

Stratford Extension Project Environmental Impact Statement



APPENDIX N

ROAD TRANSPORT ASSESSMENT





On Thursday 28 June 2012, Yancoal Australia Limited was listed on the Australian Stock Exchange and merged with Gloucester Coal Ltd (GCL) under a scheme of agreement on the same date. Stratford Coal Pty Ltd is now a wholly owned subsidiary of Yancoal Australia Limited. Any reference to GCL in this Appendix should be read as Yancoal Australia Limited.

Stratford Extension Project
Road Transport Assessment

26 April 2012

Prepared for
Stratford Coal Pty Ltd

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This report has been issued and amended as follows:

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1 Introduction

This report has been prepared on behalf of Stratford Coal Pty Ltd (SCPL) to present the results of an assessment of the road transport implications of a proposal to continue and extend open cut coal mining and processing activities at the Stratford Coal Mine (SCM) and Bowens Road North Open Cut (BRNOC) for an additional 11 years at an annual run-of-mine (ROM) coal production up to a maximum of 2.6 million tonnes per annum (Mtpa). The two mines are collectively known as the Stratford Mining Complex, and the proposed development is known as the Stratford Extension Project (the Project). This study has been undertaken with reference to the road transport components of the Director General's environmental assessment requirements for the Project, which require:

Traffic & Transport - including:

- *accurate predictions of the road and rail traffic generated by the project;*
- *a detailed assessment of the potential impacts of the development on the capacity, safety and efficiency of the:*
 - *local and regional rail network, having regard to the strategic objectives and cumulative impacts for the passenger and freight rail network; and*
 - *local and regional road network, with particular regard to a cumulative traffic impact assessment; condition assessment of the existing network; proposed new road infrastructure; and impacts of coal trains on level crossing operations;*
- *details of mine to port or other domestic customer transport movements, train path availability and any required rail infrastructure works; and*
- *a detailed description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road and rail networks in the surrounding area over the life of the project;*

The rail components of the Director General's environmental assessment requirements are addressed separately by SCPL in the Main Report of the Environmental Impact Statement (EIS), and in the Noise and Blasting Impact Assessment (SLR Consulting, 2012) presented in Appendix C of the EIS.

In addition, the issues raised by the New South Wales (NSW) Roads and Maritime Services (RMS) in their letter to the Department of Planning and Infrastructure (dated 10 November 2011) have been considered and addressed during the preparation of this assessment.

The assessment has been prepared in accordance with the *Guide to Traffic Generating Developments* (NSW Roads and Traffic Authority [RTA], 2002), and where relevant, makes reference to the RTA's (1996) *Road Design Guide* and Austroads' *Guide to Traffic Management* series.

An appreciation of the existing traffic situation around the Stratford Mining Complex can be gained by examining the existing road network, traffic volumes on the existing road network, traffic generated by the existing transport activity at the Stratford Mining Complex, observed growth in background traffic, and safety aspects of the road system. These aspects are discussed in this report, along with potential impacts from the Project.

The remainder of the report is set out as follows:

- Section 2 describes the existing and proposed operating characteristics of the Stratford Mining Complex.
- Section 3 describes the existing road transport conditions on the road system around the Stratford Mining Complex, and expected changes to the road environment.
- Section 4 assesses the potential impacts of the Project on the road transport environment.
- Section 5 presents the conclusions of the investigation.

2 Existing and Proposed Stratford Mining Complex Operations

2.1 *Existing Operations at the Stratford Mining Complex*

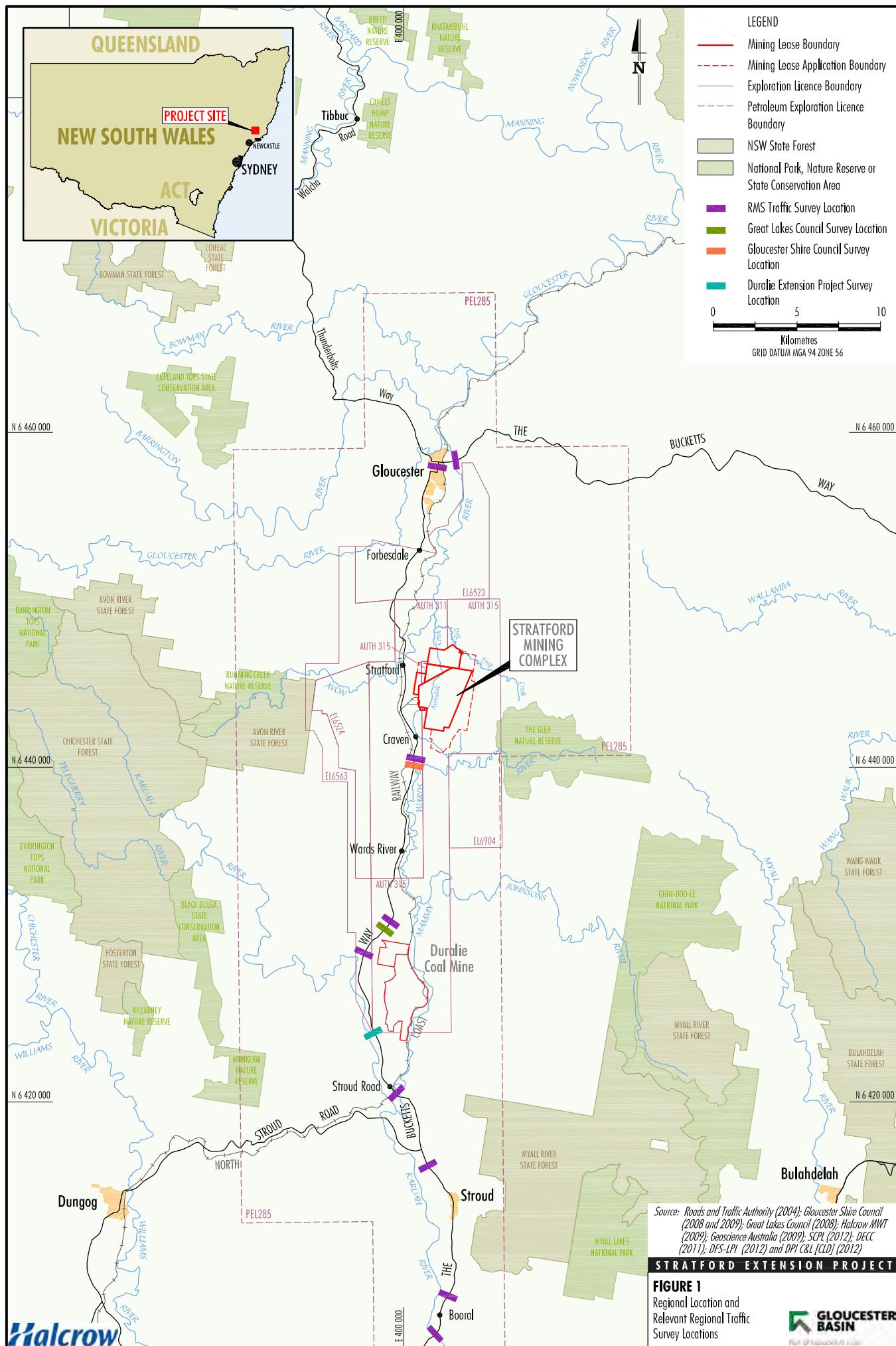
The Stratford Mining Complex is an open cut coal operation located approximately 100 kilometres (km) north of Newcastle, NSW in the Gloucester Basin (refer to **Figures 1 and 2**). SCPL is a wholly owned subsidiary of Gloucester Coal Ltd (GCL), which owns both the Stratford Mining Complex and the nearby Duralie Coal Mine (DCM) located approximately 20km south of the Stratford Mining Complex.

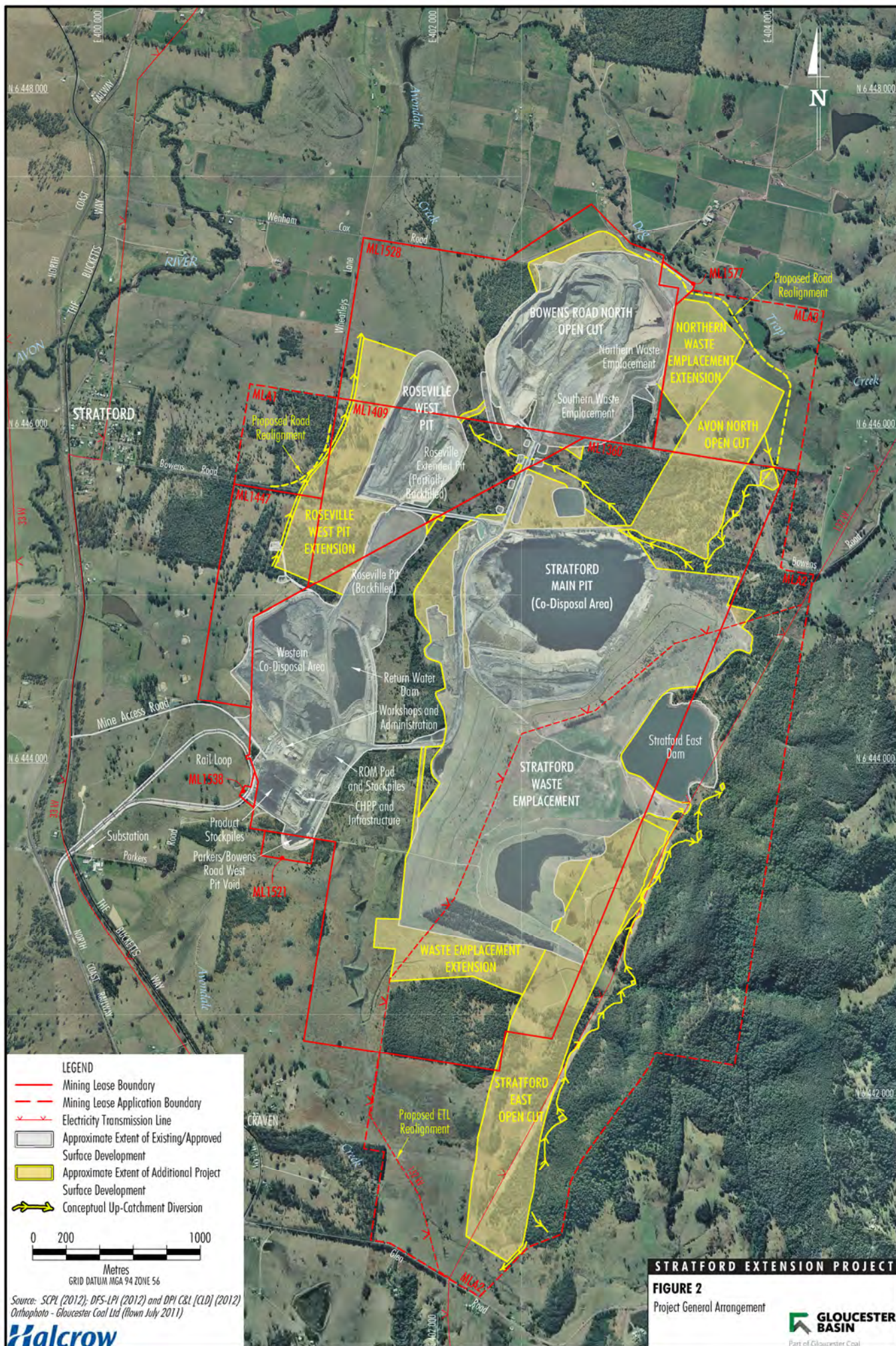
Construction at the Stratford Mining Complex commenced in 1994, and the Stratford Main Pit was mined for nine years. The Stratford Main Pit is now used for water storage and as a co-disposal area for rejects from the SCM Coal Handling and Preparation Plant (CHPP). ROM coal is currently extracted from the SCM Roseville West Pit, which commenced in 2007, and from the BRNOC, which has been in operation since 2003. All coal produced at the BRNOC is transported via the existing SCM haul road to the SCM ROM pad, where it is blended and processed in the CHPP.

The DCM commenced coal production in 2003. ROM coal mined at the DCM is transported on the North Coast Railway to the Stratford Mining Complex, where it is unloaded and processed at the CHPP.

The CHPP is used to process ROM coal from the SCM, BRNOC and the DCM, and to reprocess rejects from an existing co-disposal emplacement area at the Stratford Mining Complex. Blended product coal from Stratford Mining Complex is railed to Newcastle.

The current approvals for the Stratford Mining Complex allow mining to the end of 2013, and processing of DCM ROM coal and export of product coal to 2019. The current approved annual ROM coal production rate is 2.1Mtpa at the SCM and 1.0Mtpa at the BRNOC. The CHPP processes up to approximately 4.3Mtpa of ROM coal from both the Stratford Mining Complex and the DCM.





Mining takes place between 7.00am and 10.00pm at the SCM and between 7.00am and 7.00pm at the BRNOC. The CHPP operates 24 hours per day, seven days per week. Coal loading and export trains operate 24 hours per day, seven days per week. The DCM shuttle train, which carries coal from the DCM to the Stratford Mining Complex, operates from 7.00am to 10.00pm.

SCPL currently makes annual contributions to the Gloucester Shire Council in accordance with Condition 15 Schedule 3 of the SCM Development Consent (DA 23-98/99) and Condition 11.2 Schedule 2 of the BRNOC Development Consent (DA 39-02-01). In addition, GCL currently makes annual contributions to the Gloucester Shire Council in accordance with Condition 17 of Project Approval 08_0203 for the DCM.

2.1.1 *Existing Workforce*

The Stratford Mining Complex employs 125 people, with 110 employees at the SCM and 15 employees at the BRNOC. SCPL has advised that up to 85% of employees are present on any one day, and that employees typically travel by car, with an average of 1.2 people per car. Thus, 106 employees would travel to and from the Stratford Mining Complex per day in 89 cars, generating 178 vehicle trips per day.

The current working hours of employees vary according to their roles, as follows:

- Administration 7.00am to 4.30pm – 18%.
- Mining 7.00am to 5.00pm – 60%.
- CHPP Day 7.00am to 7.00pm – 11%.
- CHPP Night 7.00am to 7.00pm – 11%.

Employees are drawn from the surrounding area as follows:

- Gloucester – 37%.
- Taree – 18%.
- Forster – 17%.
- Newcastle – 5%.
- Stroud/Wards River/Craven/Monkerai – 11%.
- Sydney – 2%.
- Other – 10%.

On this basis, it is expected that of the 178 vehicle trips generated by employees travelling to and from the site at the start and end of shifts, 142 vehicle trips per day would be to and from the north, and 36 vehicle trips would be to and from the south.

Some employees also travel to Stratford for lunch, generating around 40 additional light vehicle trips per day on the Stratford Mining Complex access road and The Bucketts Way.

2.1.2 Existing Deliveries

SCPL has advised that the Stratford Mining Complex typically attracts 47 delivery vehicles per week, which are all heavy vehicles. Deliveries therefore generate 94 heavy vehicle trips per week, which are typically made between 6.00am and 6.00pm. For the purpose of this assessment, it is estimated that on a typical day, deliveries would generate some 20 heavy vehicle trips per day.

SCPL has advised that deliveries are made from the following locations:

- Newcastle – 75%.
- Sydney – 10%.
- Taree – 5%.
- Brisbane and Other – 10%.

Thus, around 15% of delivery vehicles would travel to and from the north, and 85% would travel to and from the south.

2.1.3 Existing Visitors

There are typically around 35 visits per day by general visitors and short-term contractors. These visitors generate around 70 vehicle trips on the Stratford Mining Complex access road, of which around 20% are heavy vehicles. It has been assumed that the distribution of visitor trips is similar to that of deliveries, i.e., 15% of trips to and from the north and 85% of trips to and from the south.

2.1.4 *Existing Exploration and Site Trips*

GCL is approved to undertake exploration activities within surrounding authorisations (Authorisations 311 and 315), and Exploration Licence 6904 to the south-east of the Stratford Mining Complex. The Stratford Mining Complex exploration and operational staff use the access road when moving around the site during the day. Such movements are typically expected to generate around 60 vehicle trips per day, of which around 5 trips would be made by heavy vehicles.

For the purpose of this assessment, it is assumed that the exploration and operational trips would be distributed such that 20% of the traffic would travel to and from the south of the Stratford Mining Complex, and 80% would travel to and from the north to Wenham Cox Road. Half of the northern traffic is assumed to use The Bucketts Way, Bowens Road and Wheatleys Lane to access Wenham Cox Road, and the remainder would use The Bucketts Way and Wenham Cox Road.

In addition, some employees travel between the Stratford Mining Complex and the DCM during the day. These movements are typically expected to generate around 20 light vehicle trips per day on the Stratford Mining Complex access road and The Bucketts Way to the south of the Stratford Mining Complex access road.

2.1.5 *Total Stratford Mining Complex Traffic Generation*

Table 2.1 summarises the expected average weekday traffic generation of the Stratford Mining Complex under typical conditions.

Table 2.1 – Average Weekday Existing Traffic Generation (vehicles/day)

Generator	Light Vehicles	Heavy Vehicles	Total Vehicles
Employees	178	0	178
Internal (SCM-DCM)	20	0	20
Employees to/from Stratford	40	0	40
Deliveries	0	20	20
Visitors	56	14	70
Exploration and Operational	55	5	60
Total	349	39	388

The Stratford Mining Complex is therefore expected to generate some 388 vehicle trips per day on a typical weekday under typical conditions. Around 39 of these trips or approximately 10% would be made by heavy vehicles.

Table 2.2 summarises the expected distribution of SCM traffic on the nearby roads during a typical weekday.

Table 2.2 – Average Weekday SCM Traffic Distribution (vehicles/day)

Generator	The Bucketts Way		The Bucketts Way		Wenham Cox Rd		Bowens Rd	
	North of SMC		South of SMC		East of Wheatleys Ln		East of Stratford	
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy
Employees	142	0	36	0	0	0	0	0
Internal (SMC-DCM)	0	0	20	0	0	0	0	0
Employee to/from Stratford	40	0	0	0	0	0	0	0
Deliveries	0	3	0	17	0	0	0	0
Visitors	8	2	48	12	0	0	0	0
Exploration and Operational	44	4	11	1	44	4	22	2
Total	234	9	115	30	44	4	22	2

SMC = Stratford Mining Complex

2.2 *The Proposed Project*

2.2.1 *Project Description*

The Project is a proposed continuation and extension of open cut mining operations at the Stratford Mining Complex for an additional operational life of approximately 11 years. The main activities associated with the development of the Project would include (refer to **Figure 2**):

- ROM coal production up to 2.6 Mtpa for an additional 11 years (commencing approximately 1 July 2013 or upon the grant of all required approvals), including mining operations associated with:
 - completion of the BRNOC;
 - extension of the existing Roseville West Pit; and
 - development of the new Avon North and Stratford East Open Cuts;
- exploration activities;
- progressive backfilling of mine voids with waste rock behind the advancing open cut mining operations;

- continued and expanded placement of mine waste rock in the Stratford Waste Emplacement and Northern Waste Emplacement;
- progressive development of new haul roads and internal roads;
- coal processing at the existing CHPP including Project ROM coal, sized ROM coal received and unloaded from the DCM and material recovered periodically from the western co-disposal area;
- stockpiling and loading of product coal to trains for transport on the North Coast Railway to Newcastle;
- disposal of CHPP rejects via pipeline to the existing co-disposal area in the Stratford Main Pit and, later in the Project life, the Avon North Open Cut void;
- realignments of Wheatleys Lane, Bowens Road, and Wenham Cox Road;
- realignment of a 132 kilovolt (kV) power line for the Stratford East Open Cut;
- continued use of existing contained water storages/dams and progressive development of additional sediment dams, pumps, pipelines, irrigation infrastructure and other water management equipment and structures;
- development of soil stockpiles, laydown areas and gravel/borrow areas, including modifications and alterations to existing infrastructure as required;
- monitoring and rehabilitation;
- all activities approved under DA 23-98/99 and DA 39-02-01; and
- other associated minor infrastructure, plant, equipment and activities, including minor modifications and alterations to existing infrastructure as required.

2.2.2 Road Transport Aspects of the Project

Key aspects of the Project which relate directly to potential impacts on the road transport network are summarised below.

Life of Mine

- The overall life of the mining operations would be extended by 11 years from July 2013 to 2024.

Workforce

- Increase in light vehicle traffic generation as a direct result of the increase in employees from approximately 125 to 250 full time on-site personnel.

- Modifications to mining employees' shift arrangements to accommodate 24 hour operations at Stratford East and Avon North Open Cuts.
- Increase in light vehicle traffic generation associated with the construction workforce for short term construction and development activities. An additional construction workforce of up to approximately 30 people would be required for short periods. It is expected that such construction and development activities would peak during Year 1 of the Project, but may be required throughout the life of the Project.

Exploration Activity

- No change to vehicle movements associated with exploration activities.

Deliveries

- Increase in the number of deliveries of materials and consumables associated with the increased level of activity at the Stratford Mining Complex during the life of the Project.
- No change to the hours during which most deliveries occur.

Road Realignment

- Road realignments would involve the construction of (refer to **Figure 2**):
 - approximately 400 metres (m) of sealed two-lane road realignment of Wheatleys Lane and Bowens Road around the western extent of the proposed Roseville West Pit Extension and upslope diversion; and
 - a sealed two-lane road realignment of Wenham Cox/Bowens Road of approximately 1.7km around the north-eastern extent of the proposed Northern Waste Emplacement Extension and Avon North Open Cut.

3 Background Road Transport Conditions

An appreciation of the existing road transport conditions can be gained by examining the road network, existing traffic volumes, past growth in traffic volumes, and the safety history of the locality. These aspects are discussed below.

3.1 *Road Hierarchy*

It is usual to classify roads according to a road hierarchy, in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil and the volume of traffic they should appropriately carry given their classification. There are various classification systems used by local authorities and the RMS. The RMS has set down the following guidelines for the functional classification of roads (Traffic Authority of NSW, 1978):

- Arterial Road – typically a main road carrying over 15,000 vehicles per day (vehicles/day) and fulfilling a role as a major inter-regional link (over 1,500 vehicles per hour [vehicles/hour]).
- Sub-arterial Road – defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 vehicles/day (500 to 2,000 vehicles/hour).
- Collector Road – provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vehicles/day (250 to 1,000 vehicles/hour). At volumes greater than 5,000 vehicles/day, residential amenity begins to decline noticeably.
- Local Road – provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles/day (250 vehicles/hour).

The RMS has adopted a classification system relating to funding purposes. It defines roads as:

- State Roads – performing an important state function for which the RMS funds 100% of the maintenance cost. State roads are essentially arterial roads.
- Regional Roads – roads performing a significant regional function and for which the RMS and Council contribute 50% each towards maintenance. Regional roads are essentially sub-arterial roads.
- Local Roads – roads performing a local or collector function and for which the Council funds 100% of the maintenance cost.

The Stratford Mining Complex is located within Gloucester Shire local government area, about 4 km north of its boundary with Great Lakes Council. Gloucester Shire Council has adopted a four tier road hierarchy, with roads designated as:

- Urban Roads – roads contained within the Gloucester Urban zone.
- Village Roads – roads contained within the designated Village boundaries.
- Regional Roads – those roads classified by the RMS as such, and while they are the responsibility of Gloucester Shire Council, they are funded by the state government.
- Local Roads – the remainder of roads not specified above.

3.2 *Existing Road Network*

The existing road network in the vicinity of the Stratford Mining Complex is shown in **Figures 1 and 3** of this report, and is described below.

The Bucketts Way (Main Road 90) extends from the Pacific Highway (State Highway 10) at Karuah in the south to Gloucester in the north, then to the Pacific Highway at Nahiab in the east. It thus provides an alternative route to the Pacific Highway between Karuah and Taree. The Bucketts Way is classified by RMS as a regional road.



In the vicinity of the Stratford Mining Complex, The Bucketts Way has a single travel lane in each direction, and a posted speed limit of 100 kilometres per hour (km/hr). The carriageway is typically 7.0m wide, with central linemarking, painted edge lines, and sealed shoulders of varying widths. At its intersection with the Stratford Mining Complex access road, The Bucketts Way is widened to provide a separate 130m right turn deceleration lane and a separate 130m left turn deceleration lane for traffic turning into the access road. This is consistent with a type “CHR” channelised right turn treatment and type “AUL” auxiliary left turn lane treatment for the through leg as set out in the *Road Design Guide* (RTA, 1996). Sight distances at this intersection are good.

The Bucketts Way has been the subject of upgrading works in recent years, with significant sections now rehabilitated and upgraded.

Stratford Mining Complex Access Road extends eastward from The Bucketts Way. It is a private roadway, which provides access only for Stratford Mining Complex related traffic. It has a single travel lane in each direction, and the carriageway is approximately 7.0 to 7.5m wide. It has double centre lines, and a posted speed limit of 60km/hr. The Stratford Mining Complex access road is flared at its intersection with The Bucketts Way, and is aligned such that it intersects with The Bucketts Way at a right angle. The access road is signposted as a private road, with no unauthorised access permitted.

Bowens Road extends eastwards from The Bucketts Way to the south of Stratford. It is a public road which formerly extended east past Wheatleys Lane to the east of the Stratford Mining Complex. It is now broken into two parts, one terminates at its intersection with Wheatleys Lane, some 1.5km from The Bucketts Way, and the second part commences at the intersection with Wenham Cox Road to the east of the BRNOC. On the western part, Bowens Road has a sealed surface which varies in width, with a minimum of approximately 5.5m. It has a posted speed limit of 50km/hr at its western end near The Bucketts Way, increasing to 60km/hr around 400m from The Bucketts Way.

On the eastern part, Bowens Road narrows and has a sealed surface for some distance and then an unsealed surface. Its width varies, however much of this section is effectively single lane, although vehicles are typically able to pass at low speed. At its easternmost end, Bowens Road is an unsealed single lane track.

At its intersection with The Bucketts Way, there is localised widening of shoulders of The Bucketts Way which allows through traffic to pass around vehicles slowing to turn into Bowens Road. This is an informal arrangement, with no designated deceleration lanes. Bowens Road is flared slightly at the intersection, however is not wide enough to allow cars to turn left and right out of Bowens Road simultaneously.

Bowens Road is classified as a local road under Gloucester Shire Council's road hierarchy.

Wenham Cox Road extends eastwards from The Bucketts Way to the north of Stratford. It is a public roadway which provides access to a limited number of private properties. With regard to its construction standard, it has two distinct sections, the first extending about 5km from The Bucketts Way, and the second being eastwards of there. It typically has no linemarking.

For about 5km eastwards of The Bucketts Way, Wenham Cox Road has a sealed surface of varying width, with a general minimum of approximately 6.0m, although much of it is wider at around 7.5m. There are two short sections which are signposted for single lane traffic only, with "give way" signs to control use of those sections. These are located on either side of its intersection with Wheatleys Lane. The standard of the road is good, following curves and undulating topography, with adequate sight distances and allowing for vehicles to pass each other at speed.

At its intersection with The Bucketts Way, there is no widening of The Bucketts Way to allow through traffic to pass around traffic slowing to turn into Wenham Cox Road. Wenham Cox Road is flared slightly at the intersection, however is not sufficiently wide to allow cars to turn left and right out of Wenham Cox Road simultaneously.

Wenham Cox Road is classified as a local road under Gloucester Council's road hierarchy.

Wheatleys Lane extends in a north-south direction between Bowens Road and Wenham Cox Road. It has a straight alignment, with some undulations. It has a sealed surface which is typically 5.5m to 6.0m wide with no shoulders and no linemarking. Vehicles are typically able to pass at reduced speed, although in some locations, trees and drains locally narrow the available width, so passing at these locations is not possible. At its intersection with Wenham Cox Road, there is no widening of either Wheatleys Lane or Wenham Cox Road, and it is noted that the unformed drain on the south-western corner of this intersection in particular is quite deep, with the ground dropping sharply away from the edge of the sealed surface.

Wheatleys Lane is classified as a local road under Gloucester Shire Council's road hierarchy.

3.3 Road Safety Review

Validated crash data was obtained from RMS Hunter Region for the most recent five year period available, being from 1 July 2005 to 30 June 2010. Provisional data for the period from 1 July 2010 to 17 March 2011 was also obtained. Two crashes were reported during the period of non-validated data, and while this has been included in this assessment, it is noted that this data is incomplete and subject to change. The data is presented in **Attachment A**.

The data is based on crashes reported to the Police, and included the area along The Bucketts Way from 5km south to 5km north of the Stratford Mining Complex, as well as the local roads around Stratford. There were 14 reported crashes in the study area, with no fatal crashes, 10 injury crashes, and four non-injury tow-away crashes. The RMS data nominates speed as a factor in four of the accidents, and fatigue as a factor in one of the accidents. All the reported accidents occurred on The Bucketts Way or at intersections along The Bucketts Way. Crashes which occurred at or near intersections of interest to the Stratford Mining Complex have been identified.

One accident occurred on The Bucketts Way near the Stratford Mining Complex access road:

- 100m south of Stratford Mining Complex entrance – a northbound car struck straying stock. This occurred in fine conditions with a dry road surface at 7.50pm on 10 March 2007.

Three of the accidents occurred at or near the intersection of The Bucketts Way and Wenham Cox Road:

- 10m south of Wenham Cox Road – a northbound 4WD left the carriageway to the left on a straight section. This occurred during fog or mist, with a dry road surface at 1.30am on 2 April 2010.
- Provisional data only – 10m south of Wenham Cox Road – a northbound car left the carriageway to the right on a straight section and struck a fence. This occurred in fine conditions, with a dry road surface at 9.15pm on 12 August 2010.
- Provisional data only – at Wenham Cox Road – a northbound truck struck a northbound stationary car, and a northbound truck waiting to turn right. This occurred in fine conditions, with a dry road surface at 2.00pm on 29 October 2010.

One accident occurred on The Bucketts Way near the intersection of Bowens Road:

- 23m south of Bowens Road – a northbound 4WD on the incorrect side of the road struck a car and a utility travelling southbound. This occurred in fine conditions with a dry road surface at 1.42pm on 18 May 2008. Fatigue was identified as a factor in this crash.

Other accidents near Stratford were:

- 12.6km south of Gloucester township – a northbound car left the carriageway to the right and struck a fence. This occurred in fine conditions with a dry road surface at 11.00am on 28 August 2009.
- At Avon Street – a westbound wagon in Avon Street turning right struck a southbound truck in The Bucketts Way. This occurred in overcast conditions on a wet road surface at 4.45pm on 7 September 2009.

Review of the RMS data has identified no particular accident pattern or causation factors in the local area.

3.4 *Historic Traffic Volumes*

3.4.1 *Traffic Volumes 2008-2009*

Gloucester Shire Council undertook surveys of traffic on a number of roads in the vicinity of Stratford Mining Complex during 2008 and 2009. The data has been provided to Halcrow in the form of average daily volumes, which are presented below (refer to Table 3.1). The average daily volumes provided are the average volume over a two week period. The locations of the Gloucester Shire Council traffic surveys are shown on **Figure 1** and/or **Figure 3**

Table 3.1 – Average Daily Traffic Volumes 2008-2009

Road	Location	Year	Average Daily Traffic
Bowens Road	Adjacent to Stratford Cemetery	2009	11
	Adjacent to Stratford Cemetery	2008	20
The Bucketts Way	On the Shire boundary East of Gloucester ^A	2009	953
	On the Shire boundary South of Gloucester	2008	1,434
Wenham Cox Road	100m from The Bucketts Way	2009	46
	100m from The Bucketts Way	2008	45
Woods Road	50m from The Bucketts Way	2009	83
	50m from The Bucketts Way	2008	86

^A Location not shown on Figures 1 or 3.

Great Lakes Council also undertook a survey of traffic on The Bucketts Way during September 2008. The survey was conducted 1.7km north of Monkerai Road, about 15km south of the intersection of The Bucketts Way with the Stratford Mining Complex access road (refer to **Figure 1**). This data indicates that at that location in 2008, The Bucketts Way carried an average of 1,300 vehicles/day on weekdays. Friday was the busiest day with 1,565 vehicles/day. The distribution of traffic throughout the day does not show distinct morning or evening peaks, rather a steady increase through the day, with a peak occurring in the late afternoon or evening on most days.

A survey of traffic on The Bucketts Way to the north of the DCM access road (refer to **Figure 1**) was conducted in July and August 2009 for the Duralie Extension Project (Halcrow MWT, 2009). This survey indicates that at that location in 2009, The Bucketts Way carried an average of 1,518 vehicles/day on weekdays, composed of around 17% heavy vehicles (Halcrow MWT, 2009).

3.4.2 *Historic Annual Average Daily Traffic on RMS Roads*

The RMS publishes traffic volume data at selected locations on its roads. Available data on roads in the vicinity of the Stratford Mining Complex was collated. Table 3.2 presents historic annual average daily traffic (AADT) data for the RMS survey locations on The Bucketts Way between 1986 and 2004, and shows how changes in daily traffic volumes has occurred on these roads over that period. The locations of the RMS traffic surveys are shown on **Figure 1**.

Table 3.2 – Historic Annual Average Daily Traffic Data 1986 to 2004

Location on MR90 The Bucketts Way	1986	1988	1990	1992	1995	1998	2001	2004
North of SH10 Pacific Hwy ^A	-	1,794	-	2,066	2,594	2,729	2,657	2,667
Limeburners Creek North of C'town Rd ^A	1,461	-	1,524	-	2,744	2,056	2,351	2,747
Booral South of Buladelah Rd	1,580	-	-	-	-	-	-	-
Booral North of Buladelah Rd	1,582	-	1,695	-	-	-	-	-
Washpool Bridge South of MR101	1,291	-	1,444	-	1,496	1,581	1,655	2,043
Stroud Road at Railway Overbridge	1,157	-	-	-	-	-	-	-
Weismantels South of Dungog Rd	955	972	1,106	1,162	1,270	1,307	1,333	1,627
Weismantels North of Dungog Rd	1,026	-	1,168	-	1,823	1,297	1,328	1,643
Gloucester/Great Lakes boundary ^B	976	-	1,391	-	1,431	1,181	1,388	1,555
Gloucester North of Hume St	3,117	-	3,806	-	4,609	4,262	3,282	4,095
Gloucester 1.1km East of Church St	1,297	1,284	1,433	1,458	1,539	1,625	1,553	1,649

Source: RTA (2004)

^A Location not shown on Figure 1.

^B Site closest to the Stratford Mining Complex.

The RMS survey location at the boundary of Great Lakes and Gloucester Shire is closest to the Stratford Mining Complex, being about 5.5km to the south of the Stratford Mining Complex. This survey location shows a growth in AADT of an average of 3.3% per annum between 1986 and 2004. The growth has been unsteady over that period however, with a significant decrease in traffic from 1995 to 1998, with the 2001 volume still somewhat below the 1995 level. It is noted that construction at the DCM commenced in May 2002 and mining operations commenced in 2003, thus it is likely that traffic associated with the DCM at least partly contributed to the observed growth rate of 4.0% per annum between 2001 and 2004.

3.5 *Project Traffic Surveys*

To quantify existing traffic conditions at key locations in the vicinity of Stratford Mining Complex, additional traffic surveys were conducted over a one week period in March 2011 at the following locations, which are shown on **Figure 3**:

- The Bucketts Way north of the Stratford Mining Complex access road;
- Stratford Mining Complex access road east of The Bucketts Way; and
- Wenham Cox Road east of Wheatleys Lane.

At each location, hourly traffic volumes were recorded by direction, together with the classification of vehicles using the *Vehicle Classification System* (Austroads, 2004), which is included in **Attachment B**.

3.5.1 *Surveyed Traffic Volumes*

The results of the traffic surveys are summarised in Table 3.3 and full results are presented in **Attachment B**. The morning peak hour results are for the busiest hour before midday, and the evening peak hour results are for the busiest hour after midday. They do not necessarily occur at the same time at the three locations.

Table 3.3 – Surveyed Two Way Traffic Volumes March 2011

	The Bucketts Way ^A	Wenham Cox Road ^A	SMC Access Road ^A
Average Weekday			
Daily (vehicles/day)	2,190	156	446
AM Peak (vehicles/hour)	166	15	82
PM Peak (vehicles/hour)	193	15	47
Saturday			
Daily (vehicles/day)	1,905	96	199
AM Peak (vehicles/hour)	212	11	41
PM Peak (vehicles/hour)	150	13	23
Sunday			
Daily (vehicles/day)	2,117	80	145
AM Peak (vehicles/hour)	174	9	40
PM Peak (vehicles/hour)	245	8	11

^A Refer to Figure 3 for locations.

SMC = Stratford Mining Complex

It is noted that at the time of the surveys, the Stratford Mining Complex access road was being used by AGL to access a gas well site. A daily vehicle log provided by AGL to SCPL indicates that AGL contributed between 5 and 17 vehicles/day to the traffic recorded on the access road during the week, with an average of 12 to 13 vehicles/day on weekdays. This is equivalent to approximately 25 vehicle trips per day on weekdays.

Also at the time of the surveys, GCL was undertaking an exploration program at the eastern end of Wenham Cox Road. Vehicle movement records kept by exploration management on the survey days indicate that this exploration activity contributed some 14 to 15 vehicles/day on the average weekday, 12 vehicles/day on Saturday, and 12 vehicles/day on Sunday. This is equivalent to an average of 28 to 30 vehicle trips per day on weekdays. These vehicles travelled between the Stratford Mining Complex and the exploration site, and used the Stratford Mining Complex access road, The Bucketts Way, Bowens Road and Wenham Cox Road.

Background traffic volumes on the Stratford Mining Complex access road, The Bucketts Way and Wenham Cox Road would therefore be expected to be somewhat lower than those recorded in Table 3.3 without the temporary influences of the GCL exploration work and AGL well access. The volumes are however quite small and thus the surveyed volumes in Table 3.3 have conservatively been taken to be a reasonable reflection of typical background traffic conditions around the Stratford Mining Complex.

3.5.2 Surveyed Traffic Composition

The survey program described in Section 3.5 also collected data on the composition of traffic on the key roads. Light vehicles include motorcycles, cars, vans, 4WDs and utilities (including those towing a trailer or caravan). Heavy vehicles include single unit trucks and buses with two to four axles and articulated vehicles such as semi-trailers, rigid trucks with trailers and B Doubles.

On the average weekday over the survey period, The Bucketts Way carried 260 heavy vehicles/day, or around 12% heavy vehicles. Wenham Cox Road carried 24 heavy vehicles/day, or 15% heavy vehicles. The Stratford Mining Complex access road carried 54 heavy vehicles/day, or 12% heavy vehicles.

3.5.3 *Stratford Mining Complex Traffic Generation*

The results of the traffic survey conducted on the Stratford Mining Complex access road provide data on the existing volumes and types of vehicles generated by the Stratford Mining Complex over a typical week. This data is presented below in Table 3.4, noting that these figures include the contribution made by GCL vehicles associated with their exploration activities and AGL vehicles using the access road for access to a gas well site.

Table 3.4 – Surveyed Stratford Mining Complex Traffic Generation

	Daily (vehicle trips/day)			AM Peak (vehicle trips/hour)			PM Peak (vehicle trips/hour)		
	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
Monday	364	33	397	73	6	79	48	1	49
Tuesday	413	61	474	77	7	84	46	3	49
Wednesday	404	71	475	78	6	84	46	0	46
Thursday	393	51	444	78	6	84	44	1	45
Friday	386	54	440	76	5	81	45	1	46
Saturday	175	24	199	40	1	41	21	2	23
Sunday	137	8	145	39	1	40	10	1	11
Weekday Average	392	54	446	76	6	82	46	1	47

The Stratford Mining Complex thus generated an average of around 450 vehicle trips per day on weekdays, and around 150 to 200 vehicle trips per day on weekend days. The reduction in weekend traffic generation occurs because administration staff and some contractors generally work weekdays only, and the majority of deliveries and site visitors tend to occur on weekdays.

The surveyed average weekday generation of 446 vehicle trips on the Stratford Mining Complex access road includes the 30 vehicle trips per day generated by the GCL exploration activities and 25 vehicle trips per day generated by the AGL activity including exploration during the survey period. Excluding the GCL and AGL traffic, the surveyed average weekday generation of the Stratford Mining Complex was 391 vehicles/day, of which 39 vehicle trips were by heavy vehicles, and 352 vehicle trips were by light vehicles. This correlates well with the estimated traffic generation of the Stratford Mining Complex of 388 vehicles/day, of which 39 vehicles are heavy vehicles (refer to Table 2.1).

The Stratford Mining Complex has its greatest contribution to traffic flows on the surrounding road system on weekdays, noting that weekend and weekday volumes are not significantly different on The Bucketts Way (refer to Table 3.3). The assessment of potential impacts of the Project which follows in Section 4 therefore focuses on weekday conditions. With respect to peak hours, it is noted that the Stratford Mining Complex generates significantly more traffic during the morning peak hour than the afternoon peak hour.

3.6 *Roadway Capacity*

Austrroads (2009) provides guidelines for the capacity of two-lane, two-way rural roads. The capacity of a road is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane is affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Level of Service is defined as a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers. A Level of Service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, convenience and safety. Level of Service A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. Level of Service B to D describes progressively worse traffic conditions. Level of Service E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for Level of Service E is taken as the capacity of a lane or roadway.

Austrroads (2009) presents a general description of Levels of Service on two way, two-lane roads which can be applied to The Bucketts Way, Wenham Cox Road and the Stratford Mining Complex access road, based on the maximum volumes attainable and assuming a nominal capacity of 3,200 passenger car equivalents per hour (pc/hr) for the two way flow. A heavy vehicle is equivalent to a number of passenger car equivalents, with the adjustment factor being dependent upon local conditions. These are presented in Table 3.5, and their equivalent volume/capacity ratio is also presented.

Table 3.5 – Levels of Service on Two Way Two-Lane Roads

Level of Service	Maximum Volume per Hour	Maximum Volume/Capacity
A	490	0.15
B	780	0.24
C	1,190	0.37
D	1,830	0.57
E	3,200	1.00

Source: Austroads (2009).

Capacity = 3,200 pc/hr

An estimation of the capacity of the travel lanes on the surveyed roads can be made by considering the adjustment factors given in the Austroads guide for lane widths and lateral clearances, and for heavy vehicles. The nominal capacities of the surveyed roads were calculated, and the resulting Levels of Service during the highest surveyed peak hour on the average weekday are presented in Table 3.6.

Table 3.6 – Average Weekday Peak Hour Levels of Service on Surveyed Roads

	The Bucketts Way	Wenham Cox Road	SMC Access Road
Estimated Two Way Capacity	2,250	1,950	2,100
Two Way Peak Hour Volume	193	15	82
Volume/Capacity	0.09	0.01	0.04
Level of Service	A	A	A

SMC = Stratford Mining Complex

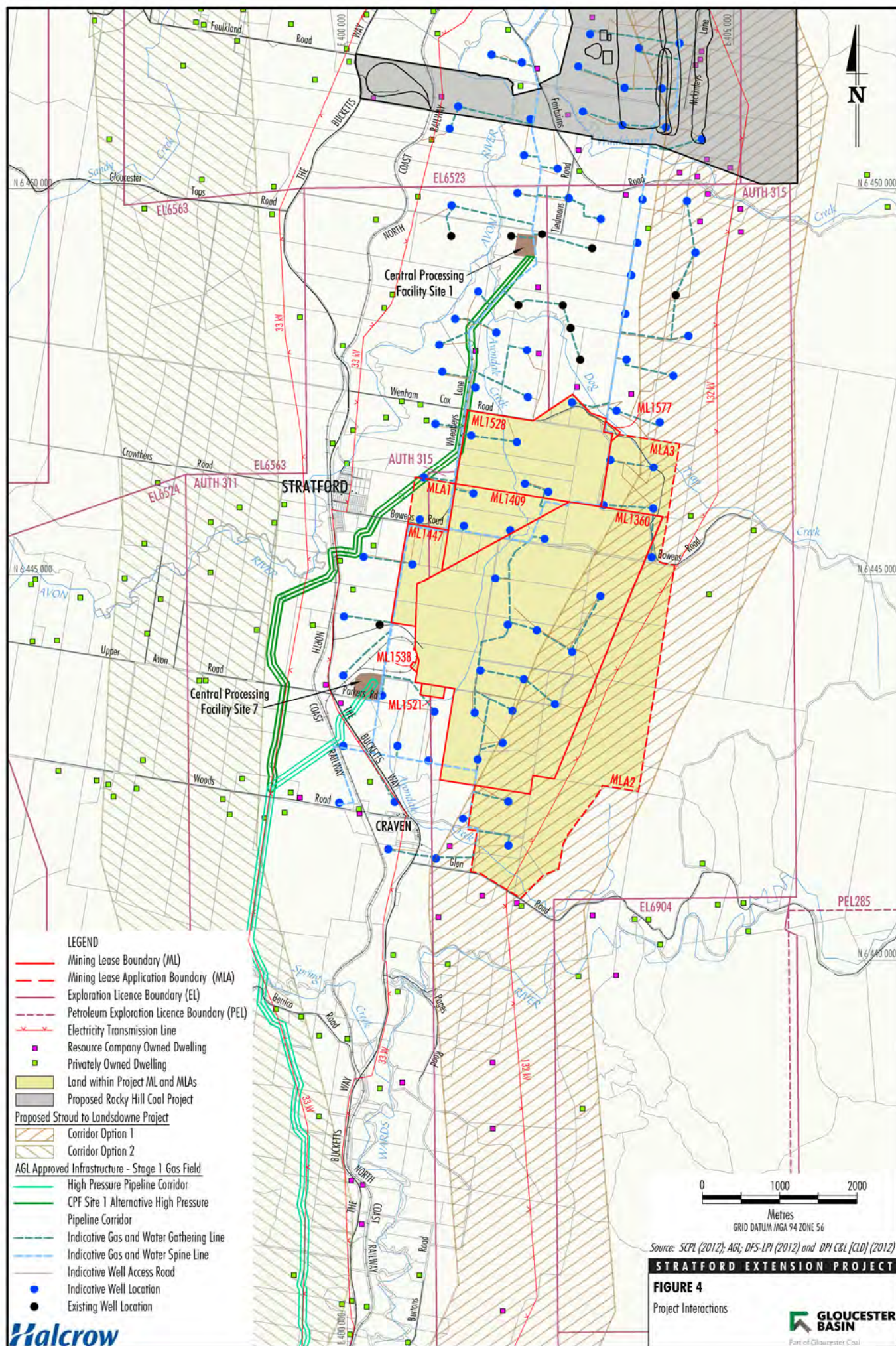
The Levels of Service experienced on these roads are therefore satisfactory.

3.7 Other Developments

3.7.1 Gloucester Gas Project

Stage 1 of the Gloucester Gas Project (GGP) was granted Project Approval (08_0154) by the Planning Assessment Commission in February 2011. The GGP includes works for the extraction of coal seam gas from the Gloucester Basin within PEL 285 (**Figure 1**). Stage 1 of the GGP involves (refer to **Figure 4**):

- development of 110 gas wells and associated infrastructure between Gloucester and just south of Stratford (the Gas Field Development Area [GFDA]);
- development of a Central Processing Facility (CPF) at one of two potential locations; and
- construction and operation of a high pressure gas transmission pipeline from Stratford to a delivery station at Hexham in NSW.



The approval allows for construction of the CPF at one of two locations. The first of these, known as Site 1, is located to the north of the Stratford Mining Complex (refer to **Figure 4**), with vehicular access being developed from Wenham Cox Road. If the CPF is located at this site, the intersection of The Bucketts Way and Wenham Cox Road would be upgraded to provide a right turn lane in The Bucketts Way for vehicles turning into Wenham Cox Road (AECOM, 2009). This would allow northbound through traffic to pass around vehicles slowed or stopped to turn into Wenham Cox Road. The second potential location, known as Site 7, is located to the south of and adjacent to the Stratford Mining Complex rail loop (refer to **Figure 4**). Vehicular access for Site 7 would be provided from The Bucketts Way with an upgraded intersection including deceleration lanes for vehicles turning both left and right in to the CPF (AECOM, 2009).

The Environmental Assessment prepared for the GGP (AECOM, 2009) identifies the construction phase of the GGP as resulting in the greatest increase in traffic in the vicinity of the Project. A Construction Environmental Management Plan is required for the GGP in accordance with Condition 7.2 Schedule 2 of Project Approval (08_0154) that must relevantly include:

... measures to monitor and manage traffic impacts in consultation with relevant road authorities (Council and RTA, as relevant) including: identification of construction traffic routes and traffic volumes along each route with considering to minimising traffic on local/ residential streets, potential traffic disruptions considering road safety and level of service, specific measures for minimising traffic impacts and mechanisms to monitor road condition during construction and remediate any damage attributable to the project ...

In addition, Condition 3.44 Schedule 2 of Project Approval (08_0154) for the GGP states:

Prior to the commencement of construction of the project, the Proponent shall commission a suitably qualified expert to assess the condition of all public roads proposed to be traversed by construction traffic associated with the project ... in consultation with relevant Councils and the RTA, and identify any upgrade requirements to accommodate project traffic for the duration of construction ... considering final traffic volumes. ... The Proponent shall ensure that all upgrade measures identified in the report are implemented to meet the reasonable requirements of the relevant Council and the RTA, prior to the commencement of construction, to the satisfaction of the Director-General.

As the detailed information (e.g. traffic volumes and routes, road upgrades) required by these Project Approval (08_0154) conditions are not available at the time of preparing this report, conservative assumptions have been made regarding potential GGP traffic generation and distribution, based upon the information provided in AECOM (2009). Key assumptions used in this assessment include:

- Peak construction traffic for the GFDA, CPF and the pipeline would occur at the same time in the vicinity of the Stratford Mining Complex.
- GGP construction activities would occur during Year 1 of the Project.
- The CPF would be located at Site 7 (**Figure 4**).

These assumptions are presented in more detail in **Attachment C** of this report.

3.7.2 Rocky Hill Project

In February 2012, Gloucester Resources Ltd (GRL) lodged a Request for Director-General's Requirements to the Department of Planning and Infrastructure for the Rocky Hill Project. The Rocky Hill Project would include open cut coal mining activities and the development of associated surface infrastructure, including a rail load-out facility (R.W. Corkery & Co., 2012).

The Rocky Hill Project is located to the north of the Project (**Figure 4**). Access to the Rocky Hill Project would be via McKinleys Road via Waukivory Road. Waukivory Road is accessed either directly from The Bucketts Way to the east of Gloucester or from The Bucketts Way south of Gloucester via Jacks Road. The intersection of Jacks Road with The Bucketts Way is located approximately 13 km north of the Stratford Mining Complex intersection with The Bucketts Way.

The Rocky Hill Project would operate for 21 years commencing in Year 1 of the Project (R.W. Corkery & Co., 2012). Approximately 100 employees would be required during construction during Year 1, and approximately 150 employees would be required during operations thereafter.

Section 4.7.1 of the *Documentation Supporting an Application for Director-General's Requirements for the Rocky Hill Project* (R.W. Corkery & Co., 2012) states the GRL's road transport consultants would:

... identify the principal road improvements required for the Proposal such as intersection upgrades, pavement widening and the installation of improved infrastructure.

For this assessment, it has been assumed that any upgrades required for the Rocky Hill Project would be implemented during the initial construction stage of the Rocky Hill Project.

As the traffic impact assessment for the Rocky Hill Project has not yet been prepared, there is no detailed information regarding road traffic generation from the Rocky Hill Project. Conservative assumptions have therefore been made regarding potential Rocky Hill Project traffic generation and distribution, based upon the information provided in R.W. Corkery & Co. (2012), and through comparison with other projects of a similar scale. These assumptions are presented in more detail in **Attachment C** of this report.

3.7.3 Duralie Extension Project

The approved Duralie Extension Project extends the life of the DCM by nine years and increase production of ROM coal from 1.8 Mtpa up to 3.0 Mtpa. The road transport implications of that project were assessed by Halcrow MWT (2009).

The road transport implications of the Duralie Extension Project are the result of a modest increase in the number of employees on the site, an increase in the number of delivery vehicles to and from the site, as well as the extended life of the DCM. Some minor local road closures were also anticipated in proximity to the DCM.

At full production, the Duralie Extension Project is expected to generate an additional 14 vehicle trips per day (10 light vehicles and four heavy vehicles) on The Bucketts Way north of Durallie Road. These vehicles would pass along The Bucketts Way past the Stratford Mining Complex. These trips are in addition to the traffic generated by the DCM prior to commencement of the Duralie Extension Project. The Duralie Extension Project is proposed to conclude in 2019.

At the time of the Project traffic surveys (refer to Section 3.5), the Duralie Extension Project was not yet at full production or employment as anticipated by the Halcrow MWT (2009) assessment. For the purpose of this assessment, the total additional traffic expected by the Duralie Extension Project has been added to the road system.

3.7.4 GCL Exploration Activities

GCL is approved to undertake exploration activities within surrounding authorisations (Authorisations 311 and 315), and Exploration Licence 6904 to the south-east of the Stratford Mining Complex (**Figure 4**). Road traffic movements associated with these exploration activities have been included in the summary of existing Stratford Mining Complex traffic (Section 2.1.4 and Table 2.1) and have therefore been considered in this assessment.

3.7.5 Gloucester Resources Limited Exploration Activities

GRL is undertaking exploration activities within Exploration Licences 6523, 6524 and 6563 to the north and west of the Stratford Mining Complex (**Figure 1**). It is considered unlikely that any significant or sustained cumulative traffic impacts would arise from the exploration activities being undertaken by GRL in the region, because exploration activities are generally short-term, of a limited extent and have therefore not been considered further in this assessment.

3.7.6 Stroud to Lansdowne Project

The Stroud to Lansdowne Project would involve construction of a single-circuit 330 kV transmission line between Essential Energy's Stroud Substation and a new substation near Lansdowne, north of Taree. TransGrid is the proponent of the Stroud to Lansdowne Project. In February 2012, TransGrid released a draft Options Selection Report (AECOM, 2012) for purposes of consultation which included several corridor options/alignments. The two corridor options in the vicinity of the Stratford Mining Complex are shown on **Figure 4**.

It is considered unlikely that any significant or sustained cumulative traffic impacts would arise from the Stroud to Taree Project in the region, because the construction activities would be generally short-term and have therefore not been considered further in this assessment.

3.7.7 Gloucester Gas Project Exploration Activities

Exploration activities continue to be undertaken as part of the GGP within PEL 285.

It is considered unlikely that any significant or sustained cumulative traffic impacts would arise from the exploration activities being undertaken by AGL in the region, as exploration activities are generally short-term and of a limited extent.

4 Future Road Transport Conditions

The remainder of this report assesses the likely implications of the Project on the road network surrounding the Stratford Mining Complex. The two future time horizons of particular interest to the Project with regard to traffic conditions are:

- Year 1 (2013), being when the Project commences, including operational traffic, construction traffic and growth in background traffic. This scenario would also include cumulative traffic generation associated with construction of the GGP and the Rocky Hill Project, and the operation of the Duralie Extension Project.
- Year 11 (2024), being the final year of the Project, including operational traffic and the accumulated growth in background traffic would be at its highest during the life of the Project. This scenario would also include cumulative traffic generation associated with the operation of the GGP and the Rocky Hill Project.

In order to compare future conditions with and without the proposed Project, traffic conditions at the time horizons above were assessed, and are discussed in this section.

Traffic movements during the decommissioning stage of the Project would be significantly lower than the construction and operational stages of the Project identified above. The potential road transport impacts associated with the decommissioning stages of the Project would therefore be less than the construction and operational stages of the Project (assessed in this section) and therefore do not warrant further consideration in this study.

4.1 *Non-Project Traffic Changes*

Table 4.1 summarises the non-Project related changes which may be expected in traffic volumes in the vicinity of the Stratford Mining Complex. These changes would be the result of the Duralie Extension Project, construction of the GGP and the Rocky Hill Project and general background growth in non-Stratford Mining Complex traffic. Table 4.1 presents forecasts of daily weekday traffic volumes for the existing, and two future time horizons without the Project.

Table 4.1 – Average Weekday Traffic Without Project (vehicles/day)

	SMC		Background Non-SMC ^A		Gloucester Gas Project		Rocky Hill Project		Duralie Extension Project		Total Traffic		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Existing 2011													
The Bucketts Way North of SMC	234	9	1,696	251	0	0	0	0	0	0	1,930	260	2,190
The Bucketts Way South of SMC	115	30	1,696	251	0	0	0	0	0	0	1,811	281	2,092
The Bucketts Way South of Parkers Rd	115	30	1,696	251	0	0	0	0	0	0	1,811	281	2,092
Wenham Cox Road East of Wheatleys Ln	44	4	88	20	0	0	0	0	0	0	132	24	156
SMC Access Rd	349	39	43	15	0	0	0	0	0	0	392	54	446
Bowens Rd	22	2	30	5	0	0	0	0	0	0	52	7	59
Year 1: 2013													
The Bucketts Way North of SMC	234	9	1,799	266	172	73	74	51	10	4	2,289	403	2,692
The Bucketts Way South of SMC	115	30	1,799	266	172	73	74	51	10	4	2,170	424	2,594
The Bucketts Way South of Parkers Rd	115	30	1,799	266	172	73	74	51	10	4	2,170	424	2,594
Wenham Cox Road East of Wheatleys Ln	44	4	88	20	208	118	0	0	0	0	340	142	482
SMC Access Rd	349	39	43	15	0	0	0	0	0	0	392	54	446
Bowens Rd	22	2	30	5	4	50	0	0	0	0	56	57	113
Year 11: 2024													
The Bucketts Way North of SMC	0	0	2,359	349	64	2	138	20	0	0	2,561	371	2,932
The Bucketts Way South of SMC	0	0	2,359	349	64	2	138	20	0	0	2,561	371	2,932
The Bucketts Way South of Parkers Rd	0	0	2,359	349	64	6	138	20	0	0	2,561	375	2,936
Wenham Cox Road East of Wheatleys Ln	0	0	88	20	36	2	0	0	0	0	124	22	146
SMC Access Rd	0	0	43	15	0	0	0	0	0	0	43	15	58
Bowens Rd	0	0	30	5	18	2	0	0	0	0	48	7	55

^A Includes AGL and GCL exploration traffic during surveys (refer to Section 3.5.1)

SMC = Stratford Mining Complex

Some conservative assumptions have been made regarding the distribution of traffic associated with the GGP and the Rocky Hill Project, as the detailed traffic assessments will be undertaken prior to construction in accordance with GGP Project Approval (08_0154) (Section 3.7.1) and included in the Rocky Hill EIS (Section 3.7.2), and are therefore not available at the time of preparing this report. For reference, the assumptions regarding traffic generation and distribution associated with the GGP and the Rocky Hill Project are presented in **Attachment C**.

As described in Section 3.4.2, increases in daily traffic have occurred on The Bucketts Way which are unrelated to operations at the Stratford Mining Complex. Growth in daily traffic occurred at an average rate of 3.3% per annum between 1986 and 2004, however growth rates have been quite variable over that period.

For the purpose of this assessment, based on the recorded growth rates on The Bucketts Way, future growth in traffic on The Bucketts Way has been estimated to occur at a rate of 3% per annum. This is somewhat higher than the observed growth between 1986 and 2001, and lower than that in the period 1986 to 2004 which included the effects of the commencement of construction and operations at the DCM. The growth was applied to the traffic not generated by the Stratford Mining Complex, assuming that the Stratford Mining Complex-generated traffic would remain unchanged in 2013 and would not occur in 2024 without the proposed Project, and that no other development would take place on the Stratford Mining Complex site.

The background traffic, i.e. traffic which is unrelated to Stratford Mining Complex, on surrounding roads has been calculated by subtracting the estimated Stratford Mining Complex traffic on that road (refer to Table 2.2) from the surveyed volume (refer to Table 3.3). The background traffic on Bowens Road has been conservatively assumed to be equal to the surveyed volume in 2008 (refer to Table 3.1) plus half of the GCL exploration traffic which currently travels between the Stratford Mining Complex and the eastern end of Wenham Cox Road.

It is not expected that any change would occur to traffic volumes on Wenham Cox Road, Bowens Road or the Stratford Mining Complex access road as a result of background growth, i.e. growth which is unrelated to Project, GGP, Rocky Hill Project or Duralie Extension Project activity.

It has been conservatively assumed that the difference in traffic volume between the estimated Stratford Mining Complex traffic (refer Table 2.1) and the surveyed traffic on the Stratford Mining Complex access road (refer Table 3.4) is included in the background traffic in the long term. This assumption results in an overestimate of future traffic volumes, however is of a small magnitude and not likely to impact the conclusions of this investigation.

4.2 *Project Traffic*

The various components of traffic expected to be generated by the Project are discussed below.

4.2.1 *Project Workforce*

The Project would increase the number of employees from approximately 125 to 250, with changes in the shift arrangements to also accommodate the 24 hour mining operation as follows:

- Administration 7.00am to 4.30pm – 9%.
- Mining Day 6.30am to 5.30pm – 40%.
- Mining Night 6.30pm to 4.00am – 40%.
- CHPP Day 7.00am to 7.00pm – 5.5%.
- CHPP Night 7.00am to 7.00pm – 5.5%.

The Project would increase the number of day shift mining employees, and extend the mining night shift. It is anticipated that the rate at which employees generate traffic would remain the same as existing, and that their distribution on the road system to the north and south would also remain the same as existing (refer to Section 2.1.1). Extra employees travelling to and from work would therefore generate an additional 178 light vehicle trips per day on a typical weekday. This would result in a total 356 light vehicle trips per day from employees travelling to and from the Project.

The proposed increase in the number of employees would be likely to increase the number of trips made by employees travelling to Stratford for lunch. The proposed increase in employees in the day mining shift represents a 23% increase in the number of employees present at the site during lunch. It is therefore anticipated that there would be about a 23% increase in the number of employee trips made to Stratford on a typical day. Employee lunch trips are therefore assumed to increase by 10 light vehicle trips per day to generate a total of 50 light vehicle trips per day to and from the Project.

4.2.2 *Project Deliveries*

SCPL has advised that it is anticipated that with the Project, the number of deliveries to the Stratford Mining Complex would increase by 30% to 61 delivery vehicles per week, which would generate 122 heavy vehicle trips per week. For the purpose of this assessment, it is estimated that on a typical day, there would be an increase of 4 heavy vehicle trips per day to 24 heavy vehicle trips per day.

The source and distribution of delivery vehicle trips on the surrounding road network is assumed to remain the same as existing (refer to Section 2.1.2).

4.2.3 *Project Visitors*

The increase in activity at the Stratford Mining Complex is likely to result in an increase in the number of trips to and from the site by visitors and short term contractors. For the purpose of this assessment, it is assumed that the Project would result in a 30% increase in the number of visitors and short-term contractors each day. Visitors and short term contractors would therefore be expected to increase by 22 vehicle trips per day to generate a total of 92 vehicle trips per day, of which 20% would be heavy vehicles.

4.2.4 *Project Exploration and Operational Trips*

There would be no change to existing exploration or operational traffic at the Stratford Mining Complex as a result of the Project.

The increase in activity at the Stratford Mining Complex as a result of the Project is likely to increase the number of trips made by employees travelling between the Stratford Mining Complex and DCM. For the purpose of this assessment, it is assumed that the Project would result in a 30% increase in the number of trips made by employees travelling between the DCM and Stratford Mining Complex. These movements would increase by 6 light vehicle movements per day to generate a total of 26 light vehicle trips per day during a typical weekday.

4.2.5 *Construction and Development Activities*

SCPL has advised that short term construction and development activities would require an additional construction workforce of up to approximately 30 people for short periods. It is expected that such construction and development activities would peak during Year 1 of the Project, but may be required throughout the life of the Project.

It is conservatively assumed that construction employees would each arrive and depart the site in their own vehicle, generating up to 60 light vehicle trips on a typical construction day. Construction work would take place between 7.00am and 6.00pm.

The distribution of construction employee traffic on the surrounding road system is assumed to be similar to that of the existing Stratford Mining Complex employees. On this basis, it is expected that of the 60 vehicle trips generated by employees travelling to and from the site at the start and end of shifts, 48 vehicle trips per day would be to and from the north, and 12 vehicle trips would be to and from the south.

SCPL has advised that the heavy vehicle movements for the short term construction and development activities would be minor due to the nature of the majority of the works (e.g. earthworks that can be conducted using existing equipment at the Stratford Mining Complex). Any heavy vehicle movements for the short term construction and development activities would be within the estimated heavy vehicle movements associated with deliveries and visitors. Some oversized vehicle movements would be required to deliver new fleet items. Oversize vehicle movements required for the Project are discussed in Section 4.9.

4.3 *Future Traffic Volumes*

Table 4.2 summarises the average weekday traffic generation of the Project (including existing Stratford Mining Complex traffic), and its distribution on The Bucketts Way to the north and south of the Stratford Mining Complex. The future traffic volumes on the key roads in the vicinity of the Stratford Mining Complex are presented in Table 4.3, which includes the cumulative effects of the Project, the GGP, the Rocky Hill Project, the Duralie Extension Project and background growth in traffic not associated with any of these projects.

Table 4.2 – Average Weekday Project Traffic Generation and Distribution (vehicles/day)

Generator	SMC		The Bucketts Way		The Bucketts Way		Wenham Cox Rd		Bowens Road	
	Access Road		North of SMC		South of SMC		East of Wheatleys Ln		East of Stratford	
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy
Employees	356	0	285	0	71	0	0	0	0	0
Employee Internal (SCM-DCM)	26	0	0	0	26	0	0	0	0	0
Employee to/from Stratford	50	0	50	0	0	0	0	0	0	0
Deliveries	0	24	0	4	0	20	0	0	0	0
Visitors	74	18	11	3	63	15	0	0	0	0
Exploration and Operational	55	5	44	4	11	1	44	4	22	2
Construction (Year 1 Only)	60	0	48	0	12	0	0	0	0	0
Total Year 1	621	47	438	11	183	36	44	4	22	2
Total After Year 1	561	47	390	11	171	36	44	4	22	2

Note: includes existing Stratford Mining Complex traffic (refer to Table 2.1 and Table 2.2)

SMC = Stratford Mining Complex

Table 4.3 – Average Weekday Traffic With Project (vehicles/day)

	Project		Background Non-SMC ^A		Gloucester Gas Project		Rocky Hill Project		Duralie Extension Project		Total Traffic		
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Total
Existing 2011													
The Bucketts Way North of SMC	234	9	1,696	251	0	0	0	0	0	0	1,930	260	2,190
The Bucketts Way South of SMC	115	30	1,696	251	0	0	0	0	0	0	1,811	281	2,092
The Bucketts Way South of Parkers Rd	115	30	1,696	251	0	0	0	0	0	0	1,811	281	2,092
Wenham Cox Road East of Wheatleys Ln	44	4	88	20	0	0	0	0	0	0	132	24	156
SMC Access Rd	349	39	43	15	0	0	0	0	0	0	392	54	446
Bowens Rd	22	2	30	5	0	0	0	0	0	0	52	7	59
Project Year 1: 2013													
The Bucketts Way North of SMC	438	11	1,799	266	172	73	74	51	10	4	2,493	405	2,898
The Bucketts Way South of SMC	183	36	1,799	266	172	73	74	51	10	4	2,238	430	2,668
The Bucketts Way South of Parkers Rd	183	36	1,799	266	172	73	74	51	10	4	2,238	430	2,668
Wenham Cox Road East of Wheatleys Ln	44	4	88	20	208	118	0	0	0	0	340	142	482
SMC Access Rd	621	47	43	15	0	0	0	0	0	0	664	62	726
Bowens Rd	22	2	30	5	4	50	0	0	0	0	56	57	113
Project Year 11: 2024													
The Bucketts Way North of SMC	390	11	2,359	349	64	2	138	20	0	0	2,951	382	3,333
The Bucketts Way South of SMC	171	36	2,359	349	64	2	138	20	0	0	2,732	407	3,139
The Bucketts Way South of Parkers Rd	171	36	2,359	349	64	6	138	20	0	0	2,732	411	3,143
Wenham Cox Road East of Wheatleys Ln	44	4	88	20	36	2	0	0	0	0	168	26	194
SMC Access Rd	561	47	43	15	0	0	0	0	0	0	604	62	666
Bowens Rd	22	2	30	5	18	2	0	0	0	0	70	9	79

^A Includes AGL and GCL exploration traffic during surveys (refer to Section 3.5.1)

SMC = Stratford Mining Complex

The Project is therefore expected to generate 668 vehicle trips per day in Year 1 (refer to Table 4.2), an increase of 280 vehicle trips per day above existing. Following the completion of construction work, the Project would generate 608 vehicle trips per day (refer to Table 4.2), an increase of 220 vehicle trips per day above existing. The Stratford Mining Complex-related traffic would be made up of approximately 7 to 8% heavy vehicles, or 47 heavy vehicle trips per day.

The greatest impacts of the Project would occur on the Stratford Mining Complex access road, which is used only by Stratford Mining Complex traffic, and on The Bucketts Way, which is a regional road. With the Project traffic, the Stratford Mining Complex would contribute fewer than 50 vehicles/day on Wenham Cox Road east of Wheatleys Lane and on Bowens Road (refer to Table 4.2). Such volumes are low, and well within the capacity of these roads. The GGP is estimated to contribute approximately 326 and 54 vehicles/day on these roads respectively in Year 1 (refer to Table 4.1).

4.4 Road Realignments

The extent of the Project open cuts and mine waste rock emplacements would require realignments of two sections of local roads for continued public road accessibility around the Project (refer to **Figure 2**). The road realignments would involve the construction of:

- a sealed two-lane road realignment of Wheatleys Lane and Bowens Road of approximately 400m around the western extent of the proposed Roseville West Pit Extension and upslope diversion; and
- a sealed two-lane road realignment of Wenham Cox/Bowens Road of approximately 1.7km around the north-eastern extent of the proposed Northern Waste Emplacement Extension and Avon North Open Cut.

Bowens Road and Wheatleys Lane currently meet at a right angle bend, which is proposed to be replaced with a curve with a radius of approximately 370m. This radius is well above the minimum 90m radius required by RTA (1996) for a design speed of 60km/h.

At low volumes, such as those anticipated on Bowens Road and Wheatleys Lane (refer to Table 4.3), it is not necessary to allow sufficient road width to allow two vehicles to pass at all locations along the road. The current construction standards of Bowens Road and Wheatleys Lane are satisfactory with regard to sight distances and allowing vehicles to pass, thus no further upgrading is considered to be warranted. Some localised improvements in the vicinity of the intersection of Wheatleys Lane and Wenham Cox Road are suggested to provide drivable shoulders where the ground currently drops off sharply to an unformed drain.

Wenham Cox Road would be realigned to pass around the north-eastern extent of the Northern Waste Emplacement Extension and Avon North Open Cut. It is anticipated that the 1.7km long realigned roadway would be of a similar standard to the existing roadway east of The Bucketts Way, with a sealed surface and a minimum carriageway width of approximately 6m.

The detailed design of the road realignments would be undertaken in accordance with the RTA's (1996) *Road Design Guide* and to the satisfaction of Gloucester Shire Council.

4.5 Levels of Service

As discussed in Section 3.6, an estimation of the capacity of the travel lanes on the key roads can be made by considering the adjustment factors given in Austroads (2009) for lane widths and lateral clearances, and for heavy vehicles. The nominal capacities of the roads were recalculated for the future conditions taking into account the future proportion of heavy vehicles, and the resulting Levels of Service during the average weekday highest peak hour are presented in Table 4.4.

The future Levels of Service are therefore expected to remain satisfactory with the Project and other development traffic. The Project would thus not impact significantly on the efficiency of the road system with regard to the perception of drivers of the operational conditions on the surrounding roads.

Table 4.4 – Future Levels of Service on Weekdays

	Estimated Two Way Capacity	Peak Hour Volume	Volume/Capacity	Level of Service
Year 1 (2013)				
The Bucketts Way	2,200	250	0.11	A
Wenham Cox Road	1,700	56	0.03	A
SMC Access Road	2,250	116	0.05	A
Year 11 (2024)				
The Bucketts Way	2,250	276	0.12	A
Wenham Cox Road	2,050	20	0.01	A
SMC Access Road	2,200	86	0.04	A

SMC = Stratford Mining Complex

4.6 *Intersections*

With respect to turning vehicles at intersections, the Project traffic would have its greatest impact on the operation of the intersections of The Bucketts Way with the Stratford Mining Complex access road, with significantly lower volumes on Bowens Road and Wenham Cox Road.

The intersection of The Bucketts Way and the Stratford Mining Complex access road currently provides left and right turn deceleration lanes in The Bucketts Way, which allow vehicles turning into the Stratford Mining Complex access road to do so out of the path of through traffic on The Bucketts Way.

Austrroads (2009) indicates that at unsignalised intersections with minor roads, where there are relatively low volumes of cross and turning traffic, capacity considerations are usually not significant, and thus capacity analysis is not necessary. The intersections of The Bucketts Way with Wenham Cox Road, Bowens Road, and the Stratford Mining Complex access road are each tee intersections, so have fewer potentially conflicting movements than the cross intersections to which Austrroads refers.

As a guide, at volumes below the following combinations of maximum hourly volumes on a cross road intersection with a two-lane major road, capacity analysis is not necessary:

- Major road 400 vehicles/hour, minor road 250 vehicles/hour.
- Major road 500 vehicles/hour, minor road 200 vehicles/hour.
- Major road 650 vehicles/hour, minor road 100 vehicles/hour.

Table 4.5 compares the estimated hourly volumes on the major and minor roads at the intersections with the criteria above, during the busiest hour of the day. The busiest hour is taken as the hour when the sum of the two way volumes on the major and minor roads is at its maximum. It is noted that the “major road” volumes in Table 4.5 are the peak hour volume on The Bucketts Way immediately north of the Stratford Mining Complex access road. Some slight variations in the volume on The Bucketts Way would be expected farther to the north of the other minor roads, however such variations would not impact the outcome of the comparison against the Austroads criteria.

The estimated hourly traffic volumes in Table 4.5 are based on the surveyed traffic distribution, and estimates of the distribution of traffic to and from the Project, GGP, the Rocky Hill Project and Duralie Extension Project based on operational considerations such as shift changes, and typical delivery periods.

Table 4.5 – The Bucketts Way Intersection Volumes (vehicles/hour)

Intersection and Peak Time	Major Road Volume	Minor Road Volume	Capacity Analysis Needed
Year 1			
Wenham Cox Road 5pm-6pm	250	47	No
SMC Access Road 6am-7am	216	131	No
Bowens Road 5pm-6pm	250	8	No
Year 11			
Wenham Cox Road 5pm-6pm	276	11	No
SMC Access Road 5pm-6pm	276	66	No
Bowens Road 5pm-6pm	276	6	No

SMC = Stratford Mining Complex, Major road = The Bucketts Way

It follows that there would be no capacity concerns regarding the future operation of the intersections of The Bucketts Way with Wenham Cox Road, Stratford Mining Complex access road and Bowens Road.

The Project would thus not impact significantly on the efficiency of the road system with regard to the delays experienced by drivers at the key intersections.

4.7 *Blasting*

During mining operations there would be occasions when blasting would be required within 500m of Bowens Road, Wheatleys Lane, Wenham Cox Road and Glen Road. Approvals would be sought from the Gloucester Shire Council to temporarily close sections of these roads to allow blasting to occur, typically for periods of approximately 30 minutes.

Road closure management measures are currently implemented at the Stratford Mining Complex in accordance with the *Road Closure Management Plan* (SCPL, 2002) which includes:

- road closure procedures;
- public safety management measures;
- access for emergency services during closure periods;
- details of post-blast road inspections; and
- notification process.

It is recommended that the existing Road Closure Management Plan be reviewed and revised for the Project in consultation with the Gloucester Shire Council and in accordance with the RTA's (2006) *Traffic Control at Worksites Manual*.

4.8 *Road Level Crossings*

There are no road level crossings associated with the North Coast Railway and The Bucketts Way. Local road level crossings are located on local roads on either side of The Bucketts Way in the vicinity of the Stratford Mining Complex.

The Project would require an average of approximately 2.5 product coal trains (total) per day, i.e. no change to the existing approved average rail movements, however a peak of approximately 12 per day (an increase of two rail movements per day) would be required at times. The current peak in rail movements on the North Coast Railway in the vicinity of the Stratford Mining Complex is approximately 39 movements per day.

The proposed additional peak rail movement therefore represents a 5% increase in the total peak rail movements on the North Coast Railway in the vicinity of the Stratford Mining Complex. The Project is not expected to increase road traffic movements at these local road level crossings.

As the increase in the peak number of trains on the North Coast Railway would be small, i.e. two per day, and the Project would be unlikely to generate additional road traffic movements at the local road level crossings, it is considered that the incremental risk of road and rail traffic interaction associated with the slightly increased Project rail movements at these local road level crossings would be low.

The Rocky Hill Project is expected to increase rail movements on the North Coast Railway by four movements per day (R.W. Corkery & Co., 2012). The additional combined Project and Rocky Hill Project rail movements represent a 15% increase in the total peak rail movements on the North Coast Railway in the vicinity of the Stratford Mining Complex. It is considered that the incremental risk of road and rail traffic interaction associated with the cumulative increase in rail movements at these local road level crossings would be low.

4.9 *Oversize Vehicles*

A number of oversize vehicle movements would be generated on an occasional basis during the life of the Project. These oversize vehicle movements would be associated with the transport of mining equipment and infrastructure to and from the Project.

Although the number of oversize vehicle movements associated with the Project is anticipated to be small, the requirement for each proposed oversize vehicle movement would be reviewed prior to the movement.

It is expected that oversize vehicles would approach the Project via The Bucketts Way and the Stratford Mining Complex access road. Notwithstanding the above, the proposed route would be negotiated with RMS and relevant local councils on a case-by-case basis.

All oversize loads would be transported with the relevant permits obtained in accordance with *Operating Conditions: specific permits for oversize and over-mass vehicles and loads* (RTA, 2007), and any other licences and escorts as required by the regulatory authorities.

Given the expected infrequent nature of oversize vehicle movements to and from the Project, it is considered that there would be minimal cumulative impacts associated with oversize vehicle movements on The Bucketts Way.

4.10 Road Safety

The review of the safety history of the roads in the vicinity of the Stratford Mining Complex (refer to Section 3.3) found that there was no identifiable causation factors in the local area which would contribute to the accidents which have occurred. The increases in traffic resulting from the Project are only moderate, and when considered in the context of the overall changes in traffic conditions resulting from general background growth, the GGP, the Rocky Hill Project and Duralie Extension Project, future traffic volumes are not considered likely to result in safety concerns on the surrounding road network.

4.11 Car Parking

Additional parking would be provided on-site to meet the increased demand resulting from the Project. The increase in the number of employees on the site at any one time would be limited to the moderate increase in the day shift mining employees, and additional parking would be made available accordingly.

4.12 Measures to Maintain or Improve Capacity

The foregoing discussions in Section 4.5 and Section 4.6 demonstrate that with the additional traffic expected to be generated by the Project, the operation of the road system would remain satisfactory with regard to both midblock capacities, and the operation of the key intersections. The review of the history of road crashes has not identified any locations with inherent safety concerns which may be exacerbated by the additional traffic generated by the Project.

Measures to provide additional capacity or improve the safety of the road system, either midblock or at intersections, are therefore not considered to be warranted.

It is anticipated that SCPL would continue to make contributions to Gloucester Shire Council with regard to road maintenance in accordance with the Project Development Consent, if approved.

5 Conclusions

This study has found that the proposed Project which would involve extension of the life of the Stratford Mining Complex and expansion of mining operations would have only minor impacts on the operation of the surrounding road system. The cumulative assessment found that the existing Levels of Service would be maintained on the surrounding roads, and key intersections would continue to operate satisfactorily.

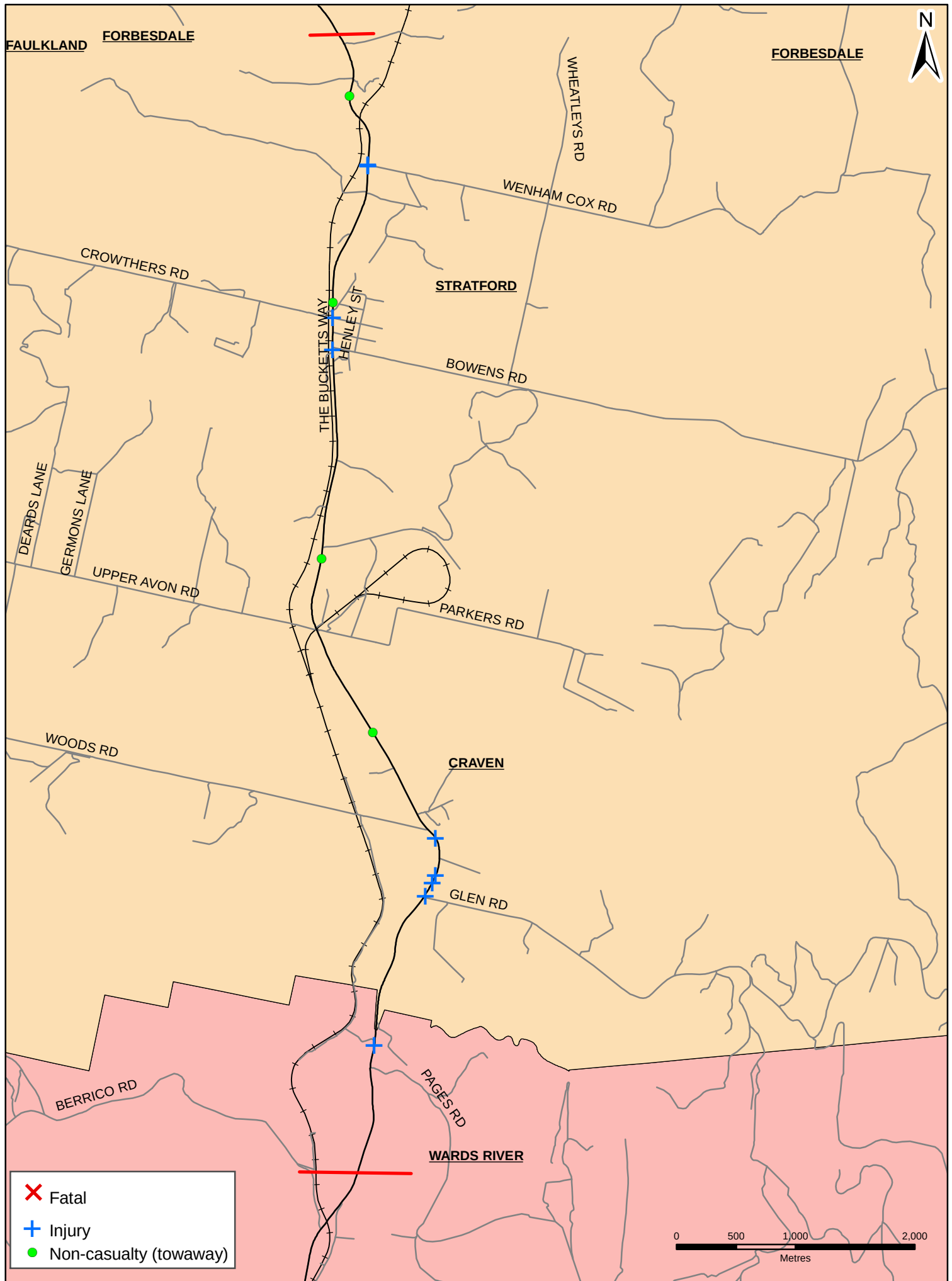
No significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of the Project and other projects. No specific management or mitigation measures are considered to be warranted.

It is anticipated that SCPL would continue to make contributions to Gloucester Shire Council with regard to road maintenance in accordance with the Project Development Consent, if approved.

Attachment A. Road Crash Data

The Bucketts Way at Stratford Coal Mine (5km north and south)

Crash period 1/07/2005 to 30/06/2010 (Finalised data).
plus provisional data (which is incomplete & subject to change) to date



Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors						
S F																										
Hunter Region		Gloucester LGA				Craven		Bucketts Way																		
483355	16/08/2005	Tue	21:30	100 m	S NUMBER 3270 HN	2WY	STR	Fine	Dry	100	1	CAR	M20	N in BUCKETTS WAY	90	Proceeding in lane	N	0	0							
E24580164	DCA: 703 Left off cway into object Guide Post																									
Hunter Region		Gloucester LGA				Craven		Bucketts Way																		
512353	23/02/2006	Thu	21:53	200 m	N GLEN RD	2WY	CRV	Fine	Dry	60	1	CAR	M17	N in BUCKETTS WAY	60	Proceeding in lane	I	0	1							
E26367166	DCA: 609 On path - Hit animal Straying stock																									
Hunter Region		Gloucester LGA				Stratford		Bucketts Way																		
560579	10/03/2007	Sat	19:50	100 m	S STRATFORD COAL ENT	2WY	STR	Fine	Dry	100	1	CAR	M39	N in BUCKETTS WAY	90	Proceeding in lane	N	0	0							
E104331896	DCA: 609 On path - Hit animal Straying stock																									
Hunter Region		Gloucester LGA				Craven		Glen Rd																		
605446	29/07/2007	Sun	23:00	10 m	E BUCKETTS WAY	TJN	STR	Fine	Dry	60	1	M/C	M43	W in GLEN RD	60	Proceeding in lane	I	0	1							
E32177937	DCA: 609 On path - Hit animal Kangaroo																									
Hunter Region		Gloucester LGA				Craven		Bucketts Way																		
609224	12/02/2008	Tue	05:15		at NUMBER 3007 HN	2WY	CRV	Raining	Wet	60	2	CAR	M18	S in BUCKETTS WAY	70	Proceeding in lane	I	0	2	S						
E33040062	DCA: 803 R Off right bend into obj CAR N in BUCKETTS WAY																									
Hunter Region		Gloucester LGA				Stratford		Bucketts Way																		
624438	18/05/2008	Sun	13:42	23 m	S BOWENS RD	2WY	STR	Fine	Dry	100	3	4WD	M31	N in BUCKETTS WAY	100	Incorrect side	I	0	2	F						
E33850906	DCA: 201 Opp - Head on UTE M20 S in BUCKETTS WAY WAG F25 S in BUCKETTS WAY																									
Hunter Region		Great Lakes LGA				Craven		Bucketts Way																		
648689	30/11/2008	Sun	11:45	2 km	S WOODS RD	2WY	CRV	Fine	Dry	100	1	CAR	F17	S in BUCKETTS WAY	90	Proceeding in lane	I	0	1	S						
E36439939	DCA: 803 L Off right bend into obj Tree/bush																									
Hunter Region		Gloucester LGA				Stratford		Bucketts Way																		
680883	28/08/2009	Fri	11:00	12.6 km	S GLOUCESTER TN	2WY	STR	Fine	Dry	100	1	TRK	F53	N in BUCKETTS WAY	Unk	Proceeding in lane	N	0	0							
E38551379	DCA: 704 Right off cway into obj Fence																									
Hunter Region		Gloucester LGA				Stratford		Bucketts Way																		
697783	07/09/2009	Mon	16:45		at AVON ST	TJN	STR	Overcast	Wet	60	2	WAG	F35	W in AVON ST	10	Turning right	I	0	1							
E38300333	DCA: 104 Adj - Right-thru from right TRK M56 S in BUCKETTS WAY																									

Detailed Crash Report - sorted

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
SF																				
Hunter Region				Gloucester LGA				Craven				Bucketts Way								
696222	18/12/2009	Fri	12:30	95 m S	WOODS RD	2WY	CRV	Overcast	Wet	60	1	CAR	M26 N in BUCKETTS WAY		90 Proceeding in lane		I	0	1	S
E39147324						DCA: 804	R	Off left bend into obj				Utility pole								
Hunter Region				Gloucester LGA				Stratford				Bucketts Way								
705489	02/04/2010	Fri	01:30	10 m S	WENHAM COX RD	TJN	STR	Fog or mist	Dry	100	1	4WD	M36 N in BUCKETTS WAY		90 Proceeding in lane		I	0	2	
E40769568						DCA: 701		Off carriageway to left												
Hunter Region				Gloucester LGA				Stratford				Bucketts Way								
710391	17/05/2010	Mon	18:40	2 km S	GLOUCESTER TOP RD	2WY	CRV	Raining	Wet	100	1	CAR	M17 N in BUCKETTS WAY		95 Proceeding in lane		N	0	0	S
E40596815						DCA: 803	R	Off right bend into obj				Embankment								
Hunter Region				Gloucester LGA				Stratford				Bucketts Way								
721053	12/08/2010	Thu	21:15	10 m S	WENHAM COX RD	TJN	STR	Fine	Dry	100	1	CAR	M18 N in BUCKETTS WAY		100 Proceeding in lane		I	0	1	
E41780248						DCA: 704		Right off cway into obj				Fence								
Hunter Region				Gloucester LGA				Stratford				Bucketts Way								
729888	29/10/2010	Fri	14:00		at WENHAMS COX RD	TJN	STR	Fine	Dry	100	3	TRK	M18 N in BUCKETTS WAY		70 Proceeding in lane		I	0	1	
E81995302						DCA: 301		Same - Rear end				CAR	M35 N in BUCKETTS WAY		0 Stationary					
												TRK	M57 N in BUCKETTS WAY		0 Wait turn right					
Report Totals:				Total Crashes: 14				Fatal Crashes: 0				Injury Crashes: 10				Killed: 0				Injured: 13

Crashid dataset The Bucketts Way at Stratford Coal Mine (5km north and south) - crash data 1/07/2005 to 30/06/2010 plus provisional data to date

Note: Ordered by: Crash Date,Crash Time,Crash No. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Attachment B. Project Traffic Survey Data

Project Traffic Survey Data

Stratford Mining Complex Access Road East of The Bucketts Way – Two Way Traffic Volumes

<i>Day Time</i>	<i>Tue</i> 22-Mar-11	<i>Wed</i> 23-Mar-11	<i>Thu</i> 24-Mar-11	<i>Fri</i> 25-Mar-11	<i>Sat</i> 26-Mar-11	<i>Sun</i> 27-Mar-11	<i>Mon</i> 28-Mar-11	<i>W/Day Ave.</i>
0:00	0	1	0	0	1	0	0	0
1:00	0	1	0	0	0	0	0	0
2:00	2	2	2	2	0	0	0	2
3:00	0	1	0	0	0	0	0	0
4:00	0	1	0	0	0	0	0	0
5:00	11	11	10	13	10	12	11	11
6:00	84	84	84	81	41	40	79	82
7:00	45	41	44	45	23	6	38	43
8:00	24	22	28	30	7	2	17	24
9:00	32	29	21	26	8	6	22	26
10:00	22	27	21	11	6	10	21	20
11:00	27	27	31	20	11	11	16	24
12:00	35	36	21	28	11	11	19	28
13:00	26	28	33	26	16	3	24	27
14:00	30	30	21	27	8	8	26	27
15:00	38	30	35	45	3	3	27	35
16:00	32	39	34	19	19	9	33	31
17:00	49	46	45	46	23	10	49	47
18:00	16	15	11	18	11	11	10	14
19:00	0	2	2	2	1	1	2	2
20:00	0	2	1	0	0	0	3	1
21:00	1	0	0	0	0	2	0	0
22:00	0	0	0	0	0	0	0	0
23:00	0	0	0	1	0	0	0	0
Total	474	475	444	440	199	145	397	446

W/day Ave. = weekday average.

Project Traffic Survey Data

Wenham Cox Road East of Wheatleys Lane – Two Way Traffic Volumes

<i>Day Time</i>	<i>Tue 22-Mar-11</i>	<i>Wed 23-Mar-11</i>	<i>Thu 24-Mar-11</i>	<i>Fri 25-Mar-11</i>	<i>Sat 26-Mar-11</i>	<i>Sun 27-Mar-11</i>	<i>Mon 28-Mar-11</i>	<i>W/Day Ave.</i>
0:00	0	0	0	1	0	0	0	0
1:00	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0
4:00	2	2	1	1	1	0	1	1
5:00	1	1	1	1	1	1	1	1
6:00	8	9	8	7	8	8	7	8
7:00	12	12	14	6	11	4	8	10
8:00	11	10	19	18	6	4	17	15
9:00	10	12	10	16	9	9	13	12
10:00	10	9	11	16	6	7	21	13
11:00	11	11	15	7	3	7	17	12
12:00	9	11	25	11	7	8	11	13
13:00	8	11	18	20	6	3	15	14
14:00	17	14	9	26	12	4	10	15
15:00	13	12	16	18	5	4	16	15
16:00	6	13	7	7	13	7	6	8
17:00	4	6	5	7	5	5	11	7
18:00	2	3	2	6	1	5	6	4
19:00	2	8	0	1	1	1	4	3
20:00	2	2	2	1	0	3	1	2
21:00	1	1	1	1	1	0	0	1
22:00	0	0	0	1	0	0	0	0
23:00	1	1	0	0	0	0	0	0
Total	130	148	164	172	96	80	165	156

W/day Ave. = weekday average.

Project Traffic Survey Data

The Bucketts Way North of Stratford Mining Complex Access Road – Two Way Traffic Volumes

<i>Day Time</i>	<i>Tue 22-Mar-11</i>	<i>Wed 23-Mar-11</i>	<i>Thu 24-Mar-11</i>	<i>Fri 25-Mar-11</i>	<i>Sat 26-Mar-11</i>	<i>Sun 27-Mar-11</i>	<i>Mon 28-Mar-11</i>	<i>W/Day Ave.</i>
0:00	7	2	4	3	4	13	4	4
1:00	3	4	2	4	1	10	6	4
2:00	3	3	2	3	3	8	1	2
3:00	4	3	10	5	3	13	3	5
4:00	22	30	25	28	24	4	22	25
5:00	59	61	55	60	39	27	59	59
6:00	139	135	142	128	62	46	126	134
7:00	134	126	124	106	70	37	98	118
8:00	120	138	136	142	126	90	142	136
9:00	131	134	146	174	151	132	134	144
10:00	116	128	159	166	185	172	182	150
11:00	172	138	158	186	212	174	176	166
12:00	140	148	152	197	144	218	132	154
13:00	152	121	208	194	144	200	129	161
14:00	131	163	135	205	143	216	153	157
15:00	147	166	178	229	128	245	160	176
16:00	127	150	161	215	150	173	154	161
17:00	178	173	172	270	122	123	171	193
18:00	82	98	105	146	64	91	92	105
19:00	47	44	56	95	44	53	38	56
20:00	28	21	41	53	25	30	21	33
21:00	19	20	16	42	28	24	15	22
22:00	23	10	16	33	22	12	4	17
23:00	13	4	7	12	11	6	7	9
Total	1997	2020	2210	2696	1905	2117	2029	2190

W/day Ave. = weekday average.

Attachment C. Gloucester Gas Project and Rocky Hill Project Traffic

C.1 Gloucester Gas Project

Ongoing vehicle movements on the external road system as described in the Environmental Assessment (AECOM 2009) are summarised below. The vehicle movements outlined below have been used in the cumulative assessment for the Stratford Extension Project (the Project). It is noted that a trip is one way movement, thus a truck which arrives with a delivery then departs generates two trips.

Gas Field Development Area (GFDA) – 18 months

Ongoing vehicle movements during the construction phase, based on the shortest possible construction schedule, would include:

Construction Phase:

- Gravel transportation: approximately 37 truck trips per day for the first three months, reducing to 19 truck trips per day thereafter.
- Drilling rigs, frac equipment, frac tanks, production equipment, cementing equipment and water tankers: approximately 58 to 62 truck trips per day.
- Personnel transport: approximately 6 to 8 light vehicle trips per day per well location.
- Employees: approximately 200 light vehicle trips per day for travel to and from site.

Operational Phase:

- Light vehicles: approximately 16 light vehicle trips per day to and from the site.
- Trucks: approximately 2 truck trips per day to and from the site.
- Employees: approximately 20 light vehicle trips per day to and from the site.

Central Processing Facility (CPF) – 12 months

The construction of the CPF is expected to generate:

Construction Phase:

- Initial delivery of plant and materials at commencement: approximately 92 truck trips over 30 days.
- Removal of plant and materials at completion: approximately 92 truck trips.
- Concrete deliveries: approximately 18 truck trips per day.
- Equipment transport: approximately 4 truck trips per day.
- Miscellaneous containers and equipment: approximately 6 truck trips per week (approximately 2 truck trips per day).
- Personnel transport: approximately 36 light vehicle trips per day.
- Employees: approximately 100 light vehicle trips per day for travel to and from site.

Operational Phase:

- Light vehicles: approximately 44 light vehicle trips per day to and from the site.
- Trucks: approximately 2 heavy vehicle trips per day to and from the site.
- Employees: approximately 20 light vehicle trips per day to and from the site.

Pipeline – 12 months

Construction Phase:

Vehicle movements associated with the initial delivery of materials to laydown areas are:

- Pipe delivery: approximately 10 truck trips per day over 70 days.
- Equipment transport: approximately 4 truck trips per day.
- Water trucks: approximately 4 truck trips per day.
- Personnel: approximately 50 to 100 light vehicle trips per day.
- Employees: approximately 100 trips per day for travel to and from site.

Operational Phase:

- Light vehicles: approximately 8 light vehicle trips per day to and from the site.
- Trucks: approximately 2 heavy vehicle trips per day to and from the site.
- Employees: approximately 20 light vehicle trips per day to and from the site.

Construction Workforce

The estimated 465 construction personnel would be located in workforce camps in proximity to the worksites, and in rental accommodation. The majority of the workforce from the camps would be transported to the work sites each day by minibus and carpooling would be encouraged. One construction camp is planned in the vicinity of Gloucester to accommodate up to 100 people, and another mid-way along the pipeline to accommodate up to 300 people.

Traffic Distribution Assumptions

- Peak construction of the GFDA, CPF and the pipeline would occur in the vicinity of the Project during Year 1 of the Project.
- CPF located at Site 7.
- GFDA and CPF employees travel to and from the accommodation camp near Gloucester (north).
- Pipeline construction employees travel to and from the accommodation camp located midway along the pipeline (south).
- Half the non-employee vehicles travel to and from the GFDA, CPF and pipeline from the north, and half to and from the south.
- Bowens Road and Wenham Cox Road are used to access the GFDA.
- New access road off The Bucketts Way would be used to access CPF Site 7 and the pipeline.
- All operational phase heavy vehicles travel to and from the south.
- Operational workforce of 40 employees are assumed to be divided evenly between the GFDA, CPF, pipeline and Hexham Delivery Station.

Gloucester Gas Project and Rocky Hill Project Traffic

Assumed Gloucester Gas Project Traffic Generation and Distribution in Project Year 1 (2013) (vehicles/day)

	GFDA		CPF		Pipeline		Employee		Total	
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy
The Bucketts Way South of Parkers Rd	4	50	18	14	50	9	100	0	172	73
The Bucketts Way North of SMC	4	50	18	14	50	9	100	0	172	73
Bowens Rd	4	50	0	0	0	0	0	0	4	50
Wenham Cox Road East of Wheatleys Ln	8	118	0	0	0	0	200	0	208	118
The Bucketts Way North of Wenham Cox Rd	4	50	18	14	50	9	300	0	372	73

Assumed Gloucester Gas Project Traffic Generation and Distribution in Project Year 11 (2024) (vehicles/day)

	GFDA		CPF		Pipeline		Employee		Total	
	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy	Light	Heavy
The Bucketts Way South of Parkers Rd	8	2	22	2	4	2	30	0	64	6
The Bucketts Way North of SMC	8	2	22	0	4	0	30	0	64	2
Bowens Rd	8	2	0	0	0	0	10	0	18	2
Wenham Cox Road East of Wheatleys Ln	16	2	0	0	0	0	20	0	36	2
The Bucketts Way North of Wenham Cox Rd	8	0	22	0	4	0	30	0	64	0

SMC = Stratford Mining Complex

C.2 Rocky Hill Project

As the traffic assessment for the Rocky Hill Project has not yet been prepared, and details of likely traffic generation are not included in the information provided in the *Documentation Supporting an Application for Director-General's Requirements for the Rocky Hill Project* (R.W. Corkery & Co., 2012), the following assumptions have been made regarding the possible traffic impacts of the Rocky Hill Project on The Bucketts Way in the vicinity of the Project.

Construction Workforce

- Conservatively assume no discount for car pooling or for employees rostered off.
- 100 employees arrive and depart by car each day = 200 light vehicle trips per day.
- Assume same distribution of construction employees as for the Project, i.e. 20% travel to and from the south past the Project.
- Any other trips by employees, such as lunch trips, would be contained to the local area around Gloucester, and would not use The Bucketts Way near the Project.

Construction Deliveries and Visitors

- Construction phase traffic generation of other coal mining projects in NSW include:
 - Wilpinjong Coal Project – 40 visitor and 24 heavy vehicle trips per day (Traffix, 2003);
 - Maules Creek Project – 66 heavy vehicle trips per day (Hyder, 2010);
 - Boggabri Coal Mine – no allowance as assumed to not be a significant generator of additional traffic (Parsons Brinkerhoff, 2010);
 - Tarrawonga Coal Project 94 heavy vehicle trips per day and 16 light vehicle trips per day (Halcrow, 2011); and
 - Moolarben Coal Project – 26 heavy vehicle trips per day (SKM, 2006).
- Based on the above construction phase traffic generation from other coal mining projects in NSW, 40 light vehicle trips per day and 60 heavy vehicle trips per day have been assumed for the Rocky Hill Project.
- Assume same distribution of construction delivery and visitor vehicles as for the Project operational deliveries, i.e., 85% travel to and from the south past the Project.

Operational Workforce

- Conservatively assume no discount for car pooling or for employees rostered off.
- 150 employees arrive and depart by car each day = 300 light vehicle trips per day.
- Assume same distribution of operational employees as for Stratford Project, i.e. 20% travel to and from the south past the Project.
- Any other trips by employees, such as lunch trips, would be contained to the local area around Gloucester, and would not use The Bucketts Way near the Project.

Operational Deliveries and Visitors

- The run-of-mine (ROM) coal production rate at the Rocky Hill Project (2.5 Mtpa) would be of a similar magnitude to the Project (2.6 Mtpa), thus the overall level of activity on the site would be comparable. The Coal Handling and Preparation Plant (CHPP) at the Project would however process ROM coal at a rate of approximately 4.8 Mtpa, including coal from the Duralie Coal Mine, i.e., at almost twice the rate of the Rocky Hill Project. Stratford Coal Pty Ltd has advised that approximately 60% of delivery and visitor trips at the Project would be associated with the CHPP. Thus the number of delivery and visitor trips associated with the Rocky Hill Project would be likely to be less than that of the Project. Notwithstanding, the number of trips made for deliveries and visitors at the Rocky Hill Project is conservatively assumed to be of a similar magnitude to the Project.
- 24 heavy vehicle trips per day, of which 85% would travel to and from the south past the Project.
- 92 light vehicle trips per day, of which 85% would travel to and from the south past the Project.

Rocky Hill Traffic on The Bucketts Way Past the Project (vehicles/day)

	Light Vehicles	Heavy Vehicles	Total Vehicles
<i>Project Year 1 (2013)</i>			
Construction workforce	40	-	40
Construction deliveries/visitors	34	51	85
Total	74	51	125
<i>Project Year 11 (2024)</i>			
Operational workforce	60	-	60
Operational deliveries/visitors	78	20	98
Total	138	20	158