.

Section 14.1.6.2 provides more details on total medium and high priority allocations in the Fitzroy Basin which includes some 262.4 gigalitres (GL) of medium (and medium A) priority water and 130.3 GL of high priority water within the supplemented water supply schemes (Table 25-15). Generally medium priority water is associated with agricultural use while high priority water is for urban or mining uses.

Table 25-15 Fitzroy Basin supplemented water supply schemes

Water Supply Scheme	Operator	ROP/iROL	Water Allocation/ Interim Water Allocation (ML/yr)		
			High Priority	Medium Priority	Medium Priority A
Dawson Valley	SunWater	Fitzroy ROP	5,579	36,797	19,456
Nogoa Mackenzie	SunWater	Fitzroy ROP	44,398	190,925	-
Callide Valley	SunWater	iROL	4,311	443	-
Lower Fitzroy	SunWater	Fitzroy ROP	25,520	3,101	-
Fitzroy Barrage	Fitzroy River Water	Fitzroy ROP	50,483	11,610	-

Mining sector water use

It is difficult to predict long-term water demand for infrastructure projects such as the proposed dam, where demand is focused on an industry with highly volatile commodity prices. Nonetheless, it is anticipated that the production of coal will increase tenfold by 2030 (AEC Group 2007). Water supplied from the proposed dam is currently intended to be entirely a high priority supply. Demand assessment for the business case for the proposed dam has identified a potential total demand of 72,000 ML/a and 103,000 ML/a, with the bulk of this water supplied to mining clients, although some water is reserved for urban use. The majority of new clients are located to the south of the dam and will be supplied through a pipeline from the proposed dam. However, several new clients are located north of the dam site and will be supplied from Nathan Dam via the downstream weirs.

While there is good evidence of strong demand, further work will be done during the business case development to further understand demand in assessing the Project's commercial viability. Estimates of the potential demand provided

may change over time as the Project evaluations progress. This assessment will also need to have regard of water generated by CSG projects which is being considered through the Surat Dawson Integrated Water Project.

- Agricultural sector water use

Irrigation is the principal use of water by primary industries in the Fitzroy Basin and the Dawson River valley. Irrigated areas and the crops grown vary appreciably from year to year depending on water availability and market outlook. Crops grown in the Dawson Valley Water Supply Scheme include cotton, fodder, cereal and horticultural crops such as wheat, barley, oats, maize, mung beans, soybeans, sunflowers, sorghum and peanuts (SunWater, 2010d). Agricultural water use can be estimated based on the levels of medium priority water diverted described in Table 25-15. The mean annual diversion (MAD) for medium priority water is currently estimated at 46,250 ML/a for the Dawson River with further diversion of some 66,939 ML/a (MAD) by unsupplemented irrigators in the Dawson River. These mean average diversion levels will be impacted by the operation of the dam. The impact is described in Section 25.3.2.5.

A study undertaken by SunWater to predict future demand found that the price of water from the proposed dam is likely to be several times the irrigated agriculture viability limit, even for high value crops. Thus, it is very unlikely that the Project will result in an expansion of irrigated agriculture.

The pipeline from the dam will reach as far as Dalby in the Condamine-Balonne catchment. There is significant agricultural activity in the catchment with land use dominated by cattle and sheep grazing and there are significant areas of irrigated grain, cotton crops as well as pasture (CSIRO 2008). While there would be potential for agricultural entities to gain access to the dam water via the pipeline, it is unlikely there will be any significant additional demand due to the likely price sensitivity of agricultural users.

25.2.8.2. Local water users

The *Central Queensland Small Communities Water Study: Community Demands Report* (PB, 2008) identified a significant demand for future urban water supplies within the Dawson River catchment. Many communities in this region are currently under water stress and cannot expand without further water supplies. Water demand in the region is primarily driven by the population growth associated with new mining activity. The availability of high priority water will be of interest and importance to meet urban and industrial needs. Further information is provided in Section 14.1.6.3.

25.2.8.3. Current input costs

- Regional wage rates

As outlined in Figure 25-9, median incomes in Western Downs Regional Council LGA are slightly higher than the wider Darling Downs region. The Taroom LGA area has lower incomes (individual, family and household) than the rest of Fitzroy which reflects the increased participation in the mining sector outside of Taroom LGA. Apart from the broader Fitzroy region, the median income for all other areas is below the State average.

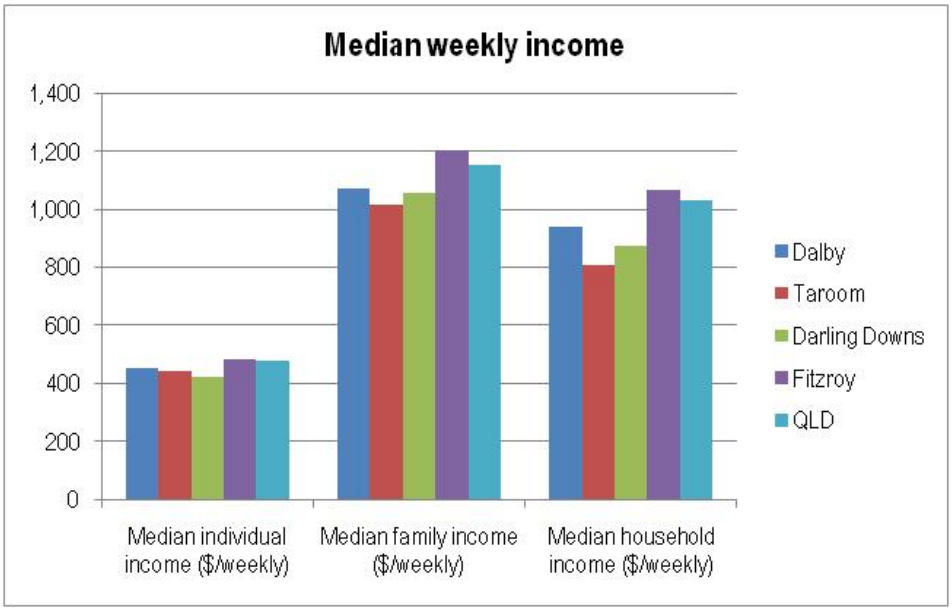

Figure 25-9 Median weekly income

Source: ABS 2006 Census

Building and construction costs

Figure 25-10 shows the producer price index for Australia for the five years to March 2010. The average annual growth rate is 2.8% down from 3.7% for the five years to December 2008 (peak price). The consistent growth was impacted by the Global Financial Crisis after the September quarter 2008 but has since rebounded. Figure 25-11 provides the price index for open cut mining which has a similar trend including the rebound.

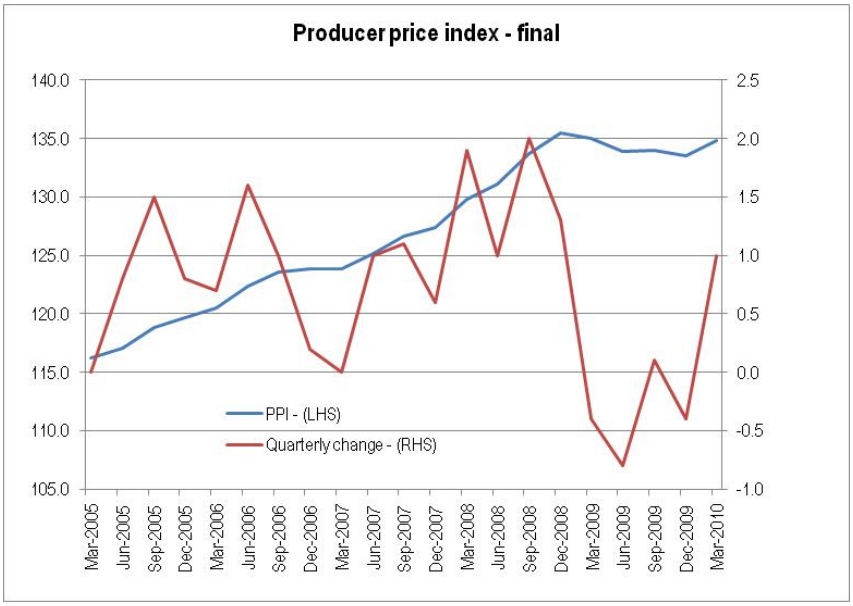

Figure 25-10 Producer price index – final

Source: ABS catalogue number 6427.0

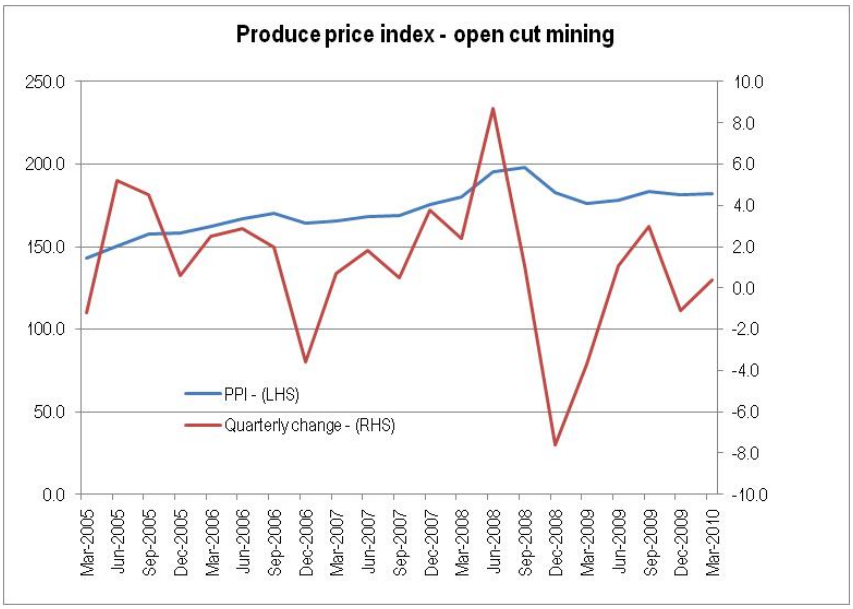

Figure 25-11 Producer price index – materials used in open cut mining

Source: ABS catalogue number 6427.0

Existing housing market and rental accommodation

In 2006, Taroom LGA had about 1,100 houses with 800 of these either owned or being purchased and 300 rented. Over 90% of the houses are classified as separate with the balance being semi-detached, flats or non-descript. However, short-term rental opportunities are very limited in Taroom and Wandoan. Also the caravan parks have limited space for permanent or long-term stays. Thus accommodation of a large workforce could not rely on the existing residential opportunities within Taroom or the district. Temporary accommodation would have to be provided for specialist construction workers and management during the construction phase of the Project. Sourcing rental accommodation is easier in Dalby and Miles. This should assist in providing accommodation for workers on both the pipeline and the dam given the project plans to provide bus transport through these towns.

25.3. Potential impacts and mitigation measures

25.3.1. Project timelines

The potential impacts are assessed for the Project and estimated time scales as set out in Table 25-16.

Table 25-16 Project development timing

Dam	Pipeline	Comments
2013-2016	2014-2016	Project reticulates Nathan Dam water as soon as possible. Dam timing assumes some early works (such as road works) in late 2013 with construction in parallel with the pipeline over 2014-2016.

25.3.2. Economic Impacts

The Project will have direct impacts on the regional and State economy including in the areas of:

- industry output;
- employment;
- factor incomes; and
- property values.

Each of these impacts is described in the following sections. The Project also has the potential to result in a range of other impacts including:

- forgone industry output particularly from agriculture;
- impacts to household, e.g. through changes to recreational facilities or traffic impact;
- flow on impacts to other industries and economies; and
- climate change impacts and mitigation.

Each of these is described and mitigation strategies provided. It is also important to note that some impacts will be temporary and largely driven by the construction process, whilst other impacts are more permanent in their nature and driven by the ongoing provision of water by the Project. However, while there are very large on-going potential benefits related to the Project's completion (such a increased mining activity), the bulk of these benefits are not included in this impact assessment as they are subject to additional and separate investment decisions and not part of the terms of reference for this economic impact assessment. The value of the Project to SunWater from future projects will be reflected in the income received for water and included in the commercial evaluation.

25.3.2.1. Industry Output

Industry output may be impacted by the Project in the ways set out below.

Existing highly water intensive industries such as mining and irrigated agriculture (although the latter is unlikely due to likely price levels) may be able to access increased water supply. This increased security will provide more certainty for investment in these industries into the future.

The Project will offer increased employment opportunities to contractors and individuals in the region largely during the construction phase. These opportunities will assist in maintaining the low regional unemployment and the buoyant regional economy. However, the low unemployment levels and the number and scale of development in the region will tend to put pressure on regional employment with limited resources available from within the region and increased requirements for resources to be imported into the region. This situation could also lead to increased costs of resources including rises in regional wage rates.

Despite an apparent tight labour market, the Project could offer a wider range of employment to regional people and encourage individuals who are currently under employed, not seeking work or are not looking for additional work to enter the workforce temporarily, providing a temporary increase in regional income and potentially a more permanent acquisition of new skills. These could include regional farmers and farm workers involvement in additional part time or seasonal employment in such areas as vegetation management, agricultural reinstatement, traffic management activities

and possibly some civil contracting services. These opportunities could provide off farm income in the event of a return to drought conditions or other cause for a down turn in the agricultural industry whether for a single season or longer term.

Some regional industries will have the opportunity to supply to the Project including local suppliers of materials and a range of construction services including vegetation management, transport, agricultural land reinstatement and plant and equipment hire, etc. Local suppliers of support services such as accommodation and hospitality services and retail should also benefit from the Project although the extent of this may be limited by the demands from other projects and any decision to minimise accommodation demand pressure through the provision of construction camps.

The range of development in the region and the likely duration of significant construction activities should ensure that business throughput and accommodation occupancy rates rise and could be sufficient to trigger additional investment. However, the additional demand could provide an inflationary pressure with the benefits reduced by rising costs and prices. It is also likely to be difficult to attribute new investment to the Project specifically.

SunWater is required (Section 25.4.2) to provide a full, fair and reasonable opportunity to tender to local industry. This will include the use of local resources and businesses, both directly and through the prime contractor for any area of service to sub contract local businesses where available. For example, vegetation management services may be contracted to a national or Queensland company who then sub contracts some of the services to qualified local providers. The Industry Capability Network Queensland (ICN) could facilitate this process by assisting in the identification of appropriate firms and assisting them to reach the required standard to submit an appropriate tender.

Based on a strategy of facilitating local businesses to tender as sub contractors there is also the possibility that some local businesses may develop a critical mass of skills and experience and a working relationship with major contractors that they continue to provide services on other major projects across the State and possibly nationally.

The Project proponent is aware of the issues associated with undertaking a Project in a region with a buoyant economy including:

- the availability of suitable employees and contractors in the region; and
- increased competition with other regional industries for skilled workers for construction of the Project that could place upward pressure on regional wages. This in turn may hinder the ability of lower paying industries, or industries that at current wage rates are marginal, to access and retain staff.

Upward pressure on wage rates will be mitigated by the use of fly in and fly out workers from other areas. However, sourcing of workers from regions within Queensland with less labour market pressures such as around Gladstone, Rockhampton, the Hervey Bay area and Brisbane and surrounds will not only mitigate this impact and will also offer scope to improve the skills and productivity more widely across South Central and Southern Queensland and reduce any leakage of the benefits of the project outside Queensland. On this basis any inflationary effect is likely to be minor, temporary and stabilise once the Project is complete.

25.3.2.2. Employment

During construction of the dam, the Project will generate direct employment opportunities for approximately 90 total construction personnel on average over the 32 month dam construction period, peaking at approximately 170 total

construction personnel towards the end of the construction period. This workforce includes a mix of on-site construction workers and professional support personnel (Figure 25-12).

Pipeline construction will employ a peak of some 150 personnel and is programmed over 21 months. Approximately 35 additional support staff will be based at each of the site offices with staff moving between offices as required providing a total peak staffing of some 220. The average total construction and support staff is estimated at 150 spread over time (Figure 25-13). The workforce profile is based on the actual workforce profile for the Sugarloaf Pipeline in Victoria adjusted to reflect the shorter construction program and the estimated peak personnel for the pipeline construction.

The construction workforce for each component of the Project includes:

- an average of 90 people for construction of the dam, peaking to 170 people during the dam construction period. This includes some 20-30 professional staff. This estimate is based on the employment profile below (Figure 25-12);
- an average of some 150 pipeline construction staff peaking at 220 people during pipeline construction including some 70 support staff (Figure 25-13);
- approximately 35 road construction workers, plus professional staff employed for some six months during the pre construction activities stage..

It should be noted that while these estimates reflect the number of employees; they will add up to more FTE employees based on FTE employee being employed for 40 hours per week given that the Project workers are working longer than 40 hours per week.

This construction employment will all take place over some 32 months broadly from late 2013 to mid to late 2016.

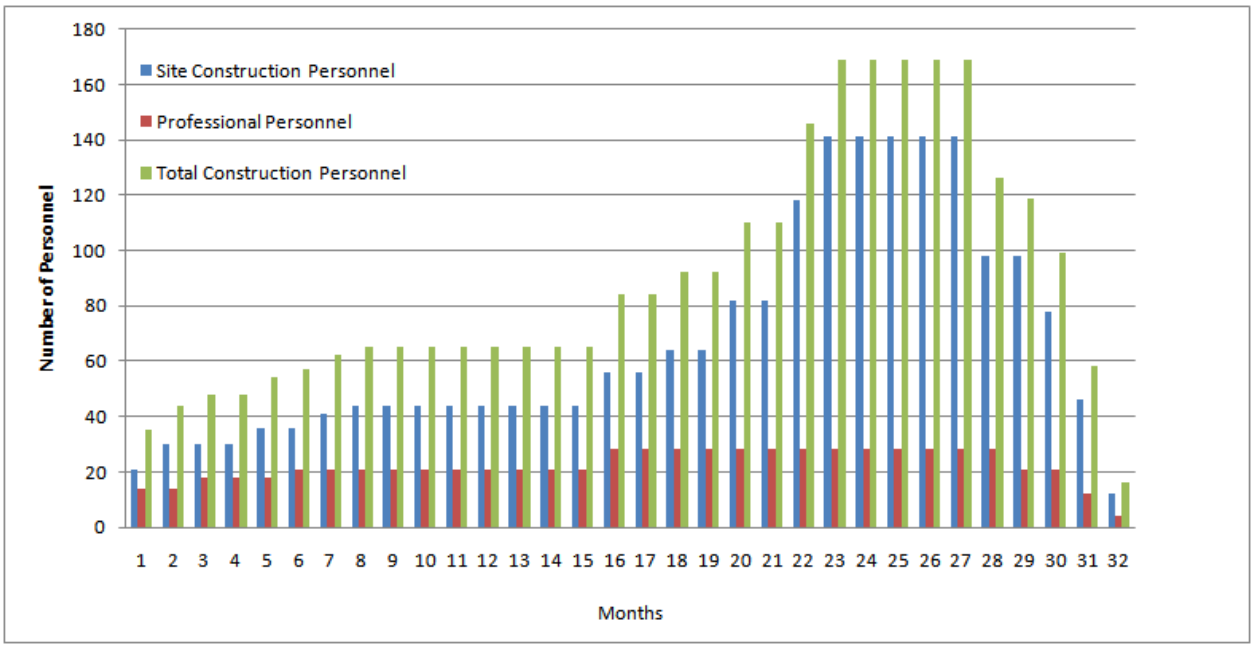

Figure 25-12 Anticipated dam construction workforce

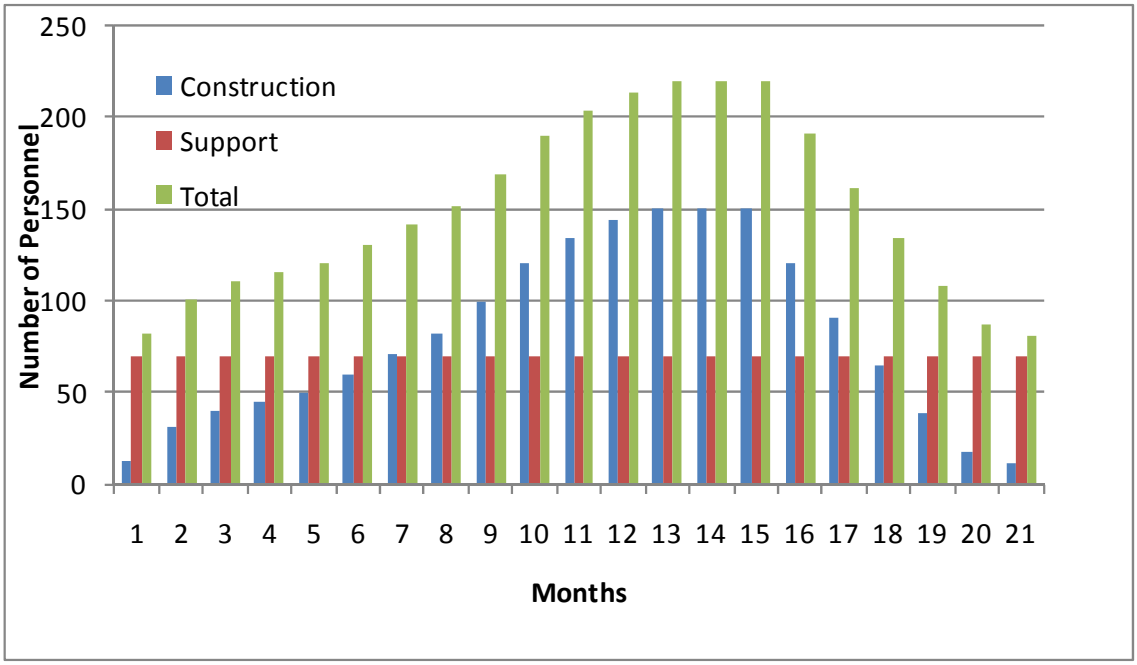

Figure 25-13 Estimated pipeline construction workforce profile

In addition, as noted above, the Project will provide opportunities for local and regional businesses through demand for goods and services. This is likely to create indirect employment opportunities, which would also have positive benefits for local residents. It is assumed that some 70% of the workforce will be employed on a fly-in fly-out (FIFO) basis, 20% drive in drive out (DIDO) employed from the nearby areas around Gladstone and Rockhampton to the north and Brisbane and hinterland to the south and 10% from the immediate region (Dalby, Chinchilla, Taroom etc.). Given the Project will have access to the airfields at Wandoan, Chinchilla and Roma, the source of some of the FIFO employees may be other Queensland locations including the same areas as some of the DIDO employees. On this basis, this assessment assumes that the proportion of employees sourced from Queensland is unlikely to vary on the basis of FIFO or DIDO recruitment so that any change is unlikely to affect this economic assessment or its conclusions. This approach to recruitment should ensure that the Project can source the required employees while eliminating or at least minimising any potential adverse impacts on the regional labour market.

During construction it is likely that the bulk of the workforce will be housed in specially built construction camps. While a few workers will relocate with their families and are expected to find accommodation in the regional towns, because of the limited number the impact on property values and rentals should be minimal. There may be some pressure on short term accommodation due to additional contractors and consultants visiting the Project sites. However, again the use of construction camps should minimise this.

The camps are likely to be managed under contract and it is understood that the use of local facilities will be minimal. The camps will include all catering and include a limited bar service which will open for a short period in the evening. The camps will be located close to or within local area towns and as such, despite an intention to reduce contact with locals, this is still likely to occur. However, the proposed working basis of 12 hours per day within a staggered roster, suggests any participation in more formal community activities is likely to be limited.

The extent of the economic impact of the construction on the regional economy will depend on the way the accommodation camps are managed. If live-in service staff are employed from outside the region and supplies are

subject to a State or national contract there may be limited regional impact. While purchases of supplies locally will increase the impact, the actual value that remains in the region is likely to be limited. However, these arrangements will alleviate any potential adverse economic effects of increased pressures on the rental market.

Staff expenditure outside the camp would have a positive benefit. However, the extent of this will depend on the proximity to a range of retail outlets and time available to access them. Based on a recent survey of a similar Project (Sugarloaf Pipeline Employee and Contractor Employee Expenditure Survey SKM, 2009) this could be of the order of 2% of Project expenditure or up to $28 million expenditure in the local community area if the workforce live and socialise in the community. However, based on the proposed policy of using accommodation camps and providing significant meals services, the potential regional expenditure will be lower.

During operation, the Project will support around 4-5 direct FTE jobs in the region. In addition it is likely that some specialist employees will be required on a drive-in drive-out basis to undertake specific testing and maintenance tasks.

As noted above, as security of water will allow additional mining and possibly some agricultural activity there is scope for substantial further on-going indirect employment as a result of the Project. Alternatively water security could ensure mining operations continue longer. However, as noted earlier, while this potential employment is a substantial benefit to the region and State it is not part of the current assessment.

25.3.2.3. Factor incomes

The ABS (2008) defines Total Factor Income (TFI) as the part of the cost of producing the gross domestic product which consists of gross payments to factors of production (labour and capital). TFI represents the value added by these factors in the process of production and is equivalent to gross domestic product less taxes plus subsidies on production and imports.

The income of the labour factor of production comprises compensation to employees including wages and salaries (in cash and kind) and employer's social contributions. The social contributions include such payments as retirement benefits (e.g. superannuation), sickness benefits, income continuation and other personal insurance payments and severance benefits. The income from the entrepreneurship factor of production is income from the production of corporate enterprises. The ABS also defines a mixed income as the surplus arising from the productive activities of unincorporated enterprises which can include the returns to the capital of the proprietors (operating surplus) and an element akin to wages and salaries accruing to proprietors and their family as a payment for labour input even though they do not receive explicit payment for their work.

As the region currently has very low unemployment rates and labour and other resource constraints, Project expenditure in the region could have an inflationary impact with some of the new expenditure involving higher prices rather than purchasing real resources. As such, the real impact on GSP and GRP will be less than expected with the expenditure providing a lower real benefit to the region. There could also be a change in the relative proportions of factor incomes between labour and capital. In practice, as discussed, the way the Project proposes to source labour and materials should spread the Project benefits across a wider geographic area and, at the same time, eliminate or at least reduce any adverse inflationary impacts in the region.

25.3.2.4. Property values

There is unlikely to be a significant impact on housing values as most of the accommodation will be provided in accommodation camps. In addition the local property market is strongly influenced by the mining industry which will outweigh any impacts of the Project. The market for agricultural land is likewise impacted by external factors such as commodities prices and climatic conditions such as drought.

25.3.2.5. Forgone impacts

This section considers the forgone impacts of the Project on industry.

- Loss of agricultural production

Potential adverse economic impacts from the Project will occur at a local level and relate primarily to the loss of productive agricultural land due to inundation and to changes in irrigation levels due to water supply arrangements. The loss of agricultural income resulting from the loss of areas of good quality agricultural land (including irrigated pasture) will occur at the individual farm level and indirectly in the local area.

The minimum area to be acquired for the water storage area is 24,644 ha. This comprises 13,824 ha of area within the full supply level (FSL), 10,603 ha of flood margin and 217 ha of construction area and buffer. The minimum area lost to agriculture as a result of the water storage is approximately 13,842 ha. Within the GQAL rating system, this comprises 5,981 ha of Class A land, 1,589 ha of Class B and 6,254 ha of Class C. Further information is provided in Chapter 7 about land use which indicates most of the properties most affected by the dam are used for grazing or dryland cropping. The Queensland Government currently owns 50% of the required land which in most cases is being leased back to previous owners. Should the Project be approved to proceed, the Government will continue to seek to voluntarily purchase only that part of a property that is required for the Project. Some landowners may elect to sell their entire properties rather than part, in which case the Government may agree to purchase the whole of their property. This strategy is based on consultation with landholders but may have implications for efficiency and viability due to loss of scale and the purchase of only the most productive alluvial components of the properties.

The socio-economic impact of the foregone land for the water storage area then becomes dependant on how the proceeds from the sale of land differ from the proceeds of agricultural production. In its simplest form, the sale of the land represents a trade-off between a future income stream at the expense of an up-front payment. On this basis, the property owner should be indifferent between a lump sum payment and the equivalent annual income stream into the future. In practice issues such as information asymmetries, differential allowance for risk, market fluctuations due to economic conditions, differential consumer preferences may lead to variations in perceptions of market value. However, on average it can be assumed the first assumption is correct and in practice market value may even overstate the present value of future production. If the proceeds from the sale are spent in the area as would the proceeds of the agricultural production, then there should be little overall regional economic impact. However, should the farmer move from the region, the impact will be larger as the region's annual production and net wealth is reduced. This can lead to reduced population and reduced local spending with flow on effects to the local community.

In terms of water use, in the Full Entitlement scenario (Section 14.1.2.2 – the Full Entitlement Scenario represents the base case for the assessment), the Dawson River is divided into two independent sub-schemes, as per current arrangements, and in the 'With Dam' scenario (Section 14.1.2.2 – the 'With Dam' scenario reflects the likely flow regime after the dam is operational) the Dawson River is managed and reported under one sub-scheme. This is due to the new

operational arrangements proposed by the proponent which are intended to increase the efficiency of the scheme operations. The Water Resource Plan targets are achieved for each group under both the Full Entitlement and "With Dam" scenario.

All high priority users achieve the same reliability of supply and mean annual diversion under both scenarios, while some of the medium priority users will experience a reduction and some will experience an increase. Overall mean annual diversions for medium priority users will increase by approximately 1,200 ML/a, with an increase of 1,400 ML/a in the upper sub-scheme and a reduction of 200 ML/a in the lower sub-scheme. This represents an overall increase of 3% of mean annual diversions. Based on an estimate of average gross value of irrigated agriculture for Queensland in 2007/08 of $1,684 / ML of water applied (ABS 2010), this indicates a net annual increase of gross value of around $2 million. This figure does, however, ignore the distributional impacts where some irrigators will suffer reduced productions while others realise a gain.

The unsupplemented irrigators in the Dawson catchment will experience an average reduction of 10% of their mean annual diversion (further detail provided in Section 14.2.2.3). This mean average diversion change to unsupplemented water uses is approximately 6,900 ML/a which, based on the average value of $1,684 / ML of water applied, represents an estimated annual cost of $11.6 million. Essentially, high flow events will still occur but they will often have a lower peak flow and may occur for a shorter duration, allowing less opportunity for waterharvesting access.

Compensation strategies related to alternative water products were tested for these irrigators however these were found to be inefficient in terms of the amount of water released from the dam compared with the benefit to the impacted waterharvesters. Appropriate compensation strategies will be developed at later stages of the Project, and in conjunction with local irrigator groups.

Like the loss of agricultural land, the socio-economic impact of the lost irrigation opportunities will depend on how the compensation levels differ from the proceeds of agricultural production. If the compensation and the loss of irrigated agricultural value is similar and the compensation is spent in the area as would the proceeds of the agricultural production, then there should be little overall regional economic impact. However should the farmer use the compensation to move from the region, the impact will be larger as the region's annual production and net wealth is reduced. This can lead to reduced population and reduced local spending with flow on effects to the local community.

The pipeline will be primarily underground apart from some sections through the Great Diving Range. Assuming appropriate restoration works, there will be minimal long term loss of grazing or cropping capacity resulting from the pipeline.

- Loss of extractive resources

As outlined in Section 7.2.1.3, the water storage area may result in the sterilisation of potential mining land held under various mining tenement although SunWater is not aware of any planning by mining companies to establish mining activities within the water storage area and surrounds. Should the Project proceed, potential mining opportunities will likely be lost. This lost opportunity essentially represents a loss of potential future income, the extent of which remains uncertain. No attempt to quantify this impact is made as it represents a potential impact which would require additional investment and, like the potential mining benefits enabled from the Project, are not considered.

Tourism

The Project may provide an increased attraction to longer term touring visitors such as the grey nomad market segment with their own motor homes or caravans. However, overall the Project is unlikely to affect tourism to the region significantly.

25.3.2.6. Impacts on households

The impact on households in terms of employment is described in Section 25.3.2.2. The dam will provide a further local or regional recreation area although it is likely to provide a social benefit rather than an economic one as commercial operations are unlikely given its location.

25.3.3. Indirect economic impacts

The direct expenditure on the Project creates a flow on effect through the direct output in each initial industry taking up goods and services from suppliers creating a secondary demand from these suppliers who need to buy additional goods and services to replenish stocks and potentially employ more people to meet initial industry demands (production induced effects). Further flow on impacts can result as these employees spend their wages and salaries creating new demands (consumption induced effects).

However, as the region is already in a strong economic position there is a danger that the major potential indirect effect may be that the Project will, by increasing the demand for employment and accommodation, increase wage levels and housing prices. In addition, the relatively short term nature of the Project and the proposed accommodation of most of the workers in camps, is also unlikely to encourage increased investment in new housing stock. However, while the flow on impacts are likely to be relatively limited in terms of increased regional employment and housing stock, any inflationary effect will be mitigated by the Project proposal to source the bulk of the work force from outside the region and, as noted, to provide construction camp accommodation for most of the workers. On this basis the indirect economic impacts of the Project on the region will be relatively small although there will be a broader flow on effect particularly across Queensland and to a lesser extent the Australian economies as discussed below.

The flow on impacts will occur more broadly across the economy and not only in the local/regional area. The production impact is likely to be felt outside the region as it is anticipated most of the Project materials and equipment such as pumps and pipes etc will be purchased from outside the region and only impact the region to the extent that local suppliers and supplies are used. Local expenditure by direct employees involved in construction should benefit the local/regional economy and is unlikely to have a significant inflationary effect. However, the proposal to house workers in construction camps could reduce the extent of local purchases where the camps are provided through a non regional contractor and if they are supplied though a State or national contract. In addition, a proportion of employees and contractors expenditures will be made outside the region and in the home region where they normally live for family and other purposes.

25.3.3.1. Indirect employment

This section estimates the flow-on employment effects of the Project at State and national level. The estimates are based on the Project capital cost estimates for the dam and the pipeline and the estimated proportion of this expenditure spent in each location (Table 25-17). The total project expenditure is estimated at approximately $1,400 million. The

proportional allocation of cost for the Project has been provided by SunWater at approximately $650 million for the dam and $750 million attributed to the pipeline.

Table 25-17 Estimated location of project capital expenditure

	Dam	Pipeline
Capital Costs $	**$650 million**	**$750 million**
Queensland	90%	75%
Other Australia	10%	20%
Overseas	0%	5%
Total	100%	100%

The location estimates in Table 25-18 are based on the assumed proportions of employment and plant, materials and other expenses in Table 25-19 and the assumption that the proportion of labour to other costs for the pipeline is some 22.4% direct project employees and 77.6% other costs including contractor labour. These proportions are based on recent pipeline project expenditures. At this stage it has been assumed that the pipes will be supplied from Brisbane. While it is difficult to split out the labour component from contract expenditure the total labour component would broadly be around 40-45% and other 55-60%. The proportion of labour to other expenses for the dam is assumed at 50% for each. Given this basis of the estimates and assumptions they are subject to further review. The supply of the more significant items of material, such as pipes and pumps, will be tendered and in recent times there has been a tendency for overseas suppliers to win these contracts, as a result, the proportions by location may change with a higher overseas component and lower Queensland component of the pipeline costs.

The location of employment is based on the indications in the Project proposal and supported by the information in the Wandoan Coal Project EIS document that limited employees will be able to be sourced from the local area. Therefore it is assumed that the Project could source 10% of the labour requirement locally, 40% from the Gladstone, Rockhampton and Hervey Bay areas, 30% from other areas of Queensland but mainly the Brisbane, Ipswich and Toowoomba areas and 20% as fly in fly out personnel from elsewhere in Australia. As noted earlier the bulk of the Queensland based employees that are not local I will fly in and fly out based on access to local airports and to reduce traffic movements. It is possible that some of the assumed interstate fly-in fly-out employees may be able to be sourced from other parts of Queensland in which case would increase the State economic impact.

The proportions for these expenditures for the dam construction are based on the assumptions that most of the materials will be sourced locally as indicated in the Project description and that some of the required plant and equipment will also be available locally based on the nature of the regional economy. It is assumed that some more specialised plant and some materials may need to be brought in to the dam site and that these items will be able to be sourced from within Queensland including some from the Gladstone and Rockhampton areas. As such, the flow on employment impacts are indicative rather than conclusive.

Table 25-18 Expenditure by location ($)

	Dam	Pipeline
Central Queensland	422,500,000	258,582,090
Other Queensland	162,500,000	306,492,537
Queensland	585,000,000	565,074,627
Australia	65,000,000	150,000,000
Overseas	-	34,925,373
Total	650,000,000	750,000,000

Table 25-19 Proportion of employment and plant, materials and other expenses assumptions

	Dam		Pipeline	
	Employment	Plant/Materials	Employment	Plant/Materials
Local/Region	10%	60%	10%	10%
Central Queensland	40%	20%	40%	20%
Other Queensland	30%	20%	30%	44%
Australia	20%	0%	20%	20%
Overseas		0%		6%
Total	100%	100%	100%	100%

The State and national indirect employment estimates are based on:

- the direct employment estimates adjusted to FTEs over the scheduled construction period for the dam and the pipeline and the proposed working rosters. The actual working hours are calculated as a proportion of a standard 40 hour week.
- the relevant Queensland and national multipliers for the water supply sector adjusted for average wage rises over the period since the currency of the most recent data 1996-97 for Queensland and 2004-05 for the Australian figures; and
- the proportions of project expenditure attributed to each location as shown in Table 25-19 and the estimated dollar expenditure in Table 25-18.

The direct employment estimate is extended by the additional jobs multiplier to provide an estimate of the flow on jobs and the total jobs. The project offers the potential to provide nearly 2,500 FTE additional jobs to Queensland and potentially a further 3,000 nationally. The national figures include Queensland and are not additional. The higher national figure reflects the lower leakages at national level over state level and the difference in industry classification between the Queensland and Australian data (Table 25-20).

Table 25-20 Estimated flow on jobs

	Direct FTE Jobs[(1)]	Flow on Jobs		Total Jobs	
		Queensland	National [(2)]	Queensland	National [(2)]
Dam and Roads	409	882	2,329	1,291	2,737
Pipeline	428	773	2,324	1,201	2,752
Total	**837**	**1655**	**4,653**	**2,492**	**5,490**

Notes: (1) FTE direct job years over the life of the project-Adjusted for Project Schedule and proposed work program. (2) Includes Queensland

The Project description indicates that the dam and pipeline will be operated and maintained from SunWater's current facilities in Theodore and Pittsworth. At least two duty dam and pipeline operators will be available at any one time, with standby operators as required. On this basis, the project is estimated to provide some 4-5 FTE on-going direct jobs .As noted above these people should be based in the region. Using the Queensland employment multipliers this implies that the Project's operational phase could generate some 10-12 FTE flow on jobs and some 14 to 17 FTE total jobs in Queensland with potentially a number of these created in the region.

25.3.3.2. Indirect Impact on the Gross State Product

At the State level the size of the economy is measured by gross state product (GSP), the equivalent of gross domestic product (GDP) at the national level. GDP and GSP are a measure of income based on value added output.

Total spending can be considered as consisting partly of value added output (income in the form of wages, profits, interest and rent) and partly of intermediate inputs. To estimate the contribution of the Project expenditure to GSP, requires use of an appropriate conversion factor expressing value added output as a percentage of total output in the water supply industry sector.

The appropriate value added conversion factor is the initial value added multiplier taken from the most recent Queensland Input – Output tables 1996-97. These tables indicate that value added represents some 41% of a change in final demand that would be created by the new expenditure on the Project. The value added factor is a proportion and therefore does not have to be adjusted for price changes in contrast to the employment multipliers above.

Table 25-21 indicates the estimates of the direct, indirect (flow on) and total contribution to GSP of the Project's capital expenditure. The estimates are based on:

- the proportions of the capital expenditure for the Project that are estimated to be made in Queensland (Table 25-17); and
- conversion of these expenditures into value added using the Queensland initial and flow on value added multipliers.

Table 25-21 Estimated Contribution to Gross State Product (GSP)

$(million)	Direct Contribution to GSP	Indirect Contribution to GSP	Total Contribution to GSP
Dam	239.9	339.3	579.2
Pipeline	231.7	327.7	559.4
Total	471.5	667.0	1138.6

The estimates indicate that construction of the Project could add over $1,100 million to GSP. The on-going contribution from operation of the Project will be much smaller but could add some $6.6 million per annum directly to GSP and some $16 million per annum in total (direct and indirect effects).

25.4. Cumulative impacts

There are a number of other projects that are underway now or will potentially take place in the near future which may result in cumulative positive and negative socio-economic impacts, these include:

Existing projects

- Wilkie Creek Coal Mine;
- Darling Downs Power Station Project; and
- Kogan Creek Power Station.

Planned Projects

- Surat Basin Rail;
- Wandoan Coal Mine; and
- A range of CSG developments.

While no other projects are located in close proximity to the dam area, a range of CSG, resource and infrastructure development projects are currently planned for the wider region and along the pipeline as noted above and as detailed in Chapter 24. The workforce requirements of many of these projects are substantial, with potentially up to approximately 10,000 new workers required for the construction of projects broadly in parallel with the Nathan Dam Project. However, some of these projects may be delayed and not impact on the Nathan Dam project, while others, even allowing for project delays, may be completed or in the latter stages of development before the Nathan Dam and pipeline is in construction. The operational stages of these projects will require fewer employees than the construction stage and while the proportion of local workers will be greater during the operational stage compared with construction, some of these employees will relocate from other parts of Queensland and elsewhere.

The OESR has produced projected workforce and population statistics for the Western Downs Regional Council area based on planned gas, rail, power, and major infrastructure projects (including road and water) (see Section 24.6.1). These projections are based on the assumption that only 5% of construction workers will be local.

The cumulative impacts of these projects on the accommodation and labour market are discussed in the relevant sections of the report including the deployment of FIFO and DIDO personnel to reduce any pressure on the regional labour market and the use of accommodation camps to avoid adverse impacts on the housing and short term accommodation markets. However, these projects and any others identified prior to the commencement of work in the region should be considered in light of any of the impacts identified in this assessment. In particular, consideration should be given to:

- any additional accommodation demands that could impact further on availability and price (purchase and rental prices and visitor accommodation tariffs) during construction;
- the possibility that if several developments take place at the same time that the regional labour market could tighten more than currently assumed reducing further potential employment of workers from the regional area and increasing the number of FIFO/DIDO employees. This could mean the temporary provision of larger or more temporary accommodation facilities; and
- similarly increased numbers of concurrent developments could lead to contractors becoming over stretched.

As noted the underlying issues of significant new regional developments are considered in the report based on the current best estimates and assumptions. It is assumed that these will be subject to review by SunWater over the Project planning period and it is anticipated that recruitment, employment and accommodation processes will be modified to reflect any change in circumstance.

It should also be noted that these projects may also have positive cumulative impacts. For example they could provide a longer period of continuous employment in the industry as people move from construction project to construction project. They may also improve apprenticeship opportunities under individual or group apprenticeships schemes and allow more diversity of employment and the further development of the regional skills base. To facilitate this SunWater and its main contractor could coordinate with contractors involved in other projects that are winding down to maximise the continuous employment of local people and other appropriate employees.

25.4.1. Climate change risk

Forecast climate change impacts for Central Queensland include continued drying and a decline in rainfall and increase in evapotranspiration which could affect soil moisture and availability of quality water (Office of Climate Change, 2008). CSIRO forecasts are for a decrease in rainfall of between 2 and 10% by 2050 with the greatest impact during winter and spring (median projections). The reduction in rainfall has the potential to impact agricultural and mining in Central Queensland. The dam will provide a total allocatable yield of 66,011 ML/a of high priority water to supply primarily mining demand and for urban use. It is unlikely that water supplied by the dam will mitigate climate changes risk for agricultural use given there is limited if any anticipated use of the allocations created by the dam for agricultural use. However, based on the hydrological modelling there is some improvement in MAD for some irrigators in the DVWSS although this is relatively small.

In terms of commercial viability of the Project itself, the analysis provided in Section 14.2.2.7 shows mean annual reliability drops from 100% (current climate) to 99.6% (median climate change). The dam will be bound by the water sharing rules contained in the Fitzroy Basin Resource Operations Plan (ROP). Under this plan an announced allocation will be issued each water year which will incorporate a range of factors including climate change. Water users can only take water to the announced allocation limit and high priority users will be serviced first. The ROP is renewed every ten years so actual climate changes can be taken into account. The water user will pay a fixed fee based on their contract

volume regardless of the announced allocation. Therefore these arrangements should ensure the commercial viability of the Project is not impacted.

25.4.2. Strategies to mitigate disruption and increase local economic benefits

As noted, the Project overall offers significant positive economic benefits. In addition there are a range of strategies that can be adopted to minimise any negative economic impacts of the Project on the local and regional economy including temporary issues related to construction activities and similar strategies that can increase the economic benefits the Project can bring to the region.

25.4.2.1. Mitigation strategies

Adverse economic impacts can include the direct impacts of reduced agricultural production due to the water storage together with a further area that will be subject to periodic inundation at flood periods. There will also be implications for unsupplemented water users who will likely have reduced access to waterhavesting volumes. Any ongoing impact of the dam should be offset through land acquisition and compensation for unsupplemented water users (Section 25.3.2.5).

Construction and operation of the pipeline will have a minor impact on the access of stock to grazing land. This impact will be minimised by the Project design, which includes the pipeline being buried except in very rocky ground and rehabilitated (without fencing in grazing areas). It is assumed that in cropping areas, as far as possible, the pipeline is laid when there are no crops in the ground with the timing based on consultation with the landowner. If this is not possible and crops in the construction corridor are lost, compensation will be provided to the landholder.

Other impacts relate to the possible reduced security of stock and ability for stock to escape or be injured from interaction with the construction site or activity and the introduction and/or transfer of disease or weeds to regional properties. Impacts on cropping land will be minimised by ensuring the pipeline is constructed along property boundaries where possible, and as noted, to the degree possible, construction occurring outside of the growing season.

The impacts of the pipeline construction activities are likely to be limited by the relatively small area of properties that the pipeline easement occupies and the limited duration of the works at any particular location. More generally, mitigation measures are provided in Table 25-22.

Table 25-22 Mitigation measures

Project Activity	Impact	Mitigation
Pre-construction	Lack of certainty on land use affects land values	Voluntary purchase of significantly affected properties. Strong property owner and other stakeholder engagement program with accurate and timely Project information
Construction	Direct loss of agricultural production	Property purchase in part or whole where impact is significant. The current strategy is to purchase the whole property where the balance would not constitute a viable living area. Full acquisition will only be undertaken with the consent of the landholder involved.
	Reduced access to property by pipeline easement	Work with landowners to minimise impact including: ■ agree location of easement to reduce impacts e.g. outside property boundaries and/or along fence lines rather than through middle of property where practicable ■ construction timing to minimise impact on farming operations

Project Activity	Impact	Mitigation
		■ provision of appropriate access and ability to cross easement ■ avoid infrastructure and facilities as far as possible and replace like with like if not possible to avoid ■ minimise time crossing farm access roads ■ provide alternative access during unavoidable construction activities
	Introduction/transfer of weeds/disease (biosecurity)	Develop appropriate biosecurity protocols including potentially restricted access, vehicle/plant wash down/ etc.
	Regional access	Information on road closures/detours and alternative routes provided in appropriate media and signage Additional signage and information for any businesses impacted by access issues
Post Construction	Adequate reinstatement of agricultural properties on pipeline route	Appropriate rehabilitation to ensure post construction condition is suitable for intended use (e.g. grazing or cropping of pipeline easement) Compensation to mange impacts on waterharvesters

25.4.3. Strategies for local participation

This section outlines the policy requirements and other strategies that will be utilised to encourage local participation. SunWater is a Government Owned Corporation (GOC) and, as such, it is subject to the Government's Local Industry Policy and is required to ensure that either a Local Industry Participation Plan is prepared or, in the case of capital assets, that the relevant elements of the Local Participation Plan are incorporated into their Significant Procurement Plans. The requirements indicated below are familiar to the Proponent.

The Local Industry Policy is designed to ensure that local industry is given a full, fair and reasonable opportunity to be considered for major work being undertaken in Queensland in both the public and the private sector. For the purposes of the Government projects, 'local industry' is defined as Queensland and Australian small and medium sized enterprises (SMEs) in the manufacturing or service sector and New Zealand suppliers of goods and services.

The Local Industry Policy document sets twelve central components of the policy. The key components for the Project include:

- commitment to local industry being given full, fair and reasonable opportunity to tender for infrastructure and resource-based Project work;
- requirement that Project proponents develop *Local Industry Participation Plans (LIPPs)* for:
  - government-funded infrastructure and resource-based projects valued at more than $5 million;
  - government-funded infrastructure and resource-based projects in regional and rural Queensland valued at more than $2.5 million; and
  - major infrastructure or resource-based projects where the Government has provided a significant contribution.

- inclusion under the Policy of capital asset acquisitions by departments and agencies (excluding Information and Communications Technology goods and services) valued at more than $5 million per contract or Standing Offer Arrangement;
- all Government Owned Corporations are requested to report annually on levels of local industry involvement in projects undertaken and to prepare *Local Industry Participation Plans* for projects valued in excess of $5 million;
- support for the role of the Industry Capability Network Queensland (ICN) in working with Government, Project proponents and local industry. The ICN's role includes evaluation of the outcomes of LIPPs and reporting on the findings to the Department of Tourism, Regional Development and Industry and to provide advice on the capacity of Queensland and Australian industry to provide inputs to major projects and to assistance to:
  - project proponents in facilitating the use of local inputs;
  - proponents in the development of LIPPs; and
  - local industry to pre-qualify against specific Project requirements.
- integration of this approach with the State Purchasing Policy, the Government's approach to private sector investment in infrastructure and training and skills development programs. The key initiatives supported by the Local Industry Policy for government funded projects in Queensland are the Government Building and Construction Contracts Structured Training and Employment Policies namely the 10% Training Policy and the Indigenous Employment Policy (IEP 20% Policy).

Based on the above the Project will need to complete a LIPP and comply with the 10% Training Policy and the IEP 20% Policy.

25.4.3.1. 10% Training Policy

The policy requires that a minimum of 10% of the total labour hours on any Queensland Government building or civil construction Project (valued over $250,000 for building or $500,000 for civil construction) must be undertaken by Indigenous workers, apprentices, trainees or cadets or used for the upskilling of existing employees (to a maximum of 25% of the deemed hours).

The policy aims to ensure that the building and construction industry continues to employ apprentices and trainees and upskill its existing workforce. The policy also requires that contractors on State Government building and construction contracts ensure that appropriate training and upskilling occur to address skills shortages and create additional employment opportunities in the industry. Recent changes to the policy include allowing Indigenous workers to be employed and trained as part of the standard compliance arrangements for this policy and the definition for upskilling of existing workers has been expanded to include the professional workforce engaged in tertiary or technical qualifications.

The policy is administered by Construction Skills Queensland (CSQ). CSQ is already working with contractors and training providers to increase industry's ability to comply by developing training plans, determining skilling strategies and allocating funds to develop and implement these.

The policy requires that SunWater:

- invite offers from contractors that have demonstrated compliance with the policy and have provided written confirmation that they will comply with the policy and complete all the required documentation;
- provide CSQ with a copy of the Letter of Acceptance to the successful tenderer;
- return all completed compliance forms to CSQ as a condition of the contract; and
- liaise with the Department of Education, Training and the Arts regarding the most appropriate strategy to deal with non-compliance.

The contractor is responsible for ensuring compliance including determining the best way of integrating training with the Project activities to meet the deemed hours requirements. Contractors need to consider the ability of subcontractors to meet the requirements and may need to provide support or require subcontractors with the capability to comply to provide more than 10% structured training.

25.4.3.2. IEP 20% Policy

The IEP 20% Policy applies to all civil construction contracts with no minimum threshold and building construction projects exceeding $250,000 (GST inclusive) in value. However, projects of lesser value can be clustered together in a contract to reach the threshold value. This Policy requires a 20% minimum benchmark of total labour hours with half of the deemed labour hours required to involve accredited training. The Indigenous workforce is to be recruited from the local Aboriginal and Torres Strait Islander community/ies.

This policy only applies to specific Aboriginal and Torres Strait Islander communities, none of which are located in the Project study area. That being said the Project does present a good opportunity to utilise local indigenous workers, and hence, where appropriate, opportunities (including training and up skilling) should be provided to such workers.

25.4.3.3. Strategies to increase benefits

Major projects offer significant potential benefits to a region. The Project offers short term benefits over the construction period through increased expenditure in the region that could support regional contractors, create jobs and support other businesses. In the longer term the Project will support regional economic activities through the more secure provision of water and additional water for mining and potentially agriculture.

SunWater has a preference to source construction materials locally. While this is necessary in containing costs it also has the potential to provide an economic benefit to the local area.

The supply of pipes and other significant plant and equipment such as pumps and valves will be subject to competitive tender. On this basis at this stage these items could be sourced from Australia or overseas although the requirements of the Local Industry Policy will influence the source. Working with the ICN to identify qualified Queensland suppliers could assist in maximising the benefit to the State and nationally.

In situations where there are underutilised resources in a region, sourcing materials, contractors and direct employees locally will take up some of the underutilised resources either directly though employing unemployed or underemployed workers or indirectly through the flow on to the unemployed. In this situation unemployment should reduce and regional output, income, value added and employment increase.

In the Project region there are fewer underutilised resources than in most other regions, with total unemployment in Taroom at some 9 (0.8%) at the end of September 2011 or some 3.3% of the estimated direct workforce for the Project. Unemployment rates are higher but, with the exception of the Tara locality, are still quite low in the Western Downs Regional Council LGA. In the broader region unemployment in the Gladstone region is slightly lower than Queensland and on a par with the national figure (5.1%).The Rockhampton regional unemployment is higher with an unemployment rate of 7.3%, well above the Queensland average (5.5%) at the end of September 2011. Sourcing a proportion of the labour from these regions and particularly Rockhampton offers scope to reduce unemployment in the region and in the State on average. The impact of the 70% fly-in fly-out staff proposed is difficult to assess without details of the likely location of the employees/contractors. However, the Project Proponents recruitment and resourcing strategy has the potential to maximise the benefits of the Project to Queensland while minimising any inflationary effect. A plausible scenario has been modelled in Section 25.3.3.1.

Housing the bulk of the workforce in construction camps will ease pressure on the scarce regional housing resources and reduce if not eliminate any pressure on rentals. However, it may reduce the beneficial regional economic impact of the Project depending on the management and resourcing of the camps. If the camps are largely self contained with contracted staff and supplies shipped in from outside the region the economic impact of the workers expenditure will be limited. However, given the tight employment situation as well as rental housing supply the provision of camp accommodation could again ensure that the Project has a positive impact and does not impact on regional wage rates and prices.

The proposed mix of locations for sourcing the workforce together with the provision of camp accommodation for the bulk of the workers could provide a manageable positive economic benefit for the region, providing potential continuous employment for a smaller number of local employees some of whom could be younger trainees and introducing a small number of more mature new entrants to the region who relocate with their families and who are likely to provide a broader range of regional expenditure and a positive impact to the nearby coastal regions.

25.4.4. Impact upon property management

The Project has the potential to impact agricultural property management in the area. The impact on property management for the water storage is largely mitigated by the acquisition process. Impacts for property management along the pipeline route can include:

- lost area of production (temporary and permanent);
- biosecurity issues (plant and animal disease risk of spreading);
- loss of access to stock watering points (temporary fencing);
- movement of stockyards and fencing (temporary);
- cutting off access to other grazeable parts of the paddock through temporary fencing of easement; and
- compaction of soil.

Mitigation measures include:

- temporary fencing, which is in place to ensure the safety of workers, landholders, stock and native fauna, is in place for the minimum period necessary and is discussed with landholders before placement;
- if any facilities required relocation, this is done at SunWater's cost and through discussion and agreement with the landholder;
- ensuring return of soil fertility to enable successful establishment of re-sown pastures for grazing. This can include:
  - use of appropriate fertilisers in consultation with land owners especially if organic-status properties are encountered; and
  - use of soil ameliorants such as gypsum or lime to improve soil sodicity.
- compacted areas from heavy traffic areas, access roads, turn-arounds, camp and work sites can be ripped, aerated or tilled to alleviate potential compaction and water logging in the root-zone. The application of gypsum may lessen the effects of soil compaction and waterlogged soils. The re-establishment of pastures or crops will be most important to re-establish soil ground cover and reduce the likelihood of run-off and erosion. SunWater is committed to undertake multiple passes at reinstatement to ensure on farm drainage is not altered by settlement of pipeline backfill or placement of excess spoil particularly for clay soil irrigated farms;
- weed control in accordance with SunWater standard procedures, modified if need be to suit the specific landholder requirements; and
- the use of temporary fencing during rehabilitation works should be used where appropriate to prevent livestock access and remain in place to facilitate successful establishment of pasture plants species.

25.5. Sustainable development

The core objectives of the *National Strategy for Ecologically Sustainable Development 1992* are:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- to provide for equity within and between generations; and
- to protect biological diversity and maintain essential ecological processes and life-support systems.

In relation to these objectives, the analysis in this section can be used to provide a comparative analysis against the first and second objectives; whereas the alignment to the third objective will be covered in other sections in the EIS. Overall the Project will provide a high priority water supply to the Central Queensland mining area which will assist in meeting identified shortfalls in water supply for industrial (particularly mining) use and for supporting urban infrastructure. Given the importance of mining to the regional economy, this project has the opportunity to enhance welfare created by a strong mining sector.

Inter and intra generational equity is achieved through the long term nature of the infrastructure that will be created. While current generations will initially benefit from the Project, the infrastructure created will ensure future generations also benefit from the Project. Costs will be recouped from users over time.

25.6. Summary

The Project will provide an overall positive economic impact in terms of providing additional water security primarily to support the development of the coal mining industry and to ensure water supplies for regional urban development. However, because the regional economy is already relatively buoyant due mainly to the mining activity, the Project impacts are likely to be dispersed more widely across the State than a similar project undertaken in a region with a less buoyant economy and more under-utilised resources.

It is also important to note that some impacts will be temporary and largely driven by the construction process and the impact this will have on the local economy, whilst other impacts are more permanent in their nature and driven by the ongoing provision of water by the Project. However, while there are very large on-going potential benefits related to the Project's completion, the bulk of these benefits are not included in this impact assessment as they are subject to additional and separate investment decisions (e.g. mining expansion plans) and not part of the terms of reference for this assessment.

During construction, the Project will generate direct employment opportunities for:

- an average of 90 people for construction of the dam, peaking to 170 people during the dam construction period. This includes some 20-30 professional staff;
- an average of some 150 pipeline construction staff peaking at 220 people during pipeline construction including some 70 support staff; and
- approximately 35 road construction workers, plus professional staff.

Economic costs in the form of forgone production will also result from the Project. The largest of these are agricultural losses where land once used for agricultural will form part of the water storage area and due to reduced water diversions particularly through reduced waterharvesting volumes. The cost however is considered to be small and will be mitigated through compensation arrangements.