



NSW GOVERNMENT
Department of Planning

***MAJOR PROJECT ASSESSMENT:
Camden Gas Project
Concept Plan - Expansion of Stage 2***



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

July 2008

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Cover photograph of EM11 gas well courtesy of AGL

EXECUTIVE SUMMARY

AGL Gas Production (Camden) Pty Ltd (AGL) has sought concept plan approval for general works and activities within Stage 2 of the Camden Gas Project to expand gas production. The concept plan proposal includes the construction and operation of 4 new wellfields, new infill wells within existing wellfields, and a range of associated infrastructure to produce gas.

The concept plan does not seek approval for the construction and operation of the proposed works and activities, nor does it identify the location and number of wells. The concept plan establishes the criteria which would guide the identification and planning of future wells and associated infrastructure for the expansion of Stage 2 of the Camden Gas Project.

The Camden Gas Project is a major coal seam methane project in south western Sydney, near Camden and Campbelltown. The Project extracts methane gas from the Illawarra Coal Measures of the Central Southern Coalfield.

The Stage 2 area of the concept plan is located in the Menangle, Menangle Park, Camden Park, Spring Farm and Gilead localities, to the south east of Camden and south of Campbelltown in the Camden, Campbelltown and Wollondilly local government areas. Stage 2 of the Camden Gas Project consists of approximately 50 operating methane gas wells, a gas treatment plant (Rosalind Park Gas Plant) and associated gas gathering and water lines and access roads.

The concept plan proposal is classified as a Major Project under Part 3A of the *Environmental Planning and Assessment Act 1979*, and consequently the Minister for Planning is the approval authority for the concept plan.

The Department exhibited the Environmental Assessment of the concept plan between 26 September and 29 October 2007, and received 8 submissions, 6 from public authorities and 2 from the general public.

The public authorities did not object to the concept plan. The submissions from the general public commented on the proposed Mount Gilead wellfield on the Mount Gilead property. The submissions raised a number of issues related to the impact of gas well development on the property's existing and future uses. One submission objected on the basis of these issues and the other submission requested that future applications consider these issues.

The key issues identified during the Department's assessment of the concept plan were noise, flora and fauna, heritage and hazards and safety. AGL has prepared locational guidelines to assist in determining the location of wells and infrastructure to minimise impacts from the construction and operation of the proposed works on the on the environment and community in the concept plan area.

The proposal would provide economic and social benefits for the State by increasing the supply of natural gas to the Sydney market, injecting significant capital investment to the local and regional economies and creating construction and operational employment opportunities.

Consequently, the Department believes the concept plan for the expansion of Stage 2 of the Camden Gas Project is in the public interest and should be approved, subject to conditions.

1 BACKGROUND

The Camden Gas Project (CGP) is a major coal seam methane project in south western Sydney, which involves the extraction of coal seam methane gas from the Illawarra Coal Measures of the central Southern Coalfield. The CGP is located to the south of Camden and Campbelltown in the Camden, Campbelltown and Wollondilly local government areas (see Figure 1).

AGL Gas Production (Camden) Pty Ltd (the proponent) operates the CGP on behalf of the joint venture partners, AGL and Sydney Gas (Camden) Operations Pty Ltd.

Stage 1 of the CGP was approved in 2002 and initially comprised 28 gas wells, a gas treatment plant and gas gathering system in the Cawdor area.

Stage 2 was approved in June 2004 and initially comprised 43 gas wells, a gas treatment plant at Rosalind Park and gas gathering systems, in the Menangle and Menangle Park areas. Stage 2 has subsequently been expanded with additional gas wells and gas gathering systems, and currently has approval for 104 wells in 9 wellfields.

AGL now proposes to further expand Stage 2 of the CGP by seeking concept plan approval for the construction and operation of 4 new wellfields, new infill wells in the existing wellfields and a range of infrastructure such as gas gathering and water lines, access roads and use of the existing infrastructure to produce gas.

AGL has also lodged a project application for the development of new wells in Spring Farm and Menangle Park in accordance with the proposed concept plan. The project application is subject to a separate assessment process under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act)

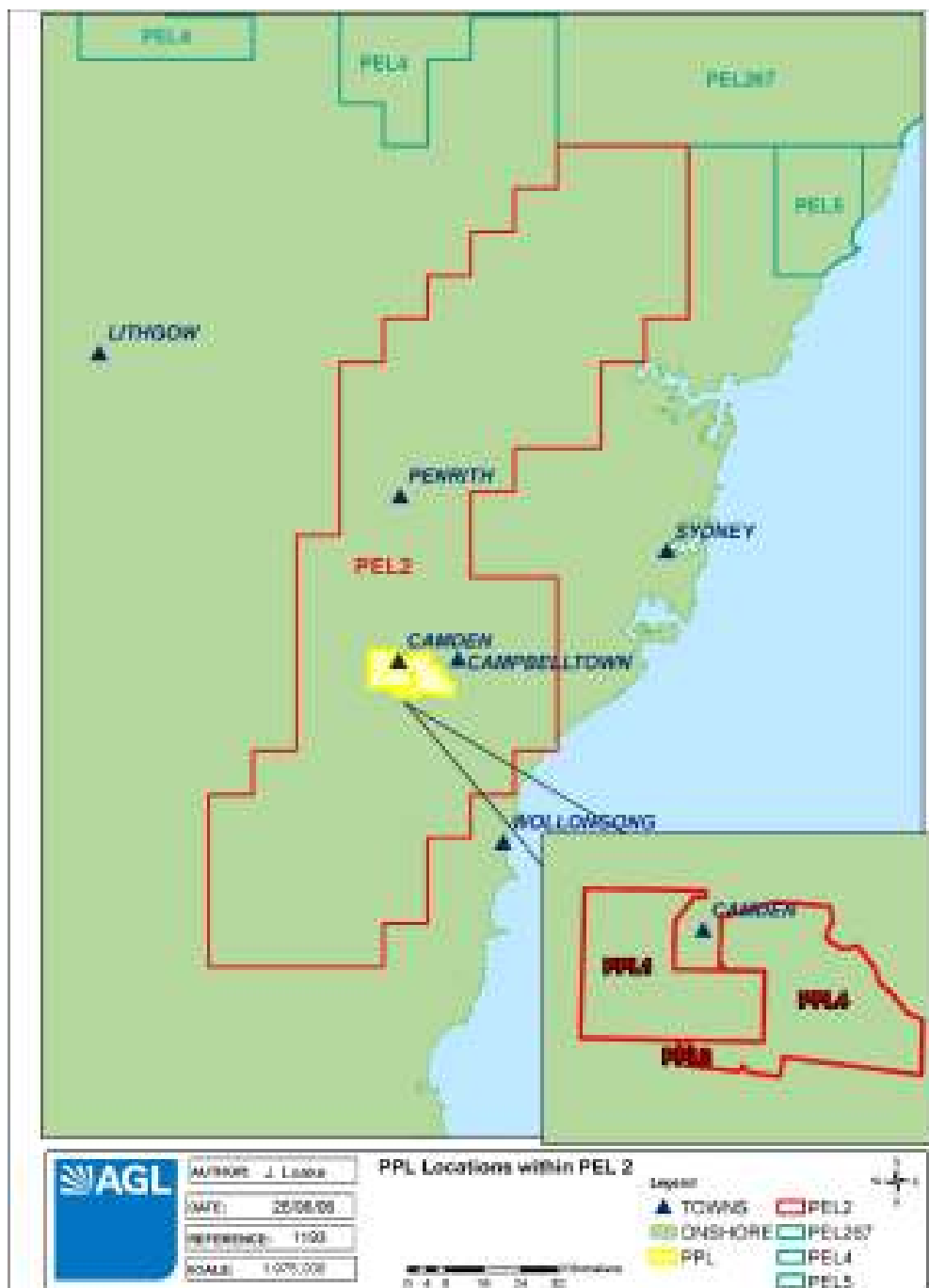


Figure 1 – Regional Context

On 7 October 2005 the Minister required Sydney Gas to submit a concept plan for the remainder of Stage 2 of the CGP. The concept plan would provide a strategic framework for future gas development and provide certainty to landowners and the community.

2 PROPOSED CONCEPT PLAN

2.1 Concept Plan Description

AGL is seeking concept plan approval for works and activities which may be implemented to enable further gas production within Stage 2 of the CGP. The boundary of the Stage 2 area for which concept plan approval is sought is shown in Figure 2. The exact location of new wells and supporting infrastructure is not known at this stage (pending geological and gas reservoir investigations, environmental constraints and land access agreements with landowners). This level of detail would be provided as part of subsequent project application(s).

AGL has developed locational principles which would guide the location of future wells and associated infrastructure within the concept plan area.

The works and activities for which the concept plan seeks approval include:

- drilling of wells in 4 new wellfields (Spring Farm, Menangle Park, Mount Gilead and Kay Park II, see Figure 3) and in-fill wells in existing wellfields;
- construction of new gas gathering and water pipelines and access roads, and upgrading (twinning) existing gas gathering lines;
- connection of new wells to the gas gathering system and the Rosalind Park Gas Plant;
- fracture stimulation of new and existing wells across all wellfields;
- installation of in-field compression in the vicinity of wellheads or along gas gathering lines;
- operation of the new wells and infrastructure, and production of gas; and
- closure and rehabilitation of the land.

AGL states that a variety of drilling techniques may be used in the concept plan area. These include:

- under- and over-balanced vertical drilling;
- directional drilling; and
- surface to in-seam (SIS) or horizontal drilling.

Each well surface location may have up to 6 co-located SIS wells.

A copy of the Environmental Assessment (EA) of the concept plan is contained in Appendix E

2.2 Project Setting

Land uses in the concept plan area are generally rural and rural industrial (extractive industries, coal washery, waste disposal), with residential development occurring along the north western, northern and north eastern boundaries. Scattered pockets of residential development occur at Menangle Park and Menangle villages.

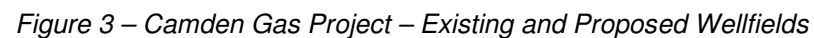
Key infrastructure in the concept plan area includes:

- Main Southern Railway Line and Glenlee spur line;
- F5 South Western Freeway;
- local roads including Menangle Road, Woodbridge Road and Remembrance Drive;
- Upper Canal Water Supply system which transport drinking water between the Upper Nepean Dams and metropolitan Sydney;
- Moomba-Sydney and Eastern Gas pipelines which transports natural gas to the Sydney market;
- Elizabeth Macarthur Agricultural Institute – which contains the State's Centre of Excellence for Animal and Plant Health; and
- recreational facilities such as Mount Annan Botanic Garden and Menangle Park Paceway.

A number of heritage items of State significance (including Camden Park and the Elizabeth Macarthur Agricultural Institute, which are associated with early European development of agriculture in Sydney) are located in the concept plan area.



Figure 2 – Concept Plan Area



2.3 Project Need

AGL has identified a significant gas resource in the Sydney Basin which is held within the coal seams of the Illawarra Coal Measures. The technology required to extract and produce the coal seam gas has been in operation overseas (particularly the USA) for many years but until now has had limited application in Australia.

AGL has used coal seam methane extraction technology locally to develop the CGP and believes that, based on the history of operation of the CGP since 2002, that they can develop a viable and cost-effective local natural gas supply for the Sydney market. Natural gas usage in NSW is expected to increase from the present 140 petajoules (PJ) per year to about 230 PJ a year by 2015, which would place additional pressure on existing suppliers. Australia's future natural gas supplies and production is expected to be depleted by 2019 (except the Gippsland Basin which has significant reserves), therefore it is essential that current supplies are supplemented from additional sources sooner rather than later.

AGL considers that the CGP is able to provide a competitively priced gas supply for the Sydney market, because:

- it has demonstrated that the CGP provides an alternative supply of natural gas which is close to the State's major natural gas market of Sydney;
- the Moomba-Sydney and the Eastern Gas pipelines which deliver natural gas to Sydney runs through the CGP; and
- the design and operation of the project can be integrated with existing and future land uses in the area..

The CGP currently produces about 3PJ of gas a year from about 50 operational wells. The Rosalind Park Gas Plant, which processes the gas from all wellfields in the CGP, has approval to produce a maximum of 14.5PJ per year. At peak production the gas output from the CGP would be equivalent to 10% of Sydney's current gas usage, or about 6% of the expected 2015 gas demand. Future expansion of the CGP would enable AGL to operate the Gas Plant at the design capacity.

The majority of NSW's energy needs are derived from the combustion of coal, which produces high levels of greenhouse gases. Natural gas (including coal seam gas) produces around 55% of greenhouse gas emissions per gigajoule of energy relative to coal. Although natural gas costs more per gigajoule than coal, it is a more efficient fuel, so the supply of gas from the CGP would reduce the dependence on more greenhouse gas intensive fuels. AGL considers the extraction of coal seam gas would produce lower greenhouse gas emissions than the use of other fossil fuels, therefore the expansion of the CGP would increase the use of cleaner fuels and reduce greenhouse gases.

AGL considers the expansion of the CGP would increase the supply of natural gas to the Sydney market and provide a safe and efficient natural gas supply close to the State's largest natural gas market.

3 STATUTORY CONTEXT

3.1 Petroleum (Onshore) Act 1991

The exploration, assessment and production of coal seam gas is regulated under the *Petroleum (Onshore) Act 1991* (the PO Act). The PO Act requires that development consent be in force over the land before a production lease is granted. Production of gas in Stage 2 of the CGP is carried out under existing Petroleum Production Leases, PPL 1, PPL 4 and PPL 5. Under these leases, AGL is permitted to produce gas provided the gas wells have development consent (project approval). AGL would be required to obtain a new PPL should the approved well or its drill path (above or below surface) extend beyond the boundary of an existing PPL.

Under section 69A of the PO Act the holder of a prospecting title (includes an exploration licence and assessment lease) is required to enter into an access arrangement with the landowner for prospecting operations. Under section 107 of the PO Act the holder of a prospecting title (including production lease) is liable to compensate the owner of any land that is affected or likely to be affected by any operation undertaken under the PO Act.

AGL states that the proposal would be undertaken in accordance with existing access arrangements with the landowners, or where there is no agreement, one would be negotiated with the landowner prior to work commencing. The location of wells and other infrastructure on the land would be negotiated with the landowner.

The matter of access to land and the payment of compensation is a requirement under the PO Act and is not a matter for consideration under the EP&A Act.

3.2 Major Project

Under *State Environmental Planning Policy (Major Projects) 2005*, the concept plan proposal is classified as a Major Project as it involves development for the purpose of drilling and operation of coal seam methane wells in the local government area of Camden, Campbelltown and Wollondilly. Consequently, Part 3A of the EP&A Act applies to the concept plan and the Minister for Planning is the approval authority.

3.3 Concept Plan Approval

On 7 October 2005, the Minister required a concept plan for the future expansion of Stage 2 of the CGP. AGL has lodged a concept plan which seeks approval for works and/or activities which may be implemented to enable further gas production within Stage 2 of the CGP. The detailed design and development of the proposed wells and associated infrastructure would be subject to future project applications under Part 3A of the EP&A Act.

3.4 Permissibility

The CGP is characterised as a “public utility undertaking” under the *Environmental Planning and Assessment Model Provisions 1980* (Model Provisions). A public utility undertaking is defined as:

“any of the following undertakings carried on or permitted or suffered to be carried on by or by authority of any Government Department or under the authority of or in pursuance of any Commonwealth or State Act:

(a) railway, road transport, water transport, air transport, wharf or river undertakings,

(b) undertakings for the supply of water, hydraulic power, electricity or gas or the provision of sewerage or drainage services,

and a reference to a person carrying on a public utility undertaking shall be construed as including a reference to a council, county council, Government Department, corporation, firm or authority carrying on the undertaking.

AGL is the holder of a Petroleum Production Lease over the concept plan area under the PO Act, which gives AGL the exclusive right to conduct petroleum extraction operations in and on the land in the lease. Consequently, as the concept plan proposal is for works to be carried out by a corporation for the primary purpose of the supply of gas authorised under the PO Act, the proposal falls within the definition of a public utility undertaking under the Model Provisions. Although the Model Provisions were repealed on 30 September 2005, they still apply to environmental planning instruments that were made prior to the repeal date.

The concept plan area falls within 3 local government areas, the relevant environmental planning instruments are:

- Camden - *Camden Local Environmental Plan No. 121 – Spring Farm, Camden Local Environmental Plan No.46 and Camden Local Environmental Plan No.47;*
- Campbelltown - *Interim Development Order No. 15 – Campbelltown and Campbelltown (Urban Area) Local Environmental Plan 2002;* and
- Wollondilly - *Wollondilly Local Environmental Plan 1991.*

Under these EPIs, the land in the concept plan area is zoned rural, residential, special uses, open space or commercial. In these zones, public utility installations and utility installation are permissible with consent, consequently the Minister may approve the concept plan.

3.5 EA Exhibition

Under section 75(3) of the EP&A Act, the Director-General is required to make the Environmental Assessment (EA) for a project publicly available for at least 30 days.

After accepting the EA for the project, the Department:

- made the EA publicly available between 26 September and 29 October 2007:
 - on the Department's website;
 - at the Department's Information Centre; and at
 - Camden Council, Camden Library, Narellan Library, Campbelltown City Council, Campbelltown Library, Wollondilly Shire Council, Wollondilly Library and the Nature Conservation Council;
- notified relevant State government authorities, Camden Council, Campbelltown City Council and Wollondilly Shire Council by letter; and
- advertised the exhibition of the EA in the *Camden & Wollondilly Advertiser* and *Campbelltown & Macarthur Advertiser* newspapers.

The Department considers these actions satisfy the requirements in section 75H(3) of the EP&A Act.

3.6 Environmental Planning Instruments

Under section 75I(2) of the EP&A Act, the Director-General's report is required to include a copy of, or reference to, the provisions of any State Environmental Planning Policies (SEPPs) that substantially govern the carrying out of the project.

The Department has assessed the project against the relevant provisions of the following environmental planning instruments (see Appendix F):

- *State Environmental Planning Policy No. 33 - Hazardous and Offensive Development;*
- *State Environmental Planning Policy No. 44 - Koala Habitat Protection;*
- *State Environmental Planning Policy No. 55 – Remediation of Land.*

This assessment concludes that the project can be conducted in a manner that is consistent with the relevant requirements of these environmental planning instruments.

3.7 Objects of the Environmental Planning and Assessment Act 1979

Decisions made under the EP&A Act must have regard to the objects of the EP&A Act, as set out in section 5 of the EP&A Act. The Minister's consideration and determination of the concept plan must be consistent with the relevant provisions of the EP&A Act, including the objects of the EP&A Act. The objects of most relevance to the Minister's decision on whether or not to approve the project are found in section 5(a)(i), (ii), (vi) and (vii) of the EP&A Act. They are:

- (a) *to encourage:*
 - (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
 - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
 - (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
 - (vii) *ecologically sustainable development,"*

The Department has fully considered the relevant objects of the EP&A Act, including the encouragement of ESD, in its assessment of the project. The assessment integrates all significant economic and environmental considerations and seeks to avoid any potential serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences.

AGL has considered a number of alternatives to the proposal, including the alternative of not proceeding, and considered the proposal in the light of ESD principles. The Department believes the project would allow the orderly and economic development of the Spring Farm and Menangle Park

release areas, by the concurrent extraction of a significant natural gas resource and future development of the area to accommodate Sydney's future growth.

3.8 Statement of Compliance

Under Section 75I of the EP&A Act, the Director-General's report is required to include a statement relating to compliance with the environmental assessment requirements with respect to the project. The Department is satisfied that the environmental assessment requirements have been complied with.

4 CONSULTATION AND ISSUES RAISED

4.1 Submissions

During the exhibition period the Department received 8 submissions on the EA:

- 6 from public authorities (Department of Environment and Climate Change (DECC), Department of Primary Industries (DPI), Heritage Office, Mine Subsidence Board, Roads and Traffic Authority (RTA) and Sydney Catchment Authority (SCA); and
- 2 from the general public

The public authorities did not object to the proposed concept plan for Stage 2 of the CGP.

The two submissions from the general public related to the Mount Gilead property. One submission objected to the proposed Mount Gilead wellfield, citing concerns about impacts on Mount Gilead's heritage significance, existing farming operations, and future urban development, and water quality of Menangle Creek. The other submission requested AGL to reduce the number of wells on Mount Gilead, and that any environmental assessment for the proposal must consider the impacts of gas wells on the future urban development of Mount Gilead, heritage significance and agricultural uses

A copy of these submissions is in Appendix D.

4.2 Response to Submissions

AGL has provided a response to the issues raised in submissions (see Appendix C), as well as a revised statement of commitments. These have been made publicly available on the Department's website. The Department has considered the issues raised in submissions, and AGL's response to these issues, in its assessment of the concept plan.

5 ASSESSMENT

5.1 Urban Release Areas

The Metropolitan Development Program (MDP) is the Government's key program for managing land supply and housing. The MDP has identified Spring Farm, Menangle Park and Mount Gilead as future urban development areas in the South-West Growth Corridor of Sydney (see Figure 4). These release areas are expected to provide 3850, 4200 and 1340 housing lots, respectively.

Spring Farm was zoned in 2004 and Camden Council has adopted a development control plan to guide residential development. The planning of the Menangle Park release area is less advanced. Campbelltown City Council is currently preparing a structure plan and local environmental plan for Menangle Park, which is expected to be rezoned later this year, with residential development occurring in 3-5 years. Planning for the Mount Gilead release area has not yet commenced.

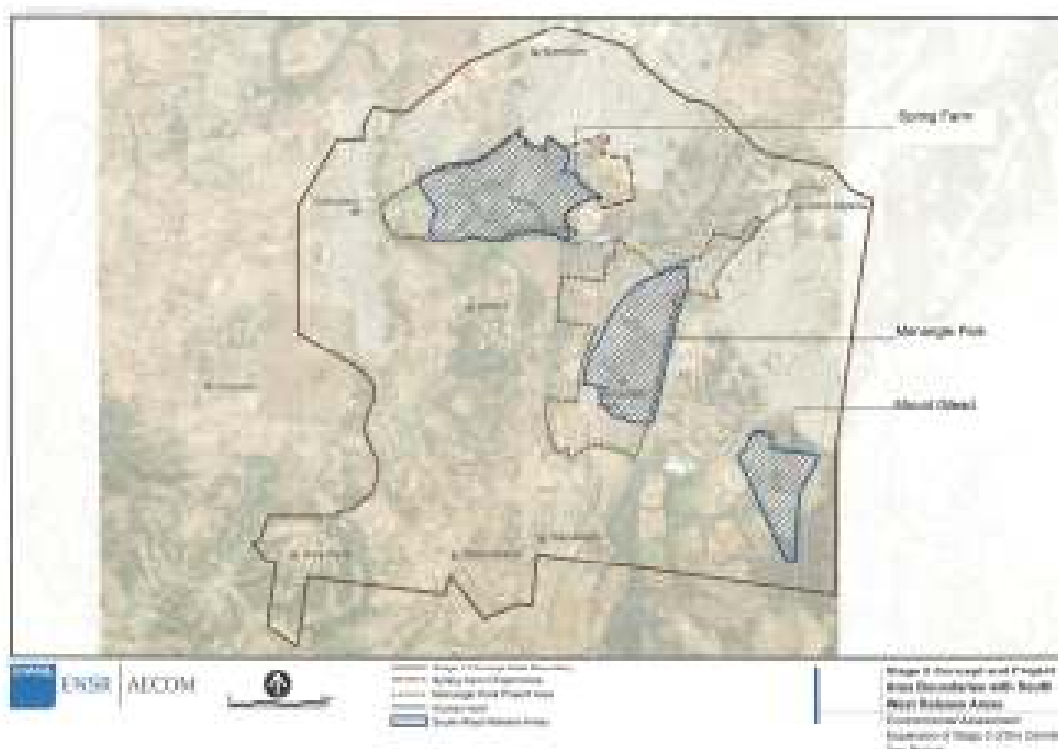


Figure 4 – South West Urban Release Areas

To minimise the potential impacts of the CGP on existing and future land use, AGL has developed principles to guide the design of wellfields in the concept plan area. Under these principles AGL would:

- consult with landowners to ensure wells and infrastructure can be sited to accommodate the primary land use;
- use SIS drilling technology and co-locate wells to reduce the number and footprint of the well locations;
- use an environmental envelope approach to assess well locations and gas gathering line and access road corridors;
- develop locational principles for future works in the concept plan area;
- complete construction prior to development of the surrounding land for urban purposes;
- co-locate up to 6 wellheads at a single well surface location;
- screen and revegetate well sites; and
- design the wellhead surface facilities to fit with the future land use.

The Department believes that the application of these principles would enable future works in the concept plan area to minimise impacts on the environment and reduce conflict with existing and likely future land use. The Department is satisfied that the future development of the three urban release areas would not be compromised by the co-existence of gas extraction and urban development. The Department recommends that the approval for the concept plan should include a condition that requires AGL to comply with minimum separation distances from various land uses.

5.2 Other Issues

The Department has assessed the environmental impacts of the project (see Table below) and is satisfied that the impacts of the project can be managed and/or mitigated to ensure an acceptable level of environmental performance.

Impact	Potential Impact	Mitigating Factors
Noise	<ul style="list-style-type: none"> • The construction and operation of the proposed activities within the Concept Plan area has the potential to generate 	<ul style="list-style-type: none"> • AGL states that the noise assessment of the Spring Farm and Menangle Park project would inform the potential noise impacts of the

	<p>noise impacts on nearby residences.</p> <ul style="list-style-type: none"> • The concept plan area is sparsely populated with predominantly rural and rural residential uses. • Part of the concept plan area has been identified for future urban development. AGL proposes to complete the construction of the gas infrastructure prior to urban development commencing. 	<p>proposed activities in the concept plan area. This assessment predicted the project would comply with the relevant DECC noise criteria.</p> <ul style="list-style-type: none"> • AGL would implement a number of noise mitigation measures to ensure compliance with the DECC's construction and operational noise criteria, including location, orientation or acoustical treatment of equipment and use of noise barriers. • Construction works and operation of the wells would be undertaken in accordance with an environmental management strategy. Noise monitoring would be undertaken to confirm compliance with the noise criteria. • Fracking is expected to generate high noise levels (up to 15 dB(A)), however the impact is not considered to be significant as it is a short term activity which is undertaken during the daytime and for a maximum of one day. • During the life of a well, a workover rig may be required to access the site for maintenance works periodically (usually once every 2 years). Although the workover work may result in elevated noise levels, the work is infrequent and temporary and occur during the daytime, • AGL has developed locational guidelines to inform the location of future well surface locations. Under these guidelines, AGL would: <ul style="list-style-type: none"> ○ locate wells to take into account distance to sensitive receivers, topography and meteorological conditions; and ○ consider the potential for noise impact and ensure noise minimisation measures are built into the project design. • AGL would undertake detailed noise assessments as part of future project applications for new wells in the concept plan area.
Water Quality	<ul style="list-style-type: none"> • The construction of gas infrastructure has the potential to impact on surface water quality. 	<ul style="list-style-type: none"> • AGL would undertake construction works in accordance with a soil and water management plan. • Drill cuttings and formation waters would be collected and stored in a drill pit or water tank, and clean and dirty water control measures would be implemented to ensure sediment laden waters are contained within the construction site. • AGL proposes to recycle formation waters for drilling and fracking activities. Water transport lines would be installed in the gas gathering line trench to transfer water to central locations for transfer to tankers for reuse or disposal to licensed wastewater facilities. • Gas gathering lines and access roads may require the crossing of a watercourse. AGL would design such crossings in accordance with DWE requirements. • AGL would rehabilitate construction sites following completion of the wells and trenching to reduce soil and water erosion impacts. • AGL's locational guidelines to minimise water quality impacts are: <ul style="list-style-type: none"> ○ to locate wells and infrastructure at least 40 metres from a watercourse where possible; and ○ avoid unnecessary disturbance to watercourses; • A comprehensive assessment of impacts on

		water quality would be undertaken for future project applications.
Hazards and Risk	<ul style="list-style-type: none"> The Department has developed guidelines for coal seam methane development, which recommend separation distances between various land uses and gas wells. Compliance with these guidelines would mean that people are not exposed to an unacceptable level of risk. AGL has updated the risk analysis to assess the risk of locating multiple wells at a single well surface location. 	<ul style="list-style-type: none"> The updated QRA recommended a separation distance of 20m between a proposed well site and residential/sensitive (hospital/school/aged care) development during early/intermediate operation and 15m from an established operation. The existing guideline for a single well recommends 10 and 5m, respectively. AGI states that wells that comply with these separation distances would have minimal impact on the specified land uses and would not expose people to unacceptable risk levels. The Department is satisfied with the risk assessment and recommends that AGL comply with the updated QRA in locating future gas infrastructure.
Heritage	<ul style="list-style-type: none"> There are a number of heritage items (State and local heritage significance) in the concept plan area largely related to the early European settlement and development of agriculture in the State. The location of gas wells near heritage items has the potential to impact on the heritage significance of the item or affect views to or from the heritage item. The construction of gas infrastructure has the potential to disturb/destroy Aboriginal archaeological relics and artefacts. 	<ul style="list-style-type: none"> AGL states that construction impacts on heritage items from construction vehicles and equipment is temporary and short term. Construction sites would be rehabilitated following construction and gas wellheads would be designed and constructed with materials and colours to be compatible with surrounding development. AGL would implement mitigation measures such as landscaping and planting to reduce line of sight views and locate wells to take advantage of screening by existing vegetation. AGL has prepared locational guidelines to take into account heritage issues in the siting of wells, which include: <ul style="list-style-type: none"> locate in areas which have been subject to previous disturbance, where possible; avoid heritage items and significant curtilage; and take into account significant views to and from heritage items. A detailed Aboriginal cultural heritage assessment and non-Aboriginal heritage study would be undertaken as part of a future project application. AGL would involve the Aboriginal community in the assessment of impacts on Aboriginal cultural heritage.
Flora and Fauna	<ul style="list-style-type: none"> The concept plan area has undergone extensive clearing from past and present land uses, including agriculture, residential, infrastructure and extractive industries. The remaining vegetation is largely fragmented and isolated from significant areas of remnant native vegetation, and is primarily located in the riparian corridor of the Nepean River and its tributaries and on steeper land. These include various endangered ecological communities (Shale/Sandstone Transition Forest, Cumberland Plain Woodland, River-flat Eucalypt Forest, Riparian Forest, Moist Shale Woodland and Elderslie Banksia Scrub). Although much of the remnant vegetation is degraded, it provides habitat for a range of native species. The construction of gas infrastructure has potential impacts on the removal/disturbance of native flora, 	<ul style="list-style-type: none"> AGL states that flora and fauna impacts can be minimised through the careful siting of well surface locations, gas gathering lines and access roads and by the implementation of mitigation measures. AGL has identified a number of mitigation measures, including: <ul style="list-style-type: none"> keeping the construction footprint to a minimum; avoiding the spread of weeds by ensuring vehicles remain on designated roads; and rehabilitating the construction footprint with endemic species following construction. AGL has developed locational guidelines to determine the location of wells in the concept plan area. These are: <ul style="list-style-type: none"> siting wells and associated infrastructure in areas which are cleared of vegetation or have been subject to previous disturbance wherever possible; avoiding areas of significant vegetation or potential habitat, including threatened

	fauna and endangered ecological communities.	<p>species, threatened populations and endangered ecological communities;</p> <ul style="list-style-type: none"> o avoiding further fragmentation/isolation of existing remnant vegetation wherever possible; o avoiding areas of riparian vegetation and other areas of identified environmental sensitivity wherever possible; o minimising creek crossings; and o choosing gas gathering routes and access roads which avoid further disturbance to areas of significant vegetation or potential habitat. <ul style="list-style-type: none"> • AGL would undertake a detailed ecological assessment in future project applications.
Air Quality	<ul style="list-style-type: none"> • Potential air quality impacts are largely construction related, such as dust emissions from exposed surfaces, movement of vehicles along unsealed roads, and equipment and vehicle exhaust emissions. 	<ul style="list-style-type: none"> • Dust generated by construction is considered to be potentially the most significant air quality impact, AGL considers dust impacts are not significant and temporary, and could be managed by the implementation of a range of mitigation measures. • AGL would implement an environmental management strategy to control dust emissions.
Odour	<ul style="list-style-type: none"> • Gas development has the potential to generate odour during construction from drilling activities (oxygenation of aquifer waters, venting of trapped natural gases and venting of methane gases), and during operation (venting of gas during well commissioning and accidental gas release). 	<ul style="list-style-type: none"> • AGL considers the potential for significant odour impacts is unlikely, based on past experience from similar operations in the CGP. • The need for venting of gas has been reduced as gas wells are connected to the gas gathering system early in the commissioning stage. • Odour impacts on surrounding residents are not considered to be significant given that the concept plan area is sparsely populated. However, part of the area is to be developed for urban development which would result in residences within 20m of a gas well. To ensure that there is minimal impact on surrounding residences, AGL would implement measures as part of its Safety Management System, to shut down the gas supply in the event of an accidental gas release.
Vibration	<ul style="list-style-type: none"> • The construction (drilling of wells and excavation/compaction activities) and operation (wellhead infrastructure) of gas wells may generate vibration impacts. 	<ul style="list-style-type: none"> • AGL states that the experience from construction and operation of the Camden Gas Project has demonstrated that vibration levels generated by construction and operation are minor and would not result in any damage to structures or disturbance to human comfort levels. • AGL states that vibration impacts are negligible as the concept plan area is sparsely populated and gas wells are generally located at least 200m from a residence. • As the construction of gas wells would be completed prior to the urban development of the release areas, AGL considers that there would be minimal vibration impacts on future residences in the release areas.
Traffic and Transport	<ul style="list-style-type: none"> • AGL states that the construction and operation of the proposed activities in the concept plan area would generate additional traffic movements. • Construction traffic generally involves heavy vehicles transporting machinery and equipment to and from the site, and construction personnel using light vehicles to access the site. The potential impacts are an increase in 	<ul style="list-style-type: none"> • AGL considers that traffic impacts are minor and temporary and would not have a significant impact on the local/arterial roads in the concept plan area. • AGL would implement traffic management measures to minimise impacts on traffic flows and routes. • AGL would use existing roads and access tracks where possible and implement traffic management measures when gas gathering

	<p>vehicle movements, need for additional access ways and vehicle movements in the work areas.</p> <ul style="list-style-type: none"> • A secondary impact is temporary disruptions to traffic flows from the installation of gas gathering lines in the road reserve. • Traffic movements during the production phase are associated with general maintenance and monitoring of well surface locations. 	<p>line installation occurs in the road reserve.</p>
Flooding	<ul style="list-style-type: none"> • Parts of the concept plan area are in the Nepean River floodplain, consequently there is potential for: <ul style="list-style-type: none"> ◦ localised disruptions to the flow of flood waters due to the presence of plant and equipment at well surface locations; and ◦ loss of containment of saline formation waters from drill pits during a flood event or following heavy rain. 	<ul style="list-style-type: none"> • AGL states that there would be sufficient warning prior to the occurrence of a significant flood event, which would enable mobile plant and equipment to be removed from the flood zone. • Wells are designed so that they can be safely submerged for an extended period of time with no risk to the environment or to the infrastructure. • The volume and quality of water in drill pits would be continuously monitored and bunding would be in place to minimise loss of saline water contained within the drill pit • The location of wells and infrastructure in the 1 in 100 year flood level would be managed through the implementation of Flood Management Plan.
Visual Amenity	<ul style="list-style-type: none"> • The landscape of the concept plan area is predominantly gently undulating land with several locally prominent ridges, including Razorback in the south west and Narellan Vale in the north east. The Nepean River flows the south near Menangle Village to the northwest near Spring farm. • Existing land uses are largely rural and rural-residential with residential development on the north western, northern and eastern fringes of the concept plan area. • The construction phase has the greatest visual impacts, in terms of the scale of the construction equipment, size of the construction footprint, type of construction activities and construction period. 	<ul style="list-style-type: none"> • AGL considers that the visual impacts of construction activities are of short duration and temporary. • AGL states that the visual impact of the project would be further reduced by the implementation of a number of mitigation measures, including: <ul style="list-style-type: none"> ◦ preparing and implementing a Landscape Management Plan; ◦ limiting earthworks, vegetation clearing and soil disturbance to the construction and operational footprint; ◦ maintaining existing vegetation where possible; ◦ implementing dust control measures during construction and operation; ◦ screening of well surface locations with fencing and landscaping where required; ◦ rehabilitating the well surface location and gas gathering lines to be consistent with the character of the surrounding land; and ◦ using materials for fencing or enclosures that would be integrated with the surrounding urban form where well surface locations are expected to be close to residential development.

6 RECOMMENDED CONDITIONS OF APPROVAL

The Department has prepared recommended conditions of approval for the concept plan (see Appendix A).

These conditions define the concept plan and sets out the requirements for determining the location of future wells and associated infrastructure (see Appendix B).

The Proponent does not object to the recommended conditions of approval.

7 CONCLUSION

The Department has assessed the EA, submissions and AGL's response to submissions, and is satisfied that the impacts of the proposal can be managed and mitigated to ensure an acceptable level of environmental performance.

The concept plan identifies a range of activities that may be implemented in new wellfields and existing wellfields to expand Stage 2 of the CGP. Although the concept plan does not identify surface well sites or infrastructure that would be upgraded, AGL would identify sites in future applications based on the locational guidelines established by the concept plan. These guidelines would provide a level of certainty to the community on the future location of the gas infrastructure and flexibility to AGL in determining the final location of future wells and infrastructure.

The concept plan project would provide economic and social benefits by setting the guidelines which would result in an increase in the supply of natural gas to the Sydney market and indirectly in assisting the State to reduce its overall greenhouse gas emissions.

The Department is satisfied that these benefits can be achieved without significant impacts on the environment or residences in the concept plan area. The Department believes the proposal would not adversely affect the future urban development of the urban release areas in the concept plan area.

Consequently, the Department believes the concept plan is in the public interest and should be approved subject to conditions.

8 RECOMMENDATION

It is RECOMMENDED that the Minister:

- consider the findings and recommendations of this report;
- approve the concept plan application, subject to conditions, under section 75O and 75P of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached concept plan approval (see Appendix A).

David Kitto
Director, MDA

Chris Wilson
Executive Director

Sam Haddad
Director-General