

Situation Summary of Extractive Industries in the Gloucester-Stroud Valley

*Prepared for the people of the valley and the
incorporated community groups:*



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Summary

Background

The Gloucester valley is geologically complex and distinct from its surroundings. Coal deposits underlie most of the valley floor. There are many coal measures and most are extensively deformed and faulted. This geology makes the extraction of both coal and gas more difficult, and complicates the understanding of groundwater systems.

The difficulty of modelling the water systems means that the consequences of mining upon the water supply of the valley are uncertain. One approach to this is to institute "adaptive management". This is code for "if something goes wrong we will try and fix it before it gets too bad".

The valley is covered by exploration licenses for coal and coal seam gas. Coal exploration licenses cover approximately 25,000 ha and gas 14 blocks (roughly 1,000 square kilometres) but these areas overlap. There are active coalmines at Duralie and Stratford (Yancoal, YAL). A coalmine "Rocky Hill" is proposed east of Forbesdale (Gloucester Resources, GRL). A gas field of 110 wells with processing plant and pipeline to Hexham (AGL Upstream Energy, AGL) has been approved, with additional stages of development up to 330 wells that are only described conceptually. See the maps attached.

These enterprises coincide with much of the best agricultural land of the valley floor and many creeks and rivers run through or near them. GRL owns some 35 properties (2200ha) and YAL at least 22 properties, probably many more.

Scale and Location

If the plans for extraction come to fruition the valley will be cross-crossed with infrastructure to feed the AGL gas project and coal will be open-cut in a track from Forbesdale to Duralie. These are not petty developments and they will be near (or envelope) many townships and individual houses. The Rocky Hill mine in particular is within a few kilometres of the southern suburbs of Gloucester (see maps). Except in the case of a collapse in fossil fuel prices extraction will continue for another generation.

Miners assert that other industries can coexist with them. In the case of tourism, a major contributor to the economy of the valley, where the ambience and outlook is essential to the experience it is hard to see how this is possible.

These industries are not being conducted in a blighted desert where nobody lives, the mines and infrastructure either displace the inhabitants or subject them to constant health risks. People are forced to live near mining operations. Every uncovered coal train or cloud of fine particulates from a handling operation, every poorly managed blast that covers the surrounds with an orange cloud and every year of living with constant noise eats away at the health of the residents.

Cumulative Impacts

The cumulative impacts of nearby extraction projects have been very poorly dealt with in the past. The AGL gas proposal was made knowing that there was an active coalmine adjacent to their planned processing plant and that the exploration licenses for the two resources overlie. Both will contribute to health issues due to noise and

other pollution, and to changing the landscape from rural to industrial. Any effect on the Avon river system by AGL will add to the existing discharge approved from that coalmine. Yet the proposal contains not one word about the Stratford mine.

There are conditions applied to individual projects that attempt to limit harmful activities. How adequate these conditions may be and how well they are monitored and met is moot. *There is no condition to approvals in the valley or any monitoring that attempts to deal with cumulative adverse effects.*

It remains to be seen how future proposals for the Rocky Hill mine and for expansion of the AGL gas network and Yancoal mines will deal with this issue.

Wedging (Divide and Conquer)

The wedge strategy is to use many small changes to avoid problems with a large change. Other applicable metaphors are 'divide and conquer' or 'the death of a thousand cuts'; it works this way.

Start small and get approval with a low profile, a boutique mine if you like, allow the perception that you will be gone in a few years. Then expand in increments that in themselves are not very challenging: tap the wedge. In time the entire resource will be extracted without sounding the social and environmental alarm bells that would happen if at the start it was announced, "over the next 30 years we are going to strip mine 20km from Duralie to Stratford".

This incremental approach is defended by miners saying that they can only mine one bit at a time. The deception is that to shareholders they claim the full value of the resource but for the local community and the evaluation of environmental effects the full consequences of extracting the whole resource are not considered.

They get away with this contradiction as the Government of the day retreats behind the sham that they can only evaluate the proposals in front of them not what may or may not happen in future. This misdirection has the result that the full project and its consequences are **never** prospectively evaluated. The entire project can only be evaluated retrospectively – by then it is too late.

Another way that miners attempt to fragment and diminish their problems is to say whatever is required to get the project approved and then to have the conditions that they see as too costly or restrictive altered afterwards one by one.

An example of this is AGL saying in their proposal that removing salts from produced water by Reverse Osmosis was their preferred method of dealing with the problem. After approval they are considering discharging the salty water into the Avon River. Did they not do their research before the proposal or did they know all along RO would be very expensive but chose not to make it an issue at the time?

Another example is the hours of the Duralie shuttle train. Yancoal has recently succeeded in getting the hours extended until 1am in some circumstances despite the obvious cost to the people living nearby. Would they have attempted this at the outset?

The wedge also applies to households. Landholders on the fringe of mining become concerned about pollution and loss of amenity and greatly fear a mine coming towards them. Therefore they are encouraged to leave; but who will buy them out? Only the miner will. The miner of course only buys if the property is in or very near, the future path of exploitation or if they particularly desire to silence the landholder. This saves much cash and effort clearing away landholders who might be an encumbrance. In time the mine moves forward into the acquired land and as it gets closer a new fringe of landholders begins to fear: tap the wedge.

Inequity

There is no systematic compensation for the consequences of mining from either the State or the industries. If your land loses its value or your health suffers, or your business is harmed, you cannot expect to get anything in return. Such losses are not factored in aggregate into the cost-benefit evaluation of mining proposals nor is there any mechanism for redress for the individual other than the civil courts.

Some landholders who are close to mines receive offers of compensation for loss of amenity but the condition is that they do not formally complain. This is a reflection of the fact that miners know they break their environmental conditions. It is not true compensation but buying silence.

Some landholders who are in strategic positions near or over proposed mining activity are offered prices above market value to sell to the miners.

If a landholder is in neither of these situations, or if the offers made are not considered adequate, the choice is to pursue the matter through the civil courts at great expense or to endure. Considering how little small farmers can afford on lawyers compared to a miner capitalised in the billions there is actually no choice.

The Future

The industries of the valley have changed over time. Timber getting and dairying have receded and been largely replaced by beef cattle. A generation ago the population of Gloucester was declining but rebounded.

Tourism and economic activity following "tree-changers" has added a new boost to income and new residents. The latter two activities are sustainable and will tend to maintain the heritage character of the region as they have a stake in doing so.

There is the potential for the region to diversify into food production other than beef. Given the uncertainties of food production and transport in future this capacity may prove to be valuable within and outside the region. If food is displaced by mining this potential will never be realised.

There is considerable evidence that the benefits of extractive industries are exaggerated and the costs are devalued. The manipulation of public opinion has been so successful that the population believe the mining industry is a much larger employer and that it is much more significant in the national economy than reality. Most citizens are not aware that the vast majority of mining profits go to overseas investors or that mining pays a very low percentage of corporate tax.

These misperceptions allow governments at all levels to set short-term policy in favour of mining.

Given the changes to the landscape and to the population of the valley that are happening now its character is unlikely to survive into the future without urgent intervention.

Minerals in the Valley

The valley's extremely complex geology was understood at least as early as the Loughnan Report of 1954. That report notes as an overview comment, "perhaps no other area within the State represents such a unique opportunity for studying the rapid succession of different tectonic environments as the Stroud-Gloucester Trough".

Coal deposits approximately 10 km north of Stroud Road in the Gloucester Valley were noted in 1855 and along the Gloucester River, within the township area and along the Avon River to the east of the town in 1921. Some limited coal mining took place on a local basis from about this time.

Coal exploration activity in the valley intensified during the 1970s, with Noranda Australia Ltd drilling in excess of 300 shallow holes in search of open cut coal deposits. Coal mining commenced with the Gloucester Coal Stratford mine in 1995 and the first coal train left Stratford on the 12th of July 1995. The Duralie coal mine has been in production since March 2003.

Since the 1970s the valley has been drilled hundreds of times as miners search for coal and CSG, the Duralie and Stratford mines have opened new pits, the AGL gas field has been approved and the Gloucester Resources Rocky Hill mine has been proposed.

The association of methane gas with coal seams, Coal Seam Gas (CSG), and hence coal mining has been known at least since the beginning of the Industrial Revolution. In the valley two types of coal measures have been targeted: shallow measures (0-200m) for open-cut coal mining and deeper measures (500-1000m) for CSG extraction.

The coal measures are extensively deformed and faulted. This means that mining is made more difficult as seams may only be accessible in a limited area before they change direction or depth. Consequently, open-cut pits are typically quite small in contrast to areas (for example the upper Hunter) where seams are continuous and nearly horizontal for long distances.

While the miners are not competing for resources from the same coal seams there is considerable physical overlap between the land areas of coal extraction, gas extraction and the best farmland in the valley.

Along with this complex geology comes the complexity of groundwater systems, the salinity of surface and ground waters, the high cost of coal extraction from thin and very sloping strata, and the unknown impacts of fault lines on mining processes.

There are other exploration licenses and mining leases (or applications for leases) in the valley concerning gold, lime, magnetite and geothermal energy. There are leases for ruby mining in the Barrington Tops. Of these, only a small mine extracting agricultural lime is active. None of this group appears to have any significant effect on the environment or community now.

On the other hand, the scale of extraction of coal and CSG, present and future, is huge in relation to the size of the valley.

Gloucester Resources Limited (GRL)

Key Statistics

GRL is an Australian Company based in Brisbane. The major shareholders are AMCI and SSP which are US based investors involved in the Australian mining industry and together hold an 81% interest in GRL. The remainder are Australian investors.

GRL was founded in 2005 and was granted three exploration licences in the Gloucester Basin between March and May 2006. Licence areas are EL6523 (5525ha), EL6524 (2091ha) and EL6563 (2964ha).

In early 2010 GRL came under a new management structure led by Keith Ross. LD Operations was appointed as project managers for GRL's exploration activities in June 2010.

GRL has purchased 35 properties and now own 2200ha in the valley.

GRL Activities

Stage 1 exploration area is located in the south/east corner of EL6523. In February 2012 GRL lodged an application for Director General's requirements with the NSW Dept. of Planning & Infrastructure for the Rocky Hill Coal Project. The requirements have been issued and GRL is currently (Nov. 2012) preparing an Environmental Impact Statement. 1966ha of this licence have been relinquished, so the area for EL6523 is now 3559ha. A licence renewal was lodged with Dept. of Planning on 2 March 2012.

Exploration is complete in Stage 2 exploration area EL6524, adjacent to EL6523. Licence renewal was lodged with Dept. of Planning on 2 March 2012. Woods Road EL6563 exploration is complete. Licence renewal lodged with Dept. of Planning on 3 May 2012. Maslen's dairy was purchased in Sept 2012

Current Situation

GRL is in the process of preparing an EIS for the Rocky Hill Coal Project, which is not expected to be released until early 2013.

Yancoal Australia Limited (YAL)

Corporate History

Gloucester Coal started as a small consortium, which gained its first exploration licenses in 1982 and its first mining lease in 1994. Duralie Coal and Stratford Coal are both subsidiaries of Gloucester Coal. It has been bought out several times since its inception. The management once described it as "a boutique mine".

In March 2012 approval was given for the merger of Gloucester Coal and Yancoal, from July 2012 Gloucester Coal was delisted from the ASX. Yancoal is owned by Yanzhou Coal Mining a Chinese Government enterprise. Yanzhou is the sixth largest coal miner in the world measured by reserves. Prior to this merger the GCL majority shareholder was The Noble Group (based offshore) so the minority Australian shareholders had no say in the merger. A FIRB condition of the merger was that Yanzhou reduce their holding to 70%.

Yancoal say they have invested 5 billion dollars in Australian mining since 2004. They have bought mines in NSW and other States and a 27% interest in the Wiggins Island Coal Export Terminal (Gladstone QLD). Yancoal's operations in New South Wales have allocated port capacity at both Port Waratah Coal Services and Newcastle Coal Infrastructure Group.

Mining Activities

The leases (both exploration and mining) cover some 15,000 Ha taking up much of Eastern and Southern part of the Gloucester Basin. Mines are operated currently at Stratford and Duralie. There is an ongoing drilling program to delineate the coal seams adjacent the mines and in between them.

The saleable production from the Gloucester Basin mines in 2011 was 1.9 million tons. The identified reserves (economically mineable) of the leases were 84 million tons and total resources (reasonable prospect of extraction) were 316 million tons. In their Investor Briefing to the Stock Exchange, Yancoal predict their Gloucester Basin annual production will approximately double by 2014.

The coal reserves that have been identified in the valley within the exploration licenses lie largely between the two mines. If these resources are exploited the bottom of the valley (some 20km) along Mammy Johnsons River, Wards River and near the current pit at Stratford in the Avon catchment will be open cut.

Coal from both mines is washed at Stratford. The washery and storage areas are adjacent the Stratford mine. The coal from Duralie is transported via rail on a shuttle train. The washed and blended product is railed to the port of Newcastle for export. None of these trains is covered and they pass close by many houses especially at the township of Wards River.

Current Situation

YAL is continuing its program of exploration, development and acceleration.

The company has previously repeatedly applied to discharge water directly into Mammy Johnsons River from the Duralie mine. So far this has not been approved. The most recent application for direct discharge in 2009 was withdrawn. Unless the proponent suddenly discovered that storing and treating the water on site was not

going to cost more one must conclude that they were advised of likely refusal and prefer withdrawal to such a determination.

The Stratford Modification 4 and Duralie Coal Extension projects were determined 26 November 2010. Their aim is to increase production of the Duralie pit from 1.8 to 3 million ROM tons PA. These projects include various additional infrastructure, works and extensions at Stratford to transport and process this increased production.

Duralie Shuttle Train Hours

It was stated at the time of approval of the extension that the additional coal from Duralie would be transported to Stratford by increasing the length of the shuttle train. At this time, shuttle-train movements were restricted to 7am to 10pm. A later application by Yancoal stated that more rail movements and movements outside the approved time interval would be required as the new quieter shuttle train was smaller.

The PAC heard representations on the issue of shuttle-train hours from the proponent, the Dept. of Planning, community groups and other parties. The community argued strongly that extending rail hours would materially affect the amenity of nearby dwellings and the health of the residents. This application was determined on 1 November 2012.

The determination was that Yancoal would:

- (a) only dispatch shuttle trains from the site between 6am and 10pm,
- (b) only receive shuttle trains on site between 6am and midnight,
- (c) only operate shuttle trains on the North Coast railway between midnight and 1am in exceptional circumstances.

Exceptional Circumstances are when the ARTC determines that the shuttle train must operate on the North Coast railway between midnight and 1am because there have been significant disruptions to the services on the railway over the last 12 hours, or where there have been power outages at either the Stratford or Duralie mines that have materially affected the operation of the shuttle train on the North Coast railway.

In addition, Yancoal was required to provide noise abatement modifications for some specified houses and conduct other work in relation to noise abatement processes and monitoring.

The expansion of shuttle-train hours is a good example of the process of gradual erosion of the conditions placed on miners that is routinely permitted by regulatory authorities. Rather than YAL spend more money on rolling stock, or having to limit their rate of extraction to the capacity of the current train, the community loses amenity and suffers greater health risks.

Stratford Extension Project

The Stratford Extension Project was placed on exhibition on 7 November 2012. The project plans to commence July 2013 and run for 11 years. The main features of the proposal are:

To increase ROM coal production rate of up to 2.6 million tonnes per annum, including mining operations associated with:

- completion of the Bowens Road North pit;
- extension of the existing Roseville West Pit;

- development of the new Avon North and Stratford East Open Cuts, *that would be operated 24hours a day* and
- exploration activities.

In addition there would be:

- changes to backfilling, waste placement, internal roads, processing and stockpiles;
- realignments of Wheatleys Lane, Bowens Road, Wenham Cox/Bowens Road and power lines, and
- construction of other associated minor infrastructure, plant, equipment and activities, including minor modifications and alterations to existing infrastructure as required.

This proposal is being considered by community representatives now and more detail on this project will be produced in time. Clearly, the project is a concern, as it is more of the same risks to land, water, health and other industries. Changing to mining 24 hours a day as well as existing 24/7 processing and the proximity of this project to AGL and GRL projects is a particularly worrisome health issue.

The Future

These current projects refer to extension of the life of the mine(s) to 2024. Given the untapped resources identified within exploration licenses outside existing and proposed mining leases the YAL mines clearly have many more years of life beyond that date.

Only a major change in Government policy or a collapse of the global price of coal will prevent the entire YAL resource between Stratford and Duralie being mined open-cut.

The AGL Gloucester Gas Project

The Beginnings of Exploration

The Gloucester Valley is an isolated CSG resource that is separate from the main Sedimentary Basins. It is a modest resource compared to the larger gas fields in other parts of Australia.

Coal seam gas exploration in the Gloucester Valley began with exploration by BMI Mining Pty Ltd and Esso Australia in association with their coal exploration during the mid-1980s. The current coal seam gas exploration licence PEL 285 was granted to Pacific Power under the new *Petroleum (Onshore) Act 1991* in 1992. Note that "petroleum" is a misnomer as there is no petroleum gas involved in this case. Pacific Power undertook three separate drilling programs near Stratford between 1993 and 1999, with drilling depths ranging from 444 to 895 metres. AJ Lucas Coal Technologies Pty Ltd (as the operator) and Molopo Australia Limited purchased the licence from Pacific in 2002, and began further exploration in August 2004.

The Stratford Methane Eruption of 2004

Molopo announced on 7th September that all tests had been halted after methane had erupted from a number of old boreholes in the area. At the time a strong gas flow of 280,000 cubic feet/day had been recorded even though the water level was still about 300 metres above the coal seams. Two and a half months later Molopo announced that test pumping of LMG-03 had resumed. Three boreholes from an earlier coal exploration had started producing methane, and these along with eight other boreholes had now been sealed with concrete, the company explained. The project manager explained in November that this accidental methane eruption had shown how good the lateral connections were in the reservoir.

This example shows that even with only a partial withdrawal of the hydrostatic pressure, methane will migrate quickly and in unpredictable directions.

The incident was an omen of the attitudes that were to become dominant. Lucas reported that the incident showed how productive the wells could be but no attention was given to the potentially dangerous outcomes of the eruption. Whether Lucas was unconcerned about the potential dangers or deliberately concealed them is not known. However, it seems clear that AGL would have been aware of these risks when it purchased PEL 285 from Lucas-Molopo in December 2008.

Lucas-Molopo Apply for Development

Lucas-Molopo applied for approval of the concept plan in 2008 covering the three components that make up the total project. The project was declared to be a Major Project under part 3A of the *Environmental Planning and Assessment Act 1979* on 21 May 2008 and thus subject to determination by the NSW Minister for Planning. *This decision removed the community's rights to a merits review of both the concept plan and the stage 1 project approval.*

The project consisted of three separate but interdependent components;

1. Gas Field Development - gas wells within the Field Area;
2. Central Processing Facility – compression and treatment works;

3. Gas Pipeline – high pressure pipeline from Stratford to Hexham.

The *Gloucester Coal Seam Gas Project Concept Plan and Preliminary Assessment Report* was prepared for Lucas-Molopo in July 2008.

The Director-General, Department of Planning, issued the project's Environmental Assessment Requirements (EARS) in August and October 2008, with further supplementary EARS issued in October 2009.

The AGL Purchase of the Lease

AGL Energy Pty Ltd purchased PEL 285 from Lucas-Molopo in December 2008 to be operated by its related company AGL Gloucester LE Pty Ltd. That company commenced a core hole drilling program in 2009 and claimed that high gas contents were confirmed for all of the 18 holes.

AGL noted the need for the controversial Hydraulic Fracturing, *fracking*, process from this early time, but softened the potential impact by noting on the AGL website that 'AGL has found hydraulic fracturing to be a valuable method for increasing gas flow'. Later statements by AGL indicate it was always known that fracking is an essential part of the extraction process. This arises because of the valley's complex fractured geology which is unsuited to under-reaming.

AGL conducted seismic exploration in 2009 and 2010 to gain a better understanding of the valley's geological structure. Comment from independent sources is that seismic exploration is a part of the process only and that extensive drilling is necessary if some critical aspects, such as conductivity between strata, are to be understood.

The AGL Environmental Assessment

AGL released an Environmental Assessment (EA) of the project in November 2009.

In response to the EA, the BGSPA prepared an extensive submission to the Department of Planning in January 2010. This was one of 147 submissions received. The Alliance submission raised a number of concerns, which included water, health, flood impact, air quality, noise and vibration, heritage, socio-economic impact, cumulative impact and the failure to address the principles of Ecologically Sustainable Development.

NSW Office of Water (NOW) recommended against concept approval for individual bores or determination of volumetric limits for bores until such time as the conceptual hydrogeological model referred to in the Submissions Report was completed and NOW had determined its adequacy.

The Director General's strongly pro-development Environmental Assessment Report *Major Project Assessment: Gloucester Gas Project*, which was based on the AGL Environmental Assessment, was released in November 2010.

On 21 December 2010, the Deputy Director-General of the Department of Planning referred the concept plan and the project application to the PAC for determination. The terms used in the letter to the PAC are interesting - the PAC is requested to "consider" the DG's Report, and "having considered, approve . . ."

The PAC recommended that the Gloucester Coal Seam Gas Project be approved with conditions said to strengthen environmental safeguards on 22 February 2011.

The Alliance's Court Challenge

The BGSPA instigated a judicial review of the decision. This was a review of the legality of the decision not a merits review.

The Decision was challenged on the grounds of uncertainty and the failure to consider principles of ecologically sustainable development. Firstly, the Alliance argued that certain conditions imposed in relation to both groundwater and wastewater in the project approval left open the possibility of a significantly different development from that for which approval was sought and were therefore *uncertain*. Secondly, The Alliance argued that the PAC failed to consider properly the *precautionary principle* in respect of the project approval. The case was heard by Justice Pepper in the Land and Environment Court on 18-20 October 2011 and judgment was delivered on 27 August 2012.

The Court dismissed the claim, stating that the conditions imposed in relation to the project were within the permissible limits of Part 3A, were not uncertain with respect to impacts and that the precautionary principle was adequately considered by the PAC in granting the project approval.

The Court stated that there is no common law principle that an exercise of statutory power must be certain or final in order to be valid. The Court also stated that a condition would only be invalid because it lacks certainty or finality if it falls outside the class of conditions that the statute impliedly or expressly permits. Ambiguity or uncertainty in the meaning of words will not necessarily lead to invalidity.

Comment on the Decision

Under Part 3A, proponents are not required to complete detailed studies before approval to ensure that a project adequately mitigates the risks of CSG production. In this case the plans for dealing with saline water and impacts of the project on the groundwater and hydrogeology required significantly more investigation. Despite that the project was approved and the conditions of approval require further water studies to be done prior to work commencing. This is problematic because the EP & A Act does not enable the Minister for Planning to revoke or modify an approval or the conditions attached to it should the studies or work on the project reveal significant environmental risks or impacts.

In approving the use of "adaptive management" (we will fix any problems after we discover them) the court has effectively reversed the onus of proof regarding the precautionary principle. Instead of the Proponent having to show the project is safe the critics have to show that it is not.

The Position As At September 2012

We continue to oppose the AGL Project as critical matters were not given due regard in the environmental assessment process and in the approval process. The key reasons are:

1. The amount of discretion given to all approval bodies and all parts of the approval process for coal and coal seam gas projects is excessive and fails to give due weight to environmental and social factors.
2. The failure to apply the principles of ecologically sustainable development and the failure to consider the cumulative impacts of nearby development.

3. The risks inherent in the fracking process, the removal of the moratorium on the fracking process by the New South Wales Government and the high level of fracking that will be necessary in the Gloucester Valley as being a matter of considerable concern.

Despite further limited studies by AGL the position remains that nothing less than a fully independent and expert hydrology study of the total project area is required.

AGL Pushes Ahead

Investigations and preliminary work continued during the time awaiting the court decision. The Phase 2 Groundwater Investigations: Stage 1 Gas Field Development Area were finalised and published in January 2012. A review of Aspects of Phase 2 by Pells Consulting, prepared for the Alliance in February 2012, was critical of this report.

An 'Independent peer review' of the groundwater studies was undertaken by Dr Richard Evans of consulting firm Sinclair Knight Merz was completed in May 2012. That review made 24 recommendations and until those recommendations are addressed one must serious question the credibility of the study.

Groundwater investigations are continuing and AGL is currently investigating sites for water monitoring to the north of the Stage 1 area and plans to commence drilling towards the end of 2012. Irrigation trials have been approved with conditions and AGL expects to undertake this work over summer 2012-2013. Negotiations regarding the Hexham pipeline are progressing and are claimed to be 80% complete. AGL will commence an aeromagnetic survey of the Stage 1 area in late 2012.

AGL has confirmed that fracking will be used. The hours of drilling and the resultant intrusion, particularly noise, is a matter of concern.

The Future - The Changing Law

The AGL project concept plan and Stage 1 project were approved on 22 February 2011 under the Part 3A. Part 3A was repealed on 1 October 2011 and replaced by the new Division 4.1 provisions of Part 4 of the EP&A Act.

Stage 1 will continue under Part 3A approval. However Part 3A ceases to apply to the future stages for which an application has not been made, thus the subsequent two stages will be assessed under the new Division 4.1 provisions of Part 4. Future stages approved under Part 4 must be approved in a manner that is generally consistent with the existing approval under the concept plan.

Water

Natural situation

The geology, topography, water, soils and vegetation of the Gloucester Stroud area is complex and many of the interactions are not well understood. The impact of mining on these is even less certain. Coal and CSG mining will affect the Gloucester/Barrington (particularly the Avon) and the Karuah River systems (particularly the Mammy Johnsons River).

Surface Waters

The Avon River at the junction with Waukivory Creek (at the northern boundary of AGL Stage 1) is characterised by generally low to moderate flows but with high discharges following rain. However, upstream of the junction the flows are ephemeral with zero flow for 75% of the year. This location is the site of the AGL water processing plant and potential discharge point. It is also the discharge point for surface water diversions from the Stratford mine. The GRL proposal would discharge into the Avon River in the vicinity of the junction with Waukivory Creek.

Stages 2 and 3 of the AGL proposal would occupy land in the Karuah, Barrington and Gloucester River catchments.

Groundwater

There are three basic aquifer systems in the area, however the complex geology makes distinction between these aquifers difficult in some areas.

- Shallow alluvial aquifers 2-20m deep, interacting with the surface water systems, fresh to brackish water quality, suitable for human and livestock consumption and irrigation.
- Shallow bedrock aquifers 0-50m deep containing brackish to saline water whose quality depends on the rock type and presence of coal seams.
- Deep bedrock aquifers with a very low primary porosity and permeability. Joints and fractures impart a secondary or fracture permeability to the rock mass. This groundwater is saline and alkaline in quality and generally not suitable for human or agricultural use.

CSG Impacts on Water

Based upon the quality of produced water from the pilot wells, AGL states that produced water would require treatment prior to appropriate disposal. This would result in a waste stream of salt (e.g. concentrated brine, crystalline waste, etc), which would require disposal.

Impact on Groundwater

The impact of withdrawing gas and water leads to a depressurisation of the aquifer with unknown consequences. Some modelling has been undertaken by mining companies but the accuracy of this is questioned by experts and even by the approval authority. Further research is required.

However, AGL considers that the lowering of groundwater levels is expected to predominantly affect the deep bedrock aquifer, and as this aquifer does not have any beneficial use in the vicinity of the Project area, adverse impacts are not expected on other water users. They believe that water from the other aquifers will not move into the deep bedrock aquifers but this is difficult to prove.

Groundwater Quality

Any cross contamination of water between aquifers as a result of the pressure difference caused by gas extraction will affect the quality of the receiving water. As this will generally be higher quality water flowing into the lower aquifer the problems should be minimal. However, there is the potential for chemicals from the fracking process to move out of the coal seam aquifers and contaminate groundwater in aquifers being used for human and environmental purposes.

Project Approval 3.7 states that the Proponent shall ensure that no fracking fluids containing Benzene, Toluene, Ethylbenzene and Xylene (BTEX) chemicals are used in gas field development. Whether any other potentially dangerous compounds will be used in fracking is not clear.

Current Knowledge and Approvals

There is evidence from operating CSG fields in other locations of groundwater contamination through boreholes. Many aspects of this are unknown; certainly not known in the Gloucester Basin.

Project Approvals 3.8 and 3.9 states that prior to the commencement of construction the project, the Proponent shall in consultation with Office of Water update the conceptual hydrogeological model developed during the assessment stage of the project. This will include assessment of the potential for drawdown and displacement of shallow rock and alluvial beneficial aquifers plus minimising the risk of gas migration.

AGL has undertaken a range of further studies and hired Dr C Evans to review the work to date. His study conclusions are:

In general the conceptualisation presented in the early 2012 report is broadly considered to be appropriate, and the fundamentals of the conceptual model are reasonable but need to be supplemented by further investigation programs.

In some instances it is considered that the study has drawn inaccurate conclusions from the data, drawn conclusions which cannot be substantiated based on the available data/current level of analysis, or omitted some work which would improve conceptual understanding. These generally fall into categories of: connectivity between deep and shallow systems, recharge and discharge processes, characterisation of vertical hydraulic conductivity and specific improvements that can be made to the conceptual model, including a water balance.

It is apparent that not all available information has been used to develop the conceptual model, and incorporation of additional data will enhance the current conceptualisation.

There is currently insufficient information available to characterise the hydraulic behaviour of faults within the project area and extra investigations are required.

His review has not identified any issues which necessarily indicate the project represents a high or unacceptable risk from a hydrogeological impact perspective.

Dr Evans made 24 recommendations to AGL to improve the modelling and these include:

- assessment of hydraulic behaviour of faults and conceptual modelling,
- investigation of the nature of stream-groundwater interaction over the recharge areas.
- development of a natural and developed water balance, and
- additional analysis of hydraulic conductivity data, including assessment of vertical hydraulic conductivity

Dr P Pells was engaged by community groups to analyse the AGL report and the Evans Review. A summary of his report is as follows.

Pells accepted the facts derived from the study as they were provided and went on to analyse if the scope of the facts was adequate and if the interpretation was accurate.

Pells considers that the facts presented are not adequate because:

- They investigated only 0.25% of the total area (7% of Stage 1) in a region of acknowledged complex geology that is highly faulted and of various ages and origins.
- Most of the data came from only 10 months of monitoring
- Only rainfall data from 1976 to present was used when it is available from 1889. Some of the big flood events and dry periods were just ignored.
- There is no mention in the model of the quantity or quality of the water produced during the life of the project nor how it will be stored.

Pells went on to analyse their model and in his opinion the model is oversimplified to the point of being quite inadequate.

- It only contains 4 layers in a multi-layered geology and it does not include any geological faults in a highly faulted region.
- Even if he was to accept their model with these limitations, it does not lead to the stated conclusions.
- So even if their assumptions are true the conclusions are flawed.

The conclusion of the AGL report and the Evans Review was that there is no evidence of connectivity between shallow and deep groundwater flow. In Pells' opinion neither the data studied nor the modelling done support this conclusion.

AGL stated in May 2012 that it will undertake the studies recommended by Dr Evans so that the proposed numerical modelling can be a robust and reliable assessment of long-term impacts. However, it is unclear how AGL's further modelling will be developed and how peer reviews will be undertaken so that the community can have confidence in the process and the conclusions

Both of the independent reviews of the AGL modelling (Evans and Pells) have a high level of agreement that the conceptual modelling is inadequate because

- The hydrogeology has been over-simplified and not all available data has been used.
- There is currently insufficient information available to characterise the hydraulic behaviour of faults within the project area.

- A water balance has not been included and flooding issues have been ignored.
- There is no analysis of the cumulative impact of the existing and proposed open cut coal mining in the same area.

Clearly Project Approvals 3.8, 3.9 and 4.1 have not yet been adequately addressed.

Impact on Surface Water

Disposal of produced water will have a major impact in the Avon catchment.

Quality

AGL's preferred option stated in their proposal is that produced water be treated by Reverse Osmosis desalination in order to provide treated water for other downstream uses as and that the residual saline brine from the water treatment process would be further evaporated to a solid waste for appropriate disposal. The extent of salt production depends on quality and quantity of the feedwater. At a flow of 2 ML per day and TDS of 2000 mg/L, for example, up to 4 tonnes of salt per day would be produced.

The purchase and use by AGL of 'fresh' water by buying irrigation licences to dilute the produced water should be prohibited as it is not a sustainable use of a scarce resource.

Quantity

With AGL's preferred process of treating the processed water and then making it available for downstream users, there will be changes in the hydraulic regime of the Avon and Gloucester Rivers.

Modelling by AGL of well water production has indicated that for Stage 1, produced water could average of 2 ML/day. If this is released into the Avon River (as high quality water) it will have limited impact in periods of naturally high river flow (100-1000ML/day) after rain but for most periods when there is low natural flow (1-10ML/day) it will have substantial impacts on river flow.

The proposed 65ML of storage is only adequate to store 30days' water and therefore unsuitable for Gloucester's climatic variability and the potential for mechanical problems in water treatment.

Prior to any construction, AGL has to develop an Extracted Water Management Strategy that addresses all aspects of water quality and quantity as well as water and salt disposal processes.

Open-cut Mine Impacts on water

There are 2 mining sites within the area of Stage 1 of the CSG/AGL project and 1 to the south.

Stratford Coal Existing and Proposed Extension

The Stratford Mine Complex extension application involves continuation of open cut mining for a further 11 years until 2024 by the extension of current pits and construction of two additional pits.

Current Knowledge from Stratford Coal

The majority of water used on-site is in coal washing and recovery of water for re-use in the washing plant is the single largest component of the overall water supply system. On average the site has operated in surplus with more water on average being yielded from the mine and mine infrastructure catchments than has been needed in supply for the mining and processing operations.

Management of this excess water has been by way of containment in dams and pits and historically controlled release to Avondale Creek under an Environment Protection Licence. Modelling indicates that the risk of spill is very low over the remaining mine life. Experience with mining at Stratford to date indicates that the groundwater aquifers contained in the coal seams are generally confined and that drawdown effects are localised in nature.

There is no assessment in the Preliminary EIS of any cumulative impacts of the AGL project that occupies the same land and must impact on these water issues.

Duralie Mine Extension

The approved Project involves the continuation of open pit mining operations at the Duralie Coal mine (DCM) and extends the current operation until the end of 2021.

Water management includes:

- continued beneficial use of excess water through development of new irrigation areas ;
- permanent re-alignment Coal Shaft Creek adjacent to the existing DCM mining area; and
- a Project water management system that does not include off-site controlled mine water release to the Mammy Johnsons River.

Duralie Surface Water

The main structures for clean water management are an extensive clean water diversion drain that intercepts runoff from the catchment above the mine and delivers the clean water to Coal Shaft Creek. Diversion of Coal Shaft Creek undertaken in 2003 will remain in place until the creek can be re-established at the conclusion of mining.

There is only minimal requirement for process water on site (e.g. for dust suppression and fire fighting). The Duralie site operates under a no-discharge policy. However, the Water Balance study indicates that there is a net water gain of 173ML/year into the main Dam and this is 10% of its capacity per year. About 450ML/year is used in on-site irrigation to reduce dam water levels.

There are 8 sediment control dams on site and a recent audit shows that half of these dams overflow at least 4 times a year. This is an unsatisfactory situation resulting in pollution within the site and indicating that dam design and operation needs to be improved.

A recent external audit of the site indicates that revegetation methods are not consistent with best practice and the short-term result is not adequate.

Duralie Ground Water

The shallow alluvial groundwater system in which the Mammy Johnsons River sits, is hydraulically disconnected from the deeper groundwater system.

The DCM open pit acts as a groundwater sink and groundwater nearby flows towards the pit. Dewatering of the deeper groundwater system by mining is not expected to

affect the shallow alluvial groundwater system of the River. The Groundwater Assessment modelling in the EIS concluded that there would be negligible effect on the Mammy Johnsons River.

Current Knowledge from Duralie Studies

It appears that there will be two major unknown issues at the end of mining as is stated in the EIS:

Following cessation of mining in the Weismantel Extension open pit, the remaining final void would be used to store mine water. At the end of the Project, the Clareval North West open pit would also store water. Post-mining, the final voids would continue to fill until an equilibrium level is reached. The results of the water balance for the final voids indicate that, post-mining, the two pit voids would become an integrated pit lake after 40 years and void water levels would continue to rise until an equilibrium level is reached in 120 years.

The proposed design for the post-mining alignment of Coal Shaft Creek would include reconstructing a meandering channel over the in-pit waste rock emplacement;

Both of these major engineering changes to the landscape and hydrology will have unknown consequences. The rock filling of the voids will have unknown characteristics and hence the impact on void volume and re-aligned stream flow will be unpredictable. There are too many assumptions over 40 years and ridiculous over 120 years.

GRL Proposal

Four open cut pits are proposed and their approximate depths are 60m – 180m. This means that all pits are operating well below the level of the Avon River (and the Gloucester River). These pits will intercept natural groundwater and change the hydrology of the area.

At maximum production, water usage on site is estimated at 500ML PA and GRL proposes that these would be met through:

- capturing surface and groundwater within the open cut pits with the required licences; and
- water “recovered” from Waukivory Creek and/or the Avon River within the limitation of the Applicant’s existing or purchased licences. *This is not recovered water; this is water that the mine takes out of the river system and hence is not available for agriculture.*

Rocky Hill Surface Water

GRL has identified two surface water issues:

- Alteration of natural surface water flows within the site and surrounding local catchments as a low risk issue affecting quantity of flows. On site storage and usage could also impact on groundwater recharge. *This effect will occur and therefore it is not a low risk: it will happen and natural stream and creek flows will be altered.*
- Reduction of the surface water quality in the surrounding local catchments as a medium risk due to contamination from salinity, turbidity and acidity from process water during mining and coal washing. *This effect will occur and therefore it is not a medium risk: it will happen*

Some overburden samples and all coal seam material has an elevated total sulphur content and will produce acidic leachate and runoff. Water quality testing within and around the proposed site indicates that the waters are already above national guidelines for salinity, total dissolved solids, iron and turbidity. *This mining activity will make the situation worse.*

Rocky Hill Groundwater

GRL has identified two groundwater issues:

- Alteration of natural groundwater flows within the site and surrounding local area as a medium risk issue because the mine pits intersect 60-100m of ground water that will collect in the pit and have to be pumped out and disposed of into the surface water system. *This effect will occur and therefore it is not a medium risk: it will happen and there will be less groundwater in the downstream aquifer and more in a creek or river.*
- Reduction of the groundwater quality in the surrounding local area as a low risk because some contaminated water could seep into the aquifers around the mine site. *This effect will occur and therefore it is not a low risk: saline, turbid and acidic produced water will be stored in earthen dams while waiting to be treated or disposal during periods of high river flow.*

GRL says that the key groundwater management issues will relate to the management of groundwater inflows into the open cuts from the alluvial aquifer or loss of base flows to Waukivory Creek or surrounding groundwater users. A detailed hydro-geological model is currently being prepared that will enable each of the above impacts to be established. *There is no indication in the GRL report of how this model will link with the AGL model or in fact if the two models will be compatible even though they overlap physically.*

Cumulative Impacts of All Mining and Extraction

None of the EIS documents really quantify any cumulative impacts and their modelling does not contain this as a substantive factor.

Surface water risks include the potential for:

- increased turbidity/sedimentation from earthworks, watercourse crossings, pipe lines, haul roads and other surface disturbance activities;
 - increased salinity of surface waters and detrimental impacts to surrounding vegetation; and
 - temporary and permanent diversion/alteration of natural drainage patterns.
- Groundwater risks include the potential for:
- dewatering of shallow aquifers;
 - increased aquifer permeability as a result of the fracturing and removal of groundwater;
 - reduction in stream (base) flow if dewatering of the alluvial and shallow aquifers; and
 - leakage of saline water from surface storages.

Water Management and Impacts

Many of the mining/extraction approvals require the development of water models and water management strategies prior to commencement of, or during, operations. It is important that BGSPA/GRIP/Council/CMA are able to review these as part of the approval process through the Dept. of Planning.

Health

The impacts involve both mortality (deaths) and morbidity (disease and disability). Morbidity is both acute episodes of illness (e.g. asthma and cardiac arrhythmias) and chronic damage (e.g. Chronic Obstructive Airways Disease [COAD] and strokes from cerebral arteriosclerosis) where damage accumulates over time.

Dust and Chemical pollutants

This section mainly refers to coal mining present and proposed however CSG may become a contributor to these risks.

Dust causes multiple types of health damage depending on both the different sizes of particle and the different chemical contents of those particles. Dust is produced from overburden and coal in extraction, processing, transportation and rehabilitation.

Mechanical processes tend to result in coarse PM 10 (Particulate Matter 10 Micron) and very coarse sized particles PM 50. These cause loss of amenity such as depositing coal dust on house roofs, accelerating rusting through the sulphur content and coating washing on the line. PM 10 particles can enter the upper passages of our lungs exacerbating already existing conditions such as COAD.

Additionally for those with domestic rainwater tanks the acidity from the sulphur, nitrogen oxide blast gases and diesel fuel combustion products cause release of lead and copper from roofing and plumbing. In the Macquarie University study of 101 tanks mostly within 5km of a mine they found 16% of tanks had drinking water with a lead content above the maximum advisory level and a further 16% with health endangering levels of copper.

Incendiary processes such as working diesel machinery and blasting result in fine PM 2.5 and ultrafine PM 0.1 particles. These fine particles can get into the lung tissue, between the cells like bacteria. There the particles set up inflammatory reactions which release chemicals into the blood supply which narrows fine blood vessels causing strokes, heart attacks, diabetes and reduces the birth weight of babies. Ultra-fine particles, like viruses get inside cells where they can damage genes and lead to cancers and mutations.

PM 2.5 and PM 0.1 particles are like cigarettes, there is no absolutely safe level and the higher the dose the higher is the risk. If you live near a mine, on average, your life expectancy is reduced. The very young, the elderly and the chronically sick are at greatest risk.

Dust is suppressed mostly through spraying water on haul roads, stockpiles and rail wagons but this method is less effective for fine particles. Coal from Duralie is transported unwashed in open rail wagons for 20km to the Stratford washery. Dust escapes both from the top of the wagon and the bottom where it is unloaded.

The National Pollution Inventory lists the chemicals that each mine emits that are toxic. Stratford coal mine (2010-2011) reported 24 toxic substances. These emissions include 29kg lead, 0.4 kg mercury and 6.9kg polycyclic aromatic hydrocarbons from burning diesel which all cause brain damage; also 8.4kg arsenic and 19,000kg volatile organic compounds such as BTEX which are carcinogenic. These tend to cause damage which accumulates over time. Additionally the following particles: PM 10 760,000kg and PM 2.5 19,000kg (guestimate). Amazingly despite the Stratford mine now having been operating for 17 years no Health Audit has been done to record the health of potentially affected people such as in Stratford village

who are within 1.5km of the mine and who will be within 1.0km under current proposals.

We know from several studies on schoolchildren in the UK that asthma rates start to escalate above the background rate if you live within 5km of a mine and at 1.5km the rate has tripled. A survey of those living within 5km of a mine or within 200meters of the rail line revealed approximately 50% of respondents believed their health had been damaged by mining. Asthma causes people to wake from sleep as well as the obvious breathing disturbance.

The compressors in the AGL CSG Central Processing Unit close to Stratford school will be emitting volatile organic compounds and noise, as will the pumps for each well. These will have a cumulative health impact with coal mining health impacts yet each project is assessed in isolation. The height of folly is seen where gas wells have been projected in the mine site of Rocky Hill mine.

The geography of our valley, a narrow basin with mountains on both sides, is a partially enclosed valley that holds the dust particles within. Meteorologist, Martin Babakhan, would expect the walls of the valley to redirect much of the dust back to the centre of the valley multiplying the impact of the particles and also to increase the temperature inversions.

Noise

The loudness, frequency, character and duration of noise are all factors that influence the stress that noise causes. Noise travels further when there is a temperature inversion at night.

The decibel scale is logarithmic giving deceptive impressions about relative loudness. A rise in 3 decibels doubles the sound energy. For example 123 decibels is twice as loud as 120. A rise of 15 decibels at night is likely to wake you from your sleep. A noisy coal train can easily do this especially when braking or accelerating or going uphill. Similarly, large mining vehicles can do this. The government regulators put a downward limit of 30 decibels even if the true ambiance may be as low as 20 decibels, this permits many noises that waken people from sleep to be within approved limits.

Frequent wakening will cause sleep deprivation which results in stress chemicals being released with raised blood pressure and cardiac arrhythmias. It causes emotional disruption and impairment of concentration and learning the next day and triggers behaviour problems in children. School performance is impaired. Sleep disturbance is often a cumulative result from both dust-induced asthma and sudden noise increases of more than 15 decibels.

Noise of higher frequencies is transmitted through the air and is reduced by insulation. Low frequency noise (below 60 Hz) is transmitted more through solids and is not suppressed by insulation. It can travel through a hill and re-emerge the other side. Below 20 Hz it becomes too low for many of us to hear and is called infrasound. The vibrations/sound waves are still occurring and having a stressful effect on electrical transmission in our brains. Our tissues don't like to be constantly vibrated.

Low frequency noise can be at the natural wavelength for causing resonance in an enclosed space such as a room. The sound technicians record outside, and not inside the house where resonance may be making the sound louder. They discount noise under 60Hz. Mine machinery often has its maximum loudness at these low frequencies and additionally is of an impure character that humans find unpleasant. A birdsong of a similar decibel level may not be distressing. This aspect of noise is ignored. A sudden bang (such as from a mine blast) can be very stressful, particularly if the

accompanying vibration causes the house to shake. This can cause bricks to crack, pictures to be dislodged etc. It is not unusual for people to get panic attacks triggered by mine blasts. It is unheard of to receive compensation for such medical problems. Problematic sound extends further than problematic dust.

Blasting results in noise and vibrations and if the explosive is wet, or impure old diesel is being used, very toxic nitrogen oxide fumes are released. No monitoring of these blast gases is required by current legislation.

Both noise and dust regulations are under review but don't hold your breath because dust has been 'under review' for more than 2 years. In the US they have regulated about PM 2.5 levels for 15 years and they have had dramatic improvements in health impacts as a result but Australia prefers to ignore this evidence.

Psychological Stress

Research into the psychological pain caused to individuals, who are attached to their landscape and grieve for the loss of that loved landscape (which gave them solace), has attracted the label 'Solastalgia'. Indigenous persons are particularly distressed by disturbance of their country. This contributes to feelings of depression. People feel overwhelmed and powerless at the hands of enormous mining companies. They feel helpless and hopeless. They have to abandon plans they made for the future.

In Gloucester some people were told their new house was located in the council's environment protection zone but were never told the Department of Planning could over-ride these promises of protection signed off by another minister. Similarly the Department of Planning over-rides the warnings of the Health Dept. Exploration areas lead to houses losing their value and plans may have to be put on hold for many years when a mining company has been given a 20 year life on some exploration area.

The community becomes divided by the riches a few get from a house sale in a critical area or employment in a mine. The majority don't share those riches and non-mining businesses suffer by having employees attracted elsewhere. These stressors cause some new cases of depression and anxiety but most frequently cause the re-emergence of past psychological disturbances that had become dormant but are re-activated by chronic stress.

Water Contamination

The Stratford Mine and the proposed Rocky Hill Mine and Stage 1 of the Gloucester Gas Project have all been located in the Avon River water catchment area of MidCoast Water. Damaged aquifers from both open cut coal mining and the drilling and fracking of gas wells have already been found to cause toxic deep aquifers to mix with much cleaner surface aquifers in some locations. Contaminated water has potential to poison humans, stock and native animals. The voids of Stratford and Duralie mines are in danger of leading to acid mine drainage for many decades and toxins will travel through fraced rocks.

Elsewhere at Tara QLD, nosebleeds and skin lesions have been reported. In areas where there has been contamination of water by fracking chemicals used in CSG extraction it has been noted that many are endocrine disruptors causing sexual abnormalities and increased obesity.

Lack of Health Assessment for Community

In response to community concerns about health damage from mining dust the Alliance has organised lung function and blood pressure testing to be performed by two volunteer nurses trained by the Asthma Foundation. This commenced in December 2012 and is available to those living within 5km of an existing or proposed mine, or within 200metres of the rail corridor. In future sleep quality assessment may also be added.

Miners are medically examined before they are employed and only the healthy get employment. This provides a baseline measurement of their lung and cardiac function. They are re-examined regularly. They only stay in the high risk zone for 40 hours per week. They are paid high wages as initial compensation for unhealthy work and then if health damage occurs they can get further compensation from a Dust Diseases Tribunal. Community members living close to a mine are not examined initially to see if they are in a high risk group. They may be in that high risk zone for 168 hours of the week. No compensation tribunal exists for them. Many suffer chronic health damage. Some die. Very few ever receive compensation for damaged health.

We plan to offer potentially affected residents a package of non-invasive tests including lung function testing, the Pittsburgh Sleep Quality Index, oxygen saturation and blood pressure prior to mining starting at Rocky Hill Mine. This threatens an additional 1200 people, or more, in Gloucester not currently living within 5km of a mine. We believe an air quality monitor should be sited in either the Hospital or High School grounds which are both within 5km of the proposed mine and an additional monitor in Forbesdale estate only 1km from the mine.

Specific Risks of Coal Seam Gas

The health impacts of CSG have not been properly assessed yet. Professional medical bodies such as Doctors for the Environment of Australia are unanimous in warning against proceeding with mining until a systematic program of health impact assessment has been completed. Locally in just the early exploration phase we have seen explosions from gas migrating from fraced exploration wells into old coal and water bore holes and we have seen a local farmer report bubbles coming through puddles on his property on rainy days. If gas was coming through the surface into a shed or other enclosed area there would be a great safety risk from an explosion. Well casings are not perfect in all cases (approximately 5% failure rate) and all have a limited lifespan.

Global Warming and Health Costs

It is accepted scientifically that the carbon dioxide from burning fossil fuels and the fugitive methane emissions from CSG mining are both accelerating global warming. We are already seeing a significant increase worldwide from infant diarrhoea and parasitic illnesses because of that effect. In Australia dengue fever, malaria and Murray Valley encephalitis are all on the increase because of mosquitos moving south from the tropics due to such warming.

When these effects are added to the health costs from mining and generating electricity the health costs from coal exceed \$8billion. Coal Royalties in NSW are \$1.2billion/year with \$20million coming from the Gloucester Coal Basin.

Heritage

Recognition of the Cultural Heritage Landscape

A number of individual buildings and structures within the Stroud-Gloucester Valley have been recognised for some years as having heritage significance at the NSW local or State level. As a result, they have been entered onto the respective local environmental plans and onto the State Heritage Inventory or the State Heritage Register.

However, the Stroud-Gloucester Valley as a cultural heritage landscape has not been entered onto any official heritage list or register despite being recognised as a landscape of heritage significance at the local, State and National level for many years.

Heritage Status as at September 2012

The Stroud-Gloucester Valley is listed by the National Trust of Australia (NSW). This revised assessment was completed in late 2011 and defines the valley as extending from near Booral in the south to near Barrington in the north. The other nominations made over approximately thirty-six years have not resulted in any formal statutory listing for the valley.

The nomination made by the National Trust of Australia (NSW) in 1976 for entry on the register of the National Estate expired approximately four years ago because full assessment was never undertaken and the Register was closed in favour of the National Heritage List.

The nomination made in 2011 for assessment in the 2011-12 or 2012-13 assessment periods for entry on the National Heritage List has expired because the Valley was not considered to be a priority for assessment. The Alliance was invited to resubmit the above nomination for assessment in the 2013-14 assessment period and this will be undertaken in the very near future.

A nomination for entry on the NSW Heritage Register was made to the NSW Heritage Office in July 2012 and we await advice concerning that.

Heritage and Land Use and Development

The valley's heritage significance is completely compatible with its current land uses of agriculture, horticulture, grazing, tourist development, life-style settlement and light industry. The valley's scenic-heritage qualities underpin its tourism, agriculture and life-style settlement and thus underpin its economic base and its way of life.

The heritage significance is not incompatible with mining as such, and mining has coexisted reasonably successfully to date. However, under existing environmental assessment procedures the proposed large-scale development of coal and gas mining is not compatible and threatens to destroy the valley's way of life. The issue from a scenic-heritage consideration is that these qualities should be given due weight in the environmental assessment process, not the token, cover-up processes that have marked the recent environmental assessments. These environmental assessments have been well padded with comprehensive 'expert' input but have failed to properly identify the valley's scenic-heritage qualities and attach due weight to them.

It is a concern that environmental assessments fail to include the cumulative impact of a proposed development when combined with existing and planned land uses. Scenic-heritage impact manifests itself by the increasing scarring of the landscape, both in regard to localised views and the broader scenic vistas, combined with the damage to other environmental and social qualities and the visual impact of the supporting infrastructure.

Ecologically Sustainable Development

A major deficiency (among the many) in the present environmental legal/planning process is the failure to assess the principles of ecologically sustainable development. In that respect, two sub-principles need mention.

The Precautionary Principle

Assessment of the precautionary principle requires that the threat of serious or irreversible damage to be identified and to have corrective measures put in place before the development proceeds. However, the present legal-planning approach is to place an unreasonable level of proof on those identifying and quantifying threats and to allow developers to attempt corrective measures after problems arise.

While it is true that environmental assessments over the past decades have increased their content in both the detail and the issues assessed, the current interpretation of the precautionary principle effectively emasculates it and leads to environmental assessments being made using pre precautionary principle standards.

Principle of Intergenerational Equity

The principle of intergenerational equity states that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. This is an overarching principle and its application to the valley's coal and gas industries is obvious when issue such as water quality, air quality and social amenity are considered. The Principle clearly can also be applied to the valley's scenic-heritage qualities although that approach receives little support in planning-legal areas. However, if we acknowledge the extent of opinion that the valley has heritage significance at the local, state and commonwealth levels, the destruction of that significance would breach the principle of intergenerational equity.

Summary

The valley's scenic-heritage significance is a vital component of Gloucester's social and economic development. These qualities underlie its sense of place, its social structure and its traditional economic base of agriculture, tourism and life style settlement. Unless the evaluation of proposals for new industries includes a proper level of environmental, social and economic assessment the valley's special qualities will be irretrievably lost.

A Sustainable Vision

There is a major conflict in regional development in NSW. Big businesses, including mining companies, strip wealth from regions. They do this by transferring the inherent value of production to those who transport, process, and market the production, and those who own the company. In most cases these people do not live in, or even near the source of production.

Mining exacerbates wealth stripping by not compensating communities for the full cost of its impacts. Miners are not required to compensate residents for falls in property values, physical and mental health problems and a range of pollutions. Mining can also severely affect traditional regional industries such as agriculture and tourism. These impacts are largely ignored and may last forever.

Vision

In the Gloucester region we still have a clear choice:

A continuation of laissez faire development of extractive industries which take from our community, with little genuine compensation for their true immediate costs or consideration of their cumulative or long term impacts.

OR

A coordinated and strategic approach to Regional Economic Development focussed on industries that are capable of providing regional and national wealth indefinitely and that do not preclude future land use options.

Our vision is for a vibrant community based on industries that capitalize on our natural strengths – our scenic beauty and natural heritage, our benign climate, our reliable water, our agricultural heritage, and our proximity to major population centres.

This combination of advantages is restricted to a few places in Australia. These places offer the potential for an alternate approach to regional economic development based on agriculture, tourism, recreation, services and smart industries. This development of this potential is incompatible with the current approach to mining in NSW.

Regional Food Production

Gloucester is well positioned to develop a regional economy founded on food production. Our climate, water availability, soils, proximity to major markets, land values and agricultural knowhow are all in our favour. Agriculture in Gloucester is also likely advantaged by climate change. The Gloucester Project (TGP) has recognized the local potential for agricultural development. TGP has received substantial State financial support for its regional economic development approach based on agriculture.

TGP's strategy is based on the premise that more localised economies generate significantly more regional economic and employment growth than the globalized approach of modern large businesses. This premise has been clearly demonstrated in other places.

To date, TGP has developed a demonstration market garden, run certified education courses, and developed a grass-roots grower's network that includes over 50 individual growers. Sixteen of these growers are already selling produce and looking

to develop their commercial potential. TGP was also a founding force behind the successful Gloucester Growers market, the Gloucester Garlic Growers cluster, and is developing an integrated system of food growing, marketing, sales and distribution based on high value horticultural produce.

Tourism and Recreation

The Gloucester region's tourism value is directly linked to our scenic value and natural and agricultural heritage. Gloucester is the closest town to the Barrington Tops and has long been considered the Barrington Tops "basecamp". The World Heritage listing of the Tops almost 30 years ago consolidated this unique position. The National Trust has also listed the Vale of Gloucester as a 'significant heritage landscape.'

Domestic overnight tourism is now worth over \$30 million annually to Gloucester. This figure increases by \$15-\$20 million if day-trippers are included. Our region has a strong skew to nature-based holidays: 3 times the NSW state average for camping, 3 times the state average of picnics and 2.5 times the state average for bushwalking/rainforest walks.

Tourism is a sustainable industry. It provides employment and growth for regions like Gloucester. Tourism currently employs over 220 people. At least one local operator is celebrating 30 years of adventure tourism in the region. Our region's scenic beauty and natural landscapes are essential to Gloucester's tourism draw. Any development or activity that threatens these also threatens our tourism businesses.

The regional development solution proposed by TGP is a perfect fit with food tourism - the latest trends in experience-based travel. This trend was recognized by Essentially Barrington, a group of Gloucester farming and food businesses that has been bringing thousands of tourists a year to Gloucester for the last 10 years. Food tourism is identified in Gloucester's Community Strategic Plan as an opportunity for our Shire. Gloucester also hopes to contribute to the NSW Government's target of doubling overnight tourism expenditure by 2020.

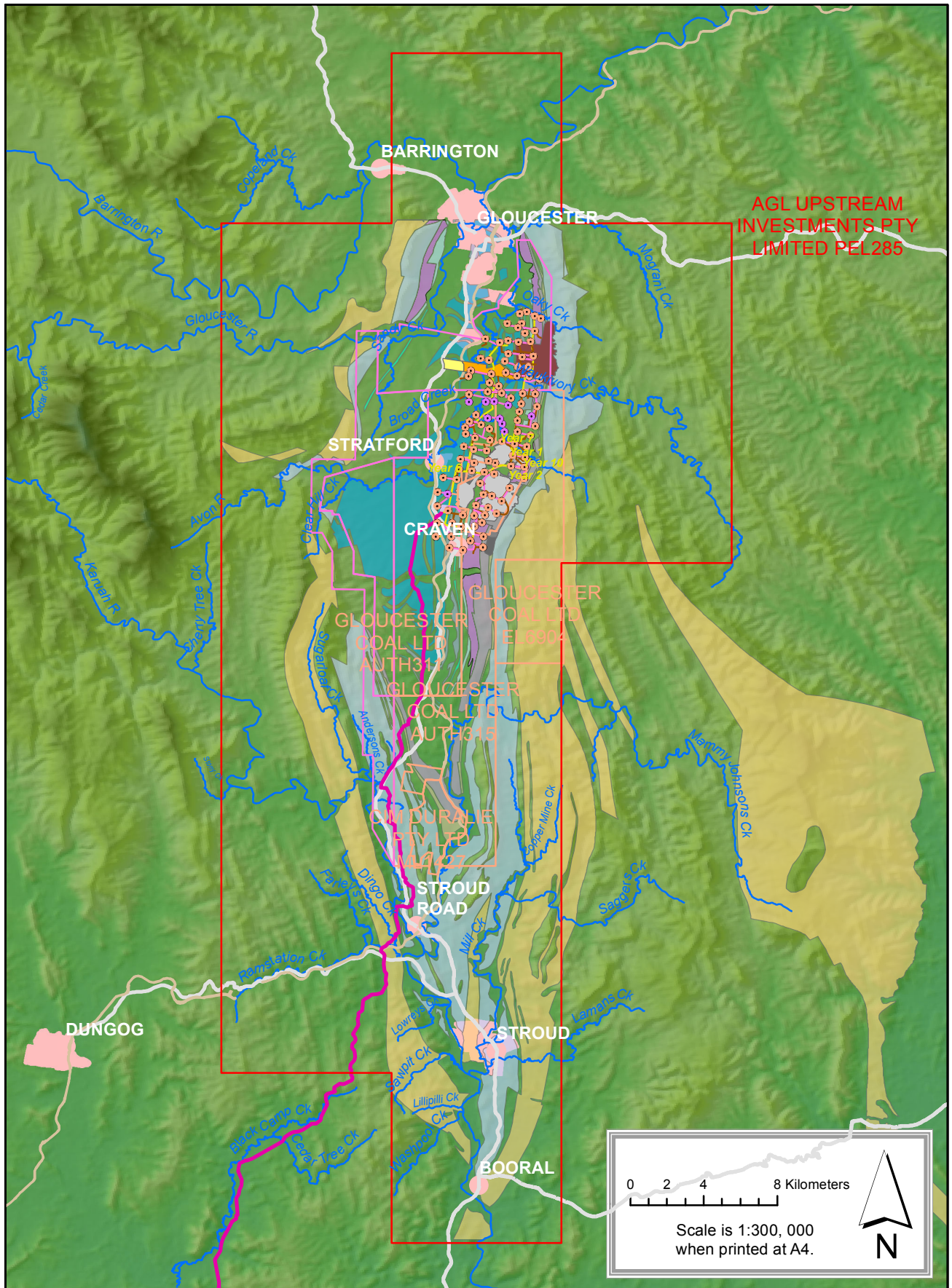
Smart Industries and Services

Gloucester already has significant services and industry sectors. Combined, the services, government, health, manufacturing and building sectors provide 56% of Gloucester's employment. A number of significant light industrial businesses are based in Gloucester. By contrast, employment in current mining activities (including Yancoal's existing open-cut operations) provides just 5% of local employment.

Industry and services are thriving in Gloucester without mining. Mining may provide a short-term boost to some industry and service businesses. However, there are already indications that mining companies will source much of their employment, industrial and services needs from outside Gloucester. Should they do this then the local boost will be muted. Any such boost will only occur for the life of the mines.

A Sustainable Gloucester

In Gloucester, there is a viable economic alternative to laissez faire mining developments. We can take a strategic view and preserve, and develop, our sustainable options. We can grow our regional economy. We can do all of this without mining. Yet with mining, perhaps none of it will be possible.



Coal and Gas Extraction in the Gloucester - Stroud Valley