



***MAJOR PROJECT ASSESSMENT
Leafs Gully Power Project***

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979
August 2009

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EXECUTIVE SUMMARY

AGL Power Generation (NSW) Pty Ltd (the Proponent) has lodged a project application seeking the Minister for Planning's approval of the Leafs Gully Power Project. The relates to the construction and operation of a nominally 360 MW gas turbine power station and associated infrastructure on Leafs Gully Farm at Gilead in the Campbelltown local government area. The project application was amended in October 2008 to include the upgrade of the access road which occurs between the site and Appin Road via an existing Right of Carriageway. As a result of the amendment, the Director-General updated his Director-General Requirements for the Environmental Assessment on 24 October 2008.

The project application and Environmental Assessment were exhibited between 25 February and 24 April 2009. On 11 May 2009, the Proponent submitted its Response to Submissions Report for the project, including responses to issues that were raised in public submissions.

Public reaction to the project has been strong with some 481 submissions being received during the public exhibition period. Many of the submissions opposed the project based on issues including air quality and health, noise, site suitability and location, visual impacts and future land use concerns. The only support for the project was received from a number of Government agencies.

The Department has undertaken a comprehensive assessment of the technical merits of the project and considers that, the project can be both constructed and operated with acceptable environmental impacts and with the implementation of stringent environmental controls. Based on the Department's assessment, as detailed in this report, the Department recommends that the Minister grant full project approval to the project, subject to a number of conditions.

The Department has recommended a number of conditions of approval which have been carefully drafted to ensure that the project can be constructed and operated with minimal interference to the local community or the road users of the local road network. The recommended conditions of approval include on-going air quality monitoring, the requirement to meet stringent air discharge and noise limits, protection of the surrounding road network, securing a surrounding conservation area within a set timeframe, ongoing environmental auditing and reporting and maintaining open and transparent information for the local community.

The Department has also recommended restriction of any future potential expansion of the project through a condition of approval that requires the Proponent to demonstrate satisfactory performance of the project for a period of at least 12 months (following commissioning of the project) concurrently with the making of any application to expand the facility.

The Department considers that the project is required to meet the State's electricity peak demand requirements and therefore is in the public interest. The project is also strategically located within close proximity to two gas supply pipelines and a high voltage electricity transmission network that runs along the eastern boundary of the site.

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1. BACKGROUND

1.1 Location

Australian Gas Light Company (AGL) proposes to construct and operate a nominal 360 MW gas turbine power station at Gilead in the Campbelltown local government area. The power station is proposed to be a peaking plant for the purposes of supply of electricity during times of peak electricity demand in NSW and therefore would operate for up to 15 per cent per year. The power station, known as the "Leafs Gully Power Project", would comprise two gas turbines which burn natural gas sourced from existing pipelines located on the site. Construction of the project is expected to take between 18 and 24 months.

The project site is located on Leafs Gully Farm at Gilead, approximately 4.5 kilometres north-west of Appin and 14 kilometres south of the Campbelltown CBD in south western Sydney. The power station would be located on an area of less than 20 hectares within the 280 hectare site. The project site is bounded by the Nepean River to its west and by the Inghams Appin Broiler Complex to its south. The regional location of the site is shown on Figure 1.

The project site is owned by AGL and comprises Lots 101 to 105 inclusive in DP 716209. The access road between Appin Road and the project site is privately owned and comprises part of Lot 1 in DP 70208.

1.2 Previous Application

The Leafs Gully Power Project was previously the subject of Project Application MP 06_0117 which was for a plant of nominally 600 MW capacity, lodged with the Department on 5 April 2006. That project application was subsequently withdrawn in response to community concerns and the Proponent undertook a re-assessment of alternative sites for the project. The review of alternative sites determined that the Leafs Gully site is the most appropriate site in NSW for the power station project. A revised project application, which is the subject of this report, was lodged with the Department on 3 April 2008.

1.3 Surrounding Land Use

Leafs Gully Farm currently operates as a trotting horse breeding and training facility. The majority of the site is cleared and used for horse grazing and horse yards. There are four residences located on the site which are used by the owner of the trotting facility, the owner's family and an employee as well as farm building and a trotting track. A 330 kV high voltage electricity transmission network traverses the eastern section of the site as does the AGL Gas Networks Main Trunk Pipeline (AGLGN) and the Eastern Gas Pipeline (EGP). Access to the site is provided via a Right of Carriageway which connects the site with Appin Road.

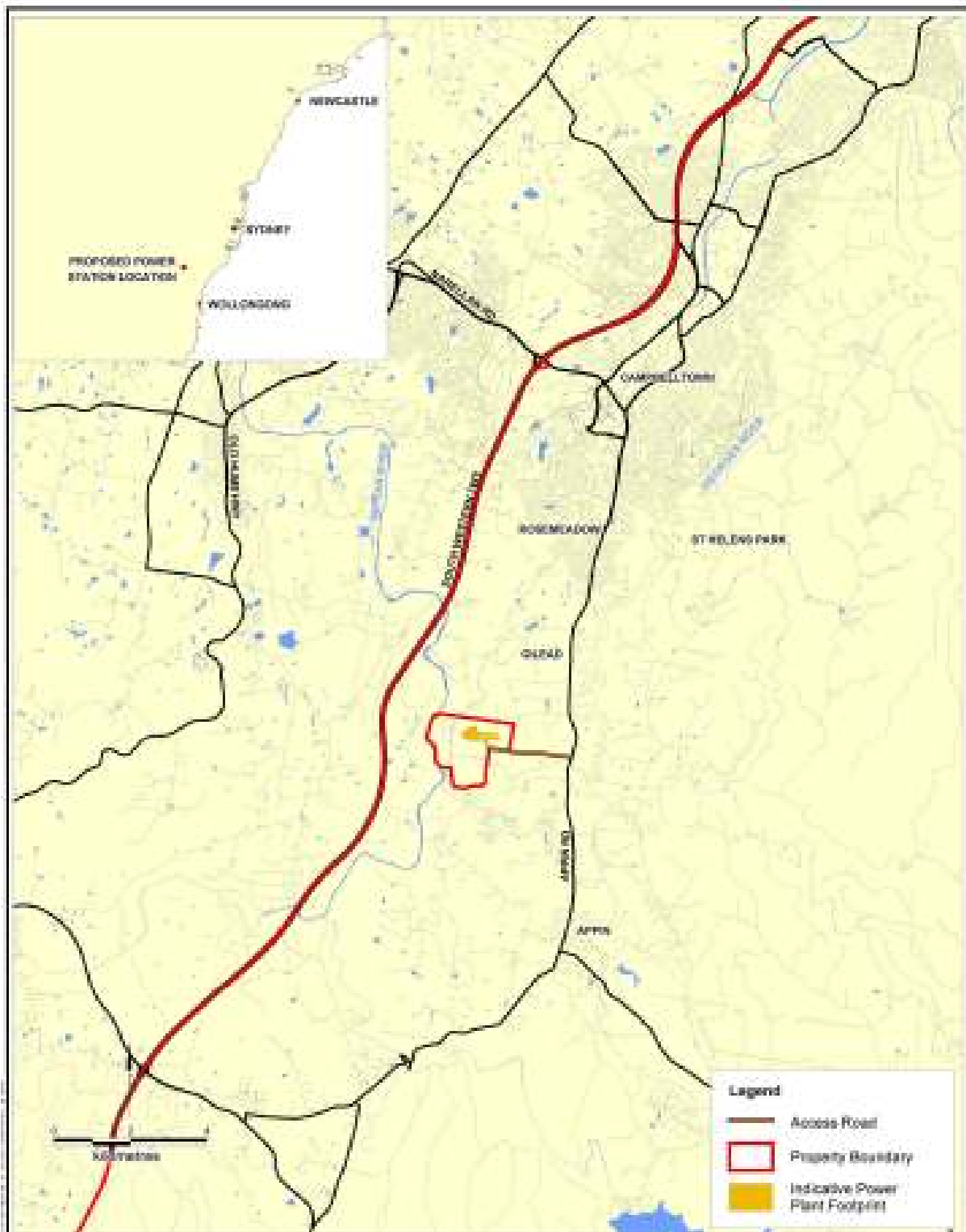
The nature of the site and immediate surrounds is shown on Figure 2.

The site is zoned Zone No. 1 Non-Urban Zone under the *County of Cumberland Interim Development Order No. 15* and the proposal is permissible within this zoning with consent. The majority of the land adjacent to the site is also zoned Non-Urban or Rural. The zoning of the site and the surrounding area is outlined on Figure 3.

Land use immediately surrounding the site comprises predominantly rural enterprises on medium size land holdings and smaller rural home sites ranging between two and ten hectares. Existing residential areas within proximity to the site south from Campbelltown include Rosemeadow (seven kilometres to the north), St Helens Park (seven kilometres to the north-east), Airs (10 kilometres to the north-east) and Menangle Park (five kilometres to the west).

The Sydney Metropolitan Strategy (2005) is a strategic document that outlines a vision for Sydney over the next 25 years. Within the south-western region of Sydney, the Strategy identifies the South West Growth Centre as being the centre for growth in the region. This area is located to the north-west of Campbelltown and is removed from the project site.

Figure 1 – Regional Location



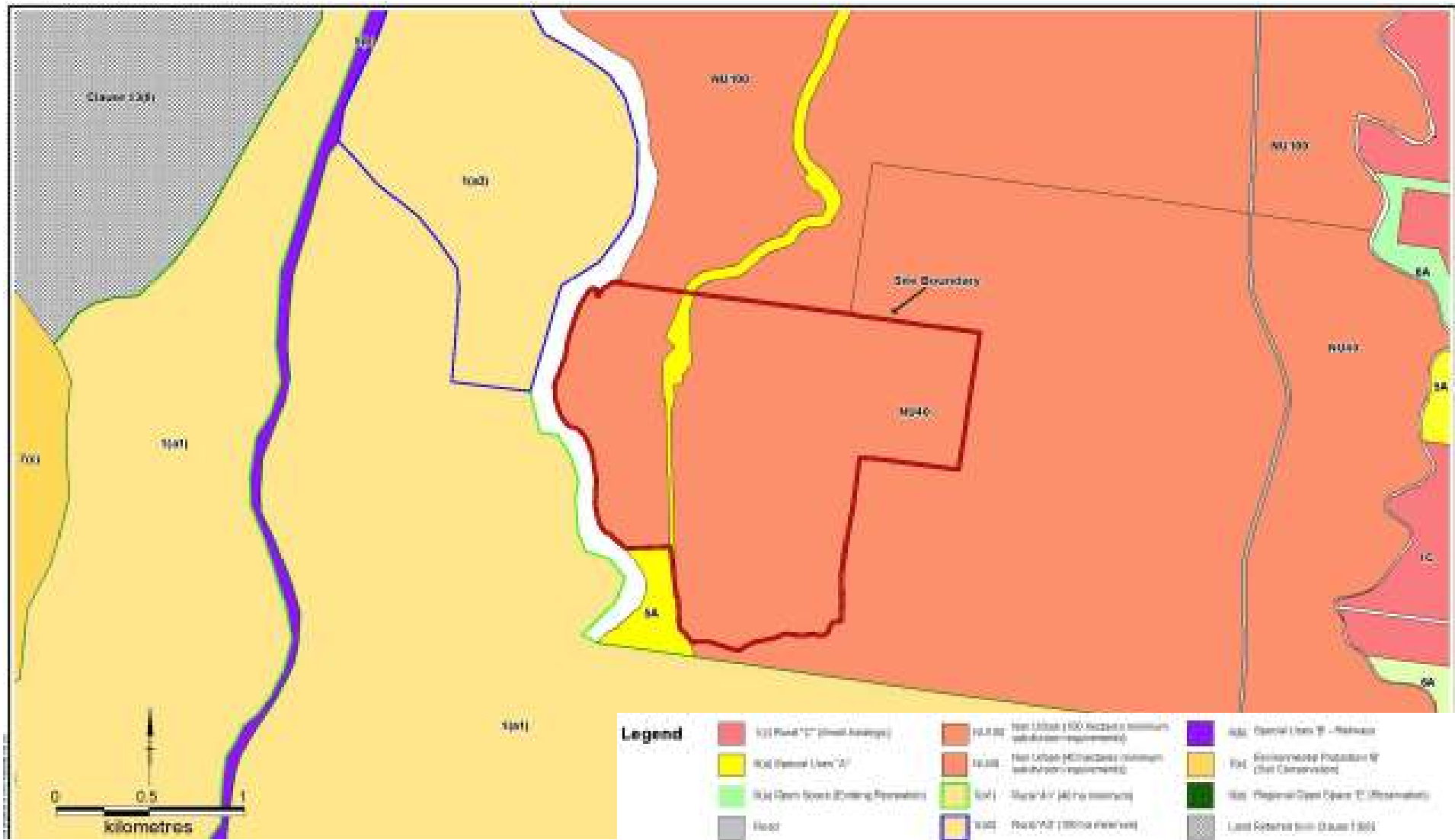
Source: Figure 1-1 of Proponents Environmental Assessment (URS, 2009)

Figure 2 – Site Boundary and Surrounding Land Use



Source: Figure 4-1 from Proponents Environmental Assessment (URS, 2009)

Figure 3 – Land Zoning

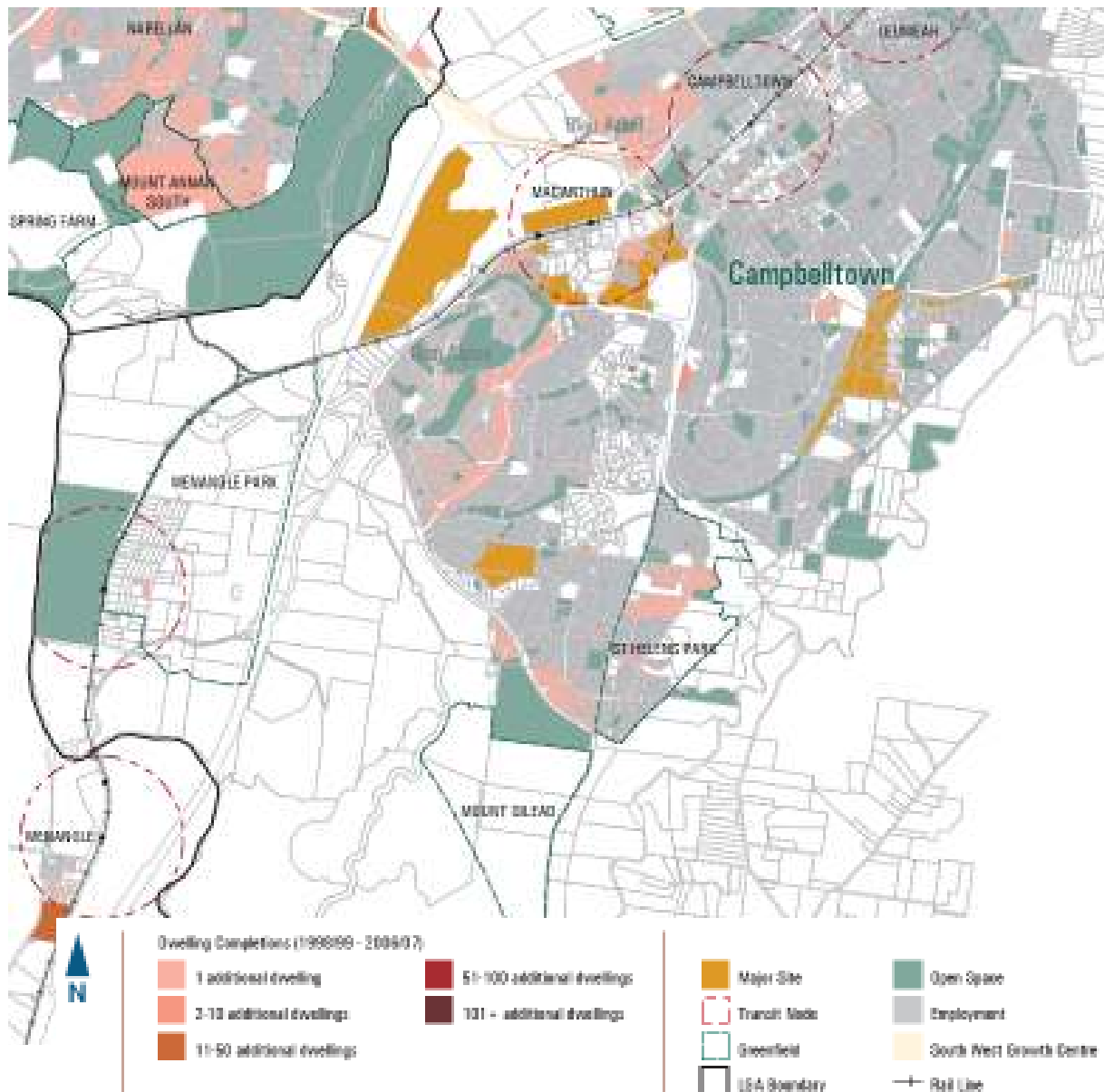


Source: Figure 16-1 of Proponents Environmental Assessment (URS, 2009)

Under the Sydney Metropolitan Strategy a draft Sub-Regional Strategy has been prepared for the South West Sub Region which has a target of 40,000 new dwellings within existing residential areas, 100,000 new dwellings in emerging suburbs in the vicinity of Edmondson Park, Austral, Leppington, Catherine Fields, Rossmore, Oran Park, Kemps Creek, Bringelly and Badgerys Creek (i.e. the South West Growth Centre), 15,000 dwellings in other greenfield sites and the generation of 80,000 new jobs.

The draft South West Subregional Strategy was completed in November 2007 and exhibited until March 2008. This strategy identified that the majority of land release in the region would occur in the South West Growth Centre and existing Metropolitan Development Program release areas including Mount Gilead. *The Metropolitan Development Program 2007/08 Report* released by the Department in April 2009 identified the Mount Gilead area as a potential area for 1,340 houses although it indicated that the area was not zoned for residential purposes or serviced. The Metropolitan Development Program identifies Mt Gilead as a greenfield release area although no production of dwellings is identified in either the short, medium or long term. No other land release areas were identified in proximity to Leafs Gully Farm. The Mount Gilead potential development area is located approximately two kilometres north-east of the project site and is shown on Figure 4.

Figure 4 – Metropolitan Development Program 2008



Source: Metropolitan Development Program 2007/2008 Report (Department of Planning, 2009)

2. PROPOSED DEVELOPMENT

2.1 Project Description

The Proponent proposes to construct and operate a nominally 360 MW gas-fired power station on a site known as Leafs Gully Farm at Gilead. The power station would utilise two open cycle gas turbines with a nominal power generating capacity of approximately 280-360 MW (depending on the turbine manufacturer). The electricity generated from the plant would be fed into the 330 kilovolt (kV) transmission network via a new switchyard on the site. Natural gas would be supplied to the plant via existing pipelines which traverse the site, with either the Alinta Gas Networks Main Trunk Pipeline or the Eastern Gas Pipeline being used. The new pipelines connecting the power station to the existing pipelines would be located underground.

The general arrangement of the proposed Leafs Gully Power Project is shown on Figure 5, while the concept plan is outlined on Figure 6. A schematic flow diagram of the electricity generation process is provided as Figure 7.

The proposal comprises the following components:

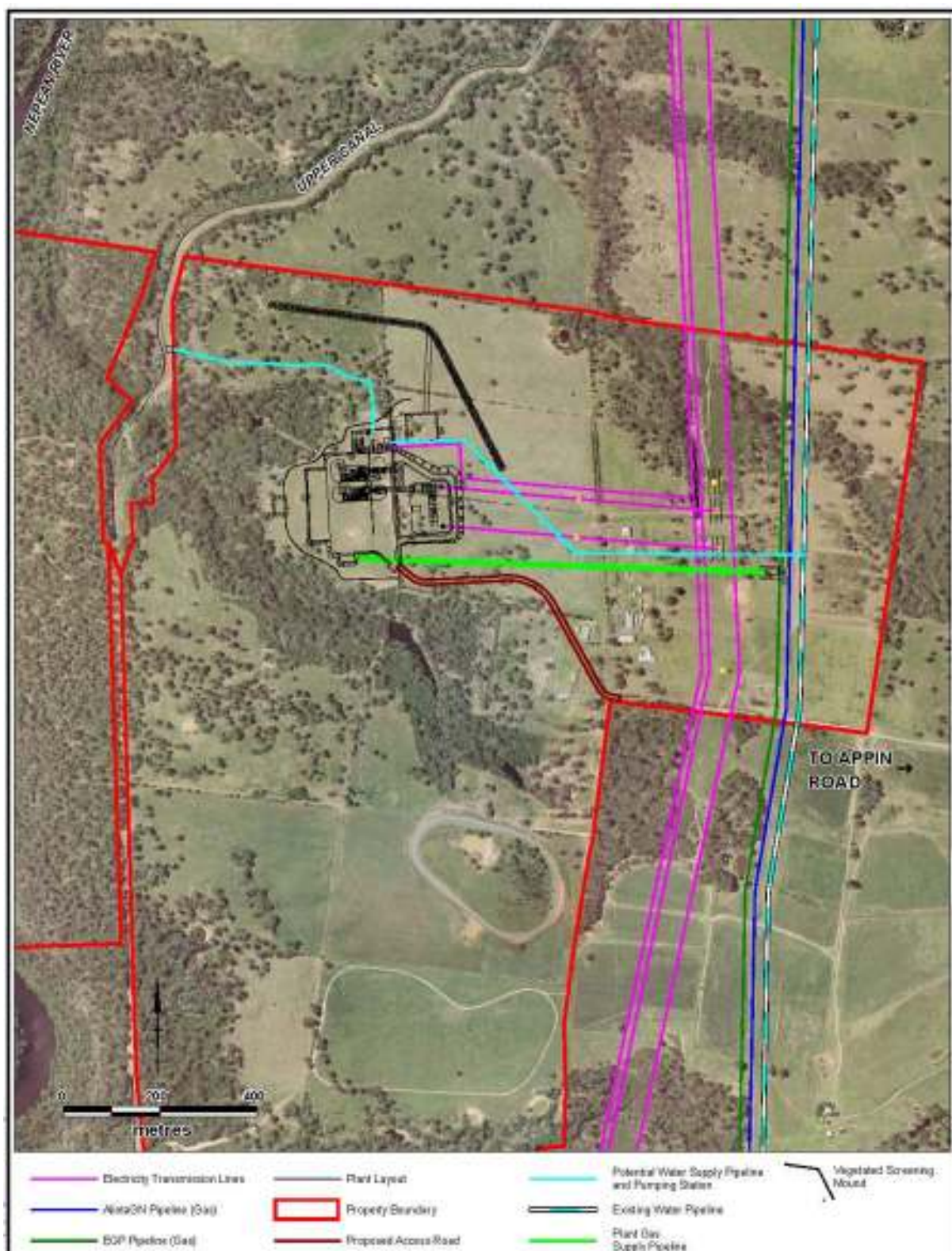
- power station plant comprising two gas turbines, generators and ancillary plant;
- high voltage switchyard comprising high voltage transformers and switchgear;
- transmission line connection to the 330 kV network;
- control room, administration, amenities, car parking and workshop facility;
- connecting gas pipelines, gas receiving station and gas conditioning station;
- fire protection tank;
- process water tank;
- domestic/rainwater tank(s);
- domestic wastewater treatment and disposal system;
- sedimentation pond and associated earth bund and diversion drain;
- evaporation pond to accommodate waste water discharges from the evaporative air inlet cooler;
- air compressor plant;
- switchroom;
- emergency generator and transformers;
- landscaping and tree planting to provide visual screening of the facility;
- internal roads;
- access road for the project from Appin Road;
- security and general fencing and gatehouse; and
- upgrade works on Appin Road at the intersection with the access road into the site.

The Environmental Assessment indicates that where possible, existing dwellings and structures on the site may be modified for use as administration and/or amenities facilities during the construction and operational phases. The Proponent is not proposing to demolish any buildings on the site with the exception of the employee's residence which is located within the proposed transmission line connection easement.

Each gas turbine generator unit would comprise a gas turbine, generator, high voltage transformer and an exhaust stack. Each stack is proposed to be a maximum height of 35 metres and the remaining ancillary plant and buildings would be up to 20 metres in height.

The Environmental Assessment identifies that the vendor for the gas turbines would be determined through a tendering process. The gas turbines would be proprietary units provided by manufacturers. The Proponent has stated that the precise output of each unit would only be known once the tendering process is completed, however, an approximate output of up to 360 MW has been assumed for the purposes of the Environmental Assessment.

Figure 5 – Project Site Layout

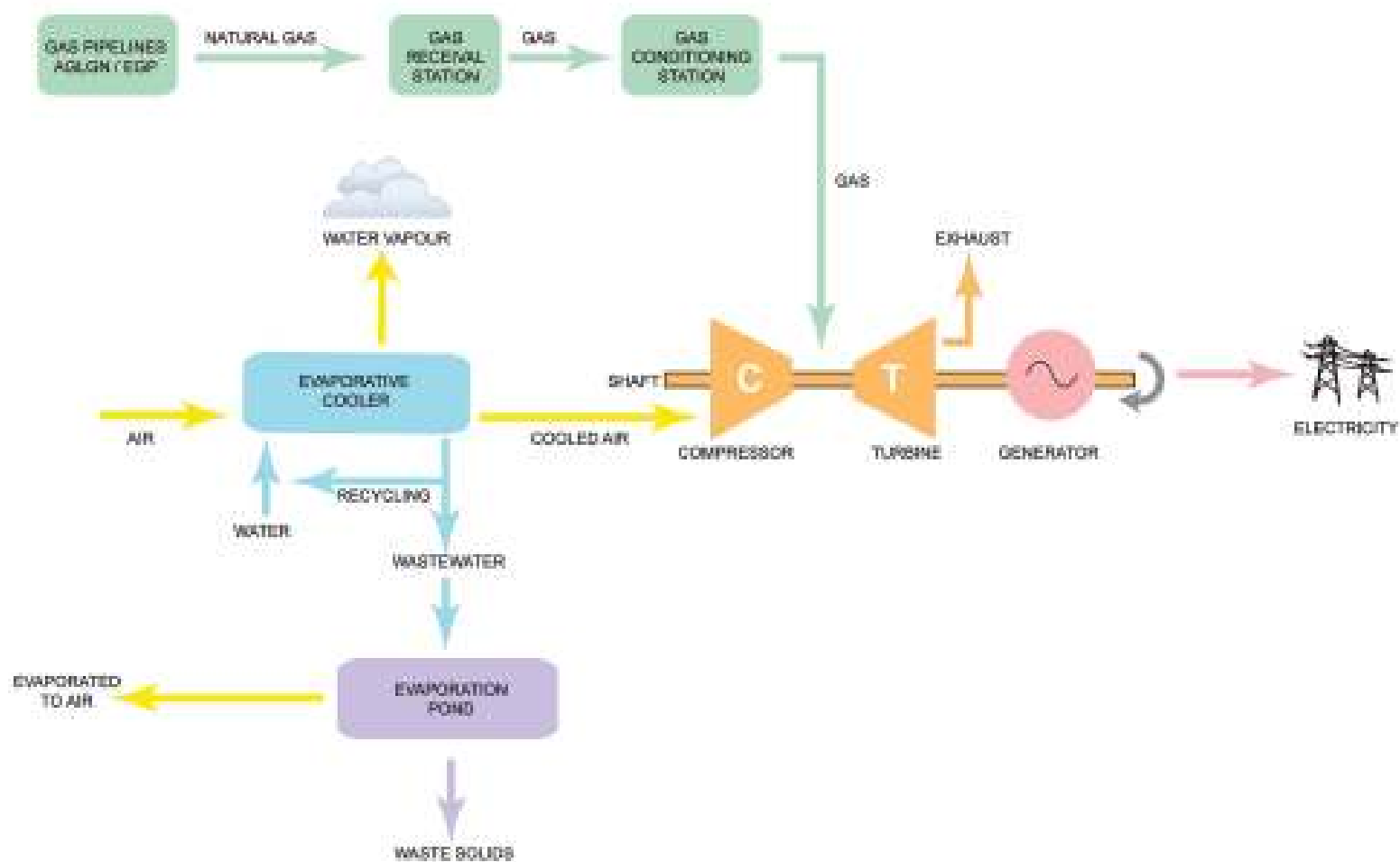


Source: Figure 1-2 of Proponents Environmental Assessment (URS, 2009)

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Figure 7 – Schematic Process Diagram



Source: Figure 4-3 of Proponents Environmental Assessment (URS, 2009)

Water would be stored in tanks on-site for fire services, process water in the plant and domestic use. The process water would be used in the evaporative air coolers, producing a small waste stream of blow down water which would be directed to an evaporation pond. There are three available sources for process water:

- the water supply main from the Macarthur Water Treatment Plant that runs through the eastern portion of the site; and
- the Sydney Catchment Authority's Upper Supply Canal that also runs through the site; and
- reuse of recycled water from a proposed sewage treatment plant at Appin.

The Department has assumed for the purposes of this assessment that a water supply would be available as a supply of process water for the plant. The Environmental Assessment indicates that rainwater would be captured and stored on site and used for non potable uses, laundry and for maintenance activities.

Power to the site would be supplied from the existing distribution system by connection to the existing 66 kV transmission line that traverses the site. A fire alarm system would be installed and monitored from the control room. A gas leak detection system would also be installed and monitored through the control room. A water tank would be provided on site for fire protection.

A large earth mound, established from site won fill, would be constructed within the site measuring approximately six metres in height with a base of approximately 27 metres to provide a visual screen for neighbours along the northern boundary.

The Proponent has stated that it proposes to permanently conserve vegetation communities in the area between the Nepean River and the Upper Canal as well as existing vegetation and fauna habitat around the project footprint comprising approximately 170 hectares of vegetation within the site. The Proponent has indicated that the land could be re-titled for conservation purposes in consultation with the Department of Environment and Climate Change (DECC), either through a Voluntary Conservation Agreement, a Biobanking Agreement or some other enduring protection mechanism. The management of the conservation area would be funded from the operation of the project.

An access road is required to be constructed generally along the Right of Carriageway between Appin Road and the project site. The Environmental Assessment states that an area 300 metres long and up to 10 metres wide would need to be cleared to allow construction of the access road. The road is proposed to be of gravel construction and sealed for a 5.5 metre width and would be constructed in accordance with Council's *Engineering Design Guide for Development* (2004). Works are also proposed to be undertaken on Appin Road at its intersection with the access road to facilitate construction traffic. Minor widening is proposed within the road reserve to accommodate a slip lane to prevent traffic building up behind vehicles turning right into the access road.

Construction of the Leafs Gully Power Project is expected to take approximately 24-30 months and employ up to 140 people during the peak of the construction period. The Leafs Gully Power Project is proposed to be available to operate 24 hours a day, seven days per week, however, in practice, the plant would only operate during periods of high electricity demand. The Proponent has suggested, based on other peaking power stations in Victoria and South Australia, that the Leafs Gully Power Project is likely to operate between two to three per cent of the year although the Environmental Assessment has assessed a worst case scenario of operation for 15 per cent of the year to determine worst case environmental impacts associated with the operation of the plant. The plant is expected to operate mainly during the morning and afternoon electricity peak periods during summer and winter. The project could be operated remotely and is expected to employ up to five people.

The Environmental Assessment indicates that post construction maintenance of major plant items would be undertaken every three years and would require up to 100 people for a four to six week period. The Proponent has estimated that the capital cost of the project is in the order of \$200 million.

2.2 Project Need

On 26 February 2008, the Minister for Planning declared development for the purpose of energy generating facilities with capacity to generate in excess of 250MW to be critical infrastructure projects. In making this declaration, the Minister recognised that additional energy generating development of this scale was essential to

the State for economic and social reasons. The Minister based his (as the Minister was at the time) decision on the outcomes of the Owen Inquiry into Electricity Supply in NSW (September, 2007) and the 2007 annual Statement of Opportunities published by the National Electricity Market Management Company (NEMMCO). NEMMCO manages the supply of electricity in Australia and each year releases its Statement of Opportunities which provides an analysis of the supply and demand scenario for each region of the National Electricity Market (NEM).

Both the Owen Inquiry and the NEMMCO Statement of Opportunities recognised that there is a need to provide additional electricity generating capacity in New South Wales to service growing energy demands. At the time the Minister made the abovementioned critical infrastructure declaration, both the Owen Inquiry and the 2007 Statement of Opportunities predicted that additional generating capacity would be required by 2013/2014 to ensure on-going energy supply within acceptable reliability standards.

The October 2008 Statement of Opportunities revised the 2007 NEMMCO predictions and outlined that additional electricity capacity will be required from 2014/2015. The reserve deficit for NSW in 2014/2015 is identified as 283 megawatts, which represents the difference between the allocated installed capacity and the capacity required to meet the minimum reserve energy level for a particular region. The reserve deficit, however, is lower than in previous years as Tallawarra and Uranquinty Power Stations commenced operations during summer 2008/2009 and Colongra Power Station is scheduled to begin operations prior to the summer of 2009/2010. Even with the implementation of the aforementioned power stations, the 2008 Statement of Opportunities has projected that the reserve deficit will increase through time from 2014/2015 onwards and it is expected to be in the order of 1200 megawatts by 2017/2018.

The Owen Inquiry Report suggested that some of the energy deficit could be reversed through the continued implementation of energy efficiency measures such as programs such as BASIX and new renewable energy generation facilities, however these approaches, while important, will not serve to entirely mitigate the risk of an energy generation-energy demand imbalance by 2014/2015. In order to secure the supply of energy in NSW for the medium term, additional generating capacity is a real and necessary requirement that needs to be carefully considered.

Renewable energy developments are likely to play an important role in the provision of sustainable energy to address the State's demands into the future. Hydro-electric power stations can provide peak load electricity, however, the opportunities in NSW have been substantially exhausted for large scale electricity generation. Generation of electricity from wind and solar energy is not suitable for peak load power stations due to the intermittent nature of the resource. In addition, despite a number of approved and proposed wind farm projects in New South Wales, the implementation of wind energy projects (and other renewable energy proposals) is currently not being undertaken at a rate to sufficiently address the predicted generation shortfalls. This circumstance may change in future, but at this time it would not be feasible to solely rely on renewable energy projects to address the energy supply-demand balance predictions. The Department considers that the most effective means of ensuring an energy generation and supply system that is effective, secure and environmentally balanced is to deliver a diverse range of energy generating options. Beyond that, market factors, consumer choices and carbon regulation will ultimately regulate generation options from the diverse suite of alternatives available.

As outlined in the Environmental Assessment, a paper titled *Development of Supply to the Newcastle – Sydney – Wollongong Area* prepared by NERA Economic Consulting for Transgrid (2006), identified that new generating capacity is best located within the Newcastle – Sydney – Wollongong load area but that substation equipment in the switchyards in the Newcastle area limit generation capacity to 300 MW in total until the network is upgraded. The Leafs Gully Power Project is located in close proximity to the transmission network being on the 330 kV network south of Sydney. A subsequent report released by Transgrid/Integral Energy in late 2006 titled *Development of Electricity Supply to the Macarthur Area and Southwest Sector* (also quoted from the Environmental Assessment) identified that demand could exceed supply in the area as soon as 2009 unless additional electricity supply was made available.

The Leafs Gully Power Project would only be used as a peaking plant and therefore will not only improve the reliability of electricity supply during peak electricity demand periods but also improve the security of the supply

as a result of a faster starting time should a black out occur. The Department considers that the power station is justified on the abovementioned grounds.

The open-cycle turbines proposed to be used for the Leafs Gully Power Project are only suitable for use as part of a peaking plant. It is understood that there are some concerns in the local community that the plant will initially be used as a peaking facility and then operate at increased times to deliver base-load electricity. Discussions with the Proponent indicate that the Proponent has no intentions of operating the Leafs Gully Power Project as anything other than a peaking plant for a maximum of 15 per cent of the year. The Environmental Assessment also quotes the *Energy Directions Green Paper* (NSW Government, 2004) which states that open cycle gas generation plants are effective in meeting peak demand and can be built for a relatively low cost and in short timeframes. The Paper further notes that because they are expensive to run they are only suited to meet high priced peak demand.

The recommended conditions of approval explicitly prohibit the project from being operated as a baseload generating facility. However, the Department does not consider it appropriate to further limit the maximum duration of operations within any year (for example to only 15%) because:

1. the Environmental Assessment for the project was based on continuous operation of the project, and as such, there is no basis for restricting operation to 15% based on environmental impacts;
2. the figure of 15% for a peaking power station in this particular location is a function of current electricity market conditions. Future market conditions, whether through fuel prices, supply and demand balances, transmission network constraints/ opportunities or Government policy/ legislation (such as the Commonwealth Government's Carbon Pollution Reduction Scheme) may affect the temporal parameters that define 'peaking power generation', and as a consequence, it would be imprudent to condition the subject project based on current market conditions on an expectation that such conditions would continue into the future; and
3. other recent power station approvals have not included explicit restrictions on the mode or duration of operations based on recognition of the need to maintain an independent, competitive electricity market.

2.3 Alternatives Considered

Alternative technologies as well as alternative site locations were considered by the Proponent prior to the selection of the preferred technology to be used for the plant and the selection of Leafs Gully Farm for the proposal. This included an assessment of various power generation technologies, alternative options available for reducing oxides of nitrogen, alternative sites for the power station within NSW and an assessment of the do nothing scenario.

The Department considers that an adequate assessment of alternatives sites was undertaken by the Proponent as summarised in Chapter 3 of the Environmental Assessment. A large number of submissions raised the issue that the Proponent undertook an assessment of alternatives sites based on purely economic factors and the potential return on its investment. The Department considers cost to be an important site selection issue as it often determines the viability of the proposal. The submissions raised, amongst other factors, that the Leafs Gully Farm is not an appropriate location for a gas turbine power station because of the potential for the site and land in the immediate surroundings to be developed for residential use in the future. In addition, many submissions also claimed that a gas-fired power station located within the locality would lead to adverse air quality impacts which would affect the health of the local population.

The Department has considered the argument related to the potential future development of the surrounding land for residential purposes and has consulted the Metropolitan Development Program 2007-2008 Report released by the Department in April 2009 in terms of the growth potential of land within the Sydney Basin. With the exception of the South West Growth Centre, located to the north-west of Campbelltown, Mount Gilead has been included in the Government's land release program. Mount Gilead release area is located approximately two kilometres from the project site has been identified as potentially providing 1,340 dwellings, however, the current zoning of the land does not permit subdivision of land to less than 40 hectares and the land is not currently serviced for development. The Metropolitan Development Program identifies the Mount Gilead site as a greenfield release area however no dwellings are identified for either the short, medium or long term.

In addition, the Leafs Gully Farm site and surrounding area lies within the Campbelltown South Mine Subsidence District, located over a Coal Lease (CCL676) owned by BHP Billiton Illawarra Coal which operates the

underground mine known as West Cliff Colliery. BHP Billiton has plans to extract the coal reserves located within the Bulli and Balgownie coal seams under the site via longwall mining blocks. The Environmental Assessment states that the current mine plan indicates that longwall extraction is expected within the Bulli seam over the next five to ten years in the Gilead area – extraction of the Balgownie seam is not expected to take place until the reserves within the Bulli seam are exhausted. According to recent discussions between the Proponent and BHP Billiton in September 2008, mining of the Balgownie seam is a long term proposition (of more than 30 years).

The Environmental Assessment states that the Proponent has undertaken detailed analysis to position the plant on the site to minimise impact on the surrounding community now and in the future. A number of submissions stated, however, that they would have preferred that the power plant be located in the middle of the site to afford a greater buffer between it and surrounding land uses. The Department has examined the central area of the site adjacent to Leafs Gully and considers that siting the plant in this area would only result in negligible benefits as a result of the greater distance from existing land uses to the north of the site although would require utility connections to cross Leafs Gully and may involve impact to sensitive vegetation communities classified as endangered ecological communities under the *Threatened Species Conservation Act 1995*. The Environmental Assessment identified that the project would take up less than 10% of the total site area and the remainder of the site (measuring approximately 170 hectares) would be subject to conservation to preserve existing and significant flora and fauna habitat areas. The Department is satisfied that the location of the project within the site was based on a number of considerations. The Environmental Assessment identified that the northern location is the most equitable for existing surrounding sensitive receptors.

Notwithstanding any arguments about the potential timing of the project and any future development around the site, the Department considers there to be minimal real potential for conflicts between the two given the outcomes of the environmental assessment process. The Proponent has demonstrated that it can constrain the environmental and amenity impacts of the project well within acceptable standards, and subject to performance verification once the project is operating, the Department is comfortable with this outcome. Further, gas-fired peaking power stations are not novel and their impacts are generally well known. Gas-fired plants have been constructed in reasonably close proximity to residential receivers in Australia and overseas, and practical experience highlights that this sort of development can co-exist in close proximity to residential receivers without adverse impacts. The principal impact that would act to limit the location of the project relative to residential receivers is noise, and it is recognised that well characterised and commonly applied engineering solutions are available to control noise impacts from typical gas-fired plant and equipment.

3. STATUTORY CONTEXT

3.1 Major Project

The project is declared to be a Major Project under *State Environmental Planning Policy (Major Projects) 2005* because it is development for the purposes of an electricity generation facility that has a capital investment value of more than \$30 million for gas or coal-fired generation (clause 24 of Schedule 1). On 3 April 2008, the Director-General, under delegation from the Minister, formed the opinion that the project meets the requirements of the Major Projects SEPP and declared the project to be a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (the Act). Therefore, the project will be assessed and determined by the Minister for Planning under Part 3A of the Act in accordance with section 75D(1).

The Director-General's requirements for the preparation of an Environmental Assessment were issued on 3 April 2008. For the purpose of section 75H of the *Environmental Planning and Assessment Act 1979*, the Environmental Assessment complied with the Director-General's requirements and the Proponent was notified of this compliance on 12 February 2009.

3.2 Critical Infrastructure

The project is for the generation of nominally 360 MW of electricity and therefore, by virtue of an Order made by the Minister for Planning on 26 February 2008, is deemed to be a critical infrastructure project under section 75C of the *Environmental Planning and Assessment Act 1979*.

The Order declares development for the purpose of an electricity generation with capacity to generate at least 250 MW to be critical infrastructure, if an application is lodged before 1 January 2013. The subject project relates to a power station with the capacity to generate nominally 300 MW and the subject application was received on 3 April 2008. It therefore meets the criteria to be considered a critical infrastructure project.

Landowners consent is not required for projects classified as critical infrastructure as outlined by clause 8(F) of the *Environmental Planning and Assessment Regulation 2000*. Nevertheless, the Proponent has obtained landowners consent for the Leafs Gully Farm, but does not have landowners consent for the proposed upgrade of the access road along the Right of Carriageway between the site and Appin Road. In accordance with clause 8(F)(3)(c) of the *Environmental Planning and Assessment Regulation 2000*, where landowners consent is not required to be obtained, the Proponent is required to notify the owner of the land within 14 days of the application being made. The Proponent notified the Department of the need to upgrade the access road as part of the project application in early 2009. At this time, it also advised that a notification letter had been sent to the landowner of the subject land in accordance with clause 8(F)(3)(c) *Environmental Planning and Assessment Regulation 2000*.

The Department can confirm that the Proponent has met all the requirements of 8(F)(3)(c) of the *Environmental Planning and Assessment Regulation 2000*.

3.3 State Environmental Planning Policies

There are no State Environmental Planning Policies that apply to the proposal that substantially govern the carrying out of the development.

3.4 Exhibition and Notification

The application and Environmental Assessment were placed on public exhibition from Wednesday 25 February to Friday 24 April 2009 and submissions invited in accordance with Section 75H of the Act. Exhibition locations were as follows:

- Department of Planning's head office;
- Campbelltown City Council; and
- Nature Conservation Council.

The Environmental Assessment was also provided for viewing and/or download from the Department's website.

Notification of the exhibition period was made through advertisements in the following newspapers, and on two separate occasions in each (8 advertisements in total):

- *Sydney Morning Herald* (25 February 2009 and 25 March 2009);
- *Daily Telegraph* (25 February 2009 and 25 March 2009);
- *Campbelltown-Macarthur Advertiser* (25 February 2009 and 25 March 2009); and
- *Macarthur Chronicle* (24 February 2009 and 24 March 2009).

3.5 Minister's Approval Power

The Department has met all its legal obligations so that the Minister can make a determination regarding the project.

4. CONSULTATION AND ISSUES RAISED

Public participation and stakeholder consultation are central to the objectives of the Act and are actively undertaken by the Department. Key stakeholders for the proposed Leafs Gully Power Project were identified as government agencies; Campbelltown City Council as well as surrounding Councils including Camden and Wollondilly local government areas, elected representatives, the local community, special interest groups such as the Campbelltown – Leafs Gully Action Group Incorporated and various industry groups. The Proponent conducted consultation with the local community, elected representatives, interest groups, industry groups, Council and government representatives as part of its preparation of the Environmental Assessment.

In this regard, the Director-General's requirements for the project required the Proponent to individually consult with each landowner and land occupier within two kilometres of the boundary of the proposed development site. As part of this consultation, the Proponent consulted with 81 stakeholders and a total of 16 submissions were received. Chapter 6 of the Environmental Assessment outlined issues that were raised from this consultation.

The Environmental Assessment was publicly exhibited between Wednesday 25 February and 24 April 2009 which exceeded the minimum statutory exhibition period by 28 days. During this period, the Department understands that a public rally was organised by the local community in opposition to the project.

Following the close of the exhibition period all submissions were collected and collated and the issues raised in submissions reviewed by the Department. A total of 481 submissions were received either during the exhibition period or within the following two weeks which the Department accepted and has considered as part of its assessment of the project.

Submissions were received from State and local Government agencies, private organisations and the local community. The majority (90 per cent or 433 submissions) of the total 481 submissions received during the public exhibition period comprised form letters. Of the total submissions received, 469 objected (97.5 per cent of submissions), two supported the project (0.4 per cent of submissions) and the remaining 10 (or 2.1 per cent of total submissions) did not state a position although indicated that they had some concerns or comments regarding the proposal.

It should be noted that the Department also received a large number of late submissions. These submissions did not raise any "new" issues regarding the project and therefore the issues raised in these submissions have been addressed as part of the assessment provided in Section 5.

4.1 Nature of Submissions

Submissions were received from six State Government agencies, as listed below as well as Campbelltown City Council and Wollondilly Shire Council:

- **NSW Department of Environment and Climate Change (DECC)** – supports the project subject to a number of specific conditions of approval as outlined in its submission. The Proponent will need to make a separate application to the DECC to apply for an Environment Protection Licence should project approval be granted. In its submission, the DECC indicated that it did not accept the proposed alternative method to assess low frequency noise and considers that the method specified in the Industrial Noise Policy should have been used. It has included correction factors for low frequency noise as part of the recommended conditions of approval for the project.
- **Sydney Catchment Authority (SCA)** – did not provide a stated position regarding the project but provided comments as part of their submission. SCA considered that issues related to water quality and heritage significance of the Upper Canal have been satisfactorily addressed as part of the EA and the mitigation measures proposed are considered to be adequate. SCA also understands that the Proponent will consult further with it should the Upper Canal water supply source option be the preferred water supply source for the project.
- **Mine Subsidence Board (MSB)** – did not state a position on the project, however, considered that the parameters used as part of the EA to predict subsidence impacts are appropriate based on current mining plans. Its submission stated that the project lies above West Cliff collieries proposed LW34 and LW35

(long wall panels) and has suggested that the project be staged around proposed mining, and so as to limit any risk to the Board's compensation fund.

- **Department of Water and Energy (DWE)** – did not state a position regarding the project however indicated that the critical issue is a reliable water supply. DWE considers the option for obtaining water from any surface water source such as the Nepean River is unlikely to be available without the purchasing of existing available water licences, due to current surface water embargoes. DWE also considers the Upper Canal as a valuable potable water supply for the Sydney area. DWE also state that the Proponent has not addressed the NSW Farm Dams Policy and that any new dams on the site will need to be consistent with that policy. In terms of groundwater, DWE is concerned that field data has not supported the statements made in the EA regarding negligible groundwater impacts. DWE considers that all stormwater management works should be conducted in accordance with the NSW Department of Housing 'Managing Urban Stormwater - Soils and Construction Volume 1 (NSW Dept of Housing, 2004). Appropriate stormwater management will need to be implemented to minimise impacts on downstream environments, surface water, groundwater and adjoining land. In terms of subsidence impacts, DWE state that the project will need to be constructed to withstand any subsidence once approved long wall mining occurs.
- **NSW Roads and Traffic Authority (RTA)** – did not state a position regarding the project, however, endorsed the intersection treatment proposed to be provided between the upgraded access road and Appin Road and the proposal to widen and seal the existing road shoulder on the western side of Appin Road. The RTA did raise road safety concerns with regard to the tightness of a vehicle longer than 12.5 metres turning left from the northbound carriageway of Appin Road into the upgraded access road because the access road would not be regarded as a public road and therefore a ban on left turn movements through the provision of a sign would not be enforceable. The RTA has requested that this issue is addressed to its satisfaction in any conditions of approval prior to the issue of a Construction Certificate.
- **Sydney Water (two submissions)** – made two separate submissions with neither submission stating a position on the project. Sydney Water provided a number of comments for the Department's consideration which included the requirement to seek permission for connection to the Macarthur Water pipeline and that the Proponent will need to obtain a section 73 certificate from Sydney Water and fund any adjustments needed to Sydney Water infrastructure. Sydney Water also indicated that the Proponent should investigate the possibility of obtaining recycled water from the proposed Appin Sewage Treatment Plant which would demonstrate the use of total water cycle management. In terms of fire fighting capability, Sydney Water has indicated that the Proponent must ensure that the general water demand of the project does not adversely impact the fire-fighting capability of surrounding areas.

Both Campbelltown City Council and Wollondilly Shire Council objected to the project. In its submission, Campbelltown City Council stated that it objects to the project for the following reasons:

- the potential impacts of the power station on:
 - local, regional and inter-regional air quality and in particular the extent and implications of ozone formation as they relate to the existing and future air shed and community health;
 - the take up of medium and longer term housing supply potential for metropolitan Sydney that occurs in the Macarthur South Release Area including residential land supply at Gilead as included in the Metropolitan Development Program;
 - future urban residential amenity; and
 - the visual landscape.
- that approval of the project would set an undesirable precedent and give rise to an unacceptable risk for other power generation plants to establish in the locality given the co-location of natural gas and electricity transmission;
- the project has failed to adequately address and demonstrate:
 - the true extent of the impact on air emissions and in particular ozone;
 - any discernable greenhouse gas offsets relating to the development;
 - the visual impact of the development noting the absence of any photographic montages that accurately depict the visualisation of the development in existing landscape settings from selected viewpoints;
 - the nature and extent of any required planning and management of bush fire risk, including vegetation removal; and

- the extent and impact of the project on flora and fauna due to unsatisfactory survey effort and solutions including those associated with the assessment of potential and core Koala habitat pursuant to SEPP 44.
- the likely upgrading of this power station to a base load power station to meet energy demands and the considerable high emissions from such a plant should that upgrade occur.

Wollondilly Shire Council stated in its submission that it objects to the project as it considers that the site is unsuitable for development, that the project would result in unacceptable impacts on the environment, particularly to air quality, public health and land stability, and that the project would significantly decrease the value of surrounding lands. Wollondilly Shire Council also requested that the project be subject to a Commission of Inquiry.

A number of specific interest, industry and/or environment groups also provided submissions in relation to the proposal, namely:

- **Sydney Chamber of Commerce** which supported the project based on its ability to contribute to securing energy supply for the future and to sustain economic prosperity in terms the generation of 250 jobs during its construction phase.
- **Winkim Holdings Pty Ltd**, an adjoining property owner, which objected to the project based on air quality/health impacts, visual amenity, site suitability and the possibility of the plant increasing operation or turning into a base load plant. Concern was also expressed that the power station would cause conflicts with future land use, particular urban development, and that it would attract similar heavy industries to the area. The submission also indicated that the project would result in a reduction in land values.
- **Leafs Gully Action Group Inc.**, comprising the majority of landowners who collectively own approximately 200 hectares of land within the Campbelltown-Appin corridor, generally north of Murrumbidgee Creek. This submission objected to the project with the primary reasons stated as being unacceptable impact of the emissions in a very sensitive air-shed and that the selected location precludes the achievement of good urban outcomes when Macarthur South is eventually developed for urban purposes. The submissions also raised the need for the project, strategic planning issues, noise, visual and flora and fauna impacts.
- **The Mir Group**, an adjoining landowner, which objected to the project based on a number of issues including no demonstrated need for the plant up to 2015, the location of the proposal within an air-shed which has been identified as having the worst air conditions in the metropolitan region, a deficient air quality assessment which relied on ambient air quality data that did not take into account recent and foreshadowed urban development in the south west sector, the escalation of the size of the plant and the period of operation (up to 24 hours per day, seven days per week) and the resultant impact on air quality, visual and noise impacts on surrounding land uses. The submission states that Koalas have not been seen on their lands for at least three decades and that the suggestion that the site be used as a Koala sanctuary is ill-informed.
- **National Parks Association** which supports the request of both Campbelltown and Wollondilly Councils that a Public Inquiry should be held to inform the community on whether the pollution generated from the project would be higher than that of building homes. While the Association does not specifically state a position on the project, the submission indicates that its preference would be that no development take place along the Appin/Campbelltown Road corridor between the Georges and Nepean Rivers as the region is the last remaining wildlife corridor between the two rivers, however, the reality is that at least some of the area on the western side of the road will be developed for the future. The submission also states that the proposed wildlife corridor would need to have the protection of a permanent Conservation Agreement between the Proponent and the DECC in order to secure its enduring tenure and ongoing appropriate management.

4.2 Issues Raised

The main issues that were raised in the submissions are summarised (in no particular order) in Table 1 and addressed in Section 5 of this report. The majority of the submissions raised more than one issue of concern regarding the project, however, this was mainly due to the large number of form submissions which were received with pre-determined issues forming part of the submission.

A large number of submissions also raised the issue of site selection as a concern. The issue of site selection was previously addressed in Section 2.3 and has not been repeated in Section 5.

Table 1 – Issues Raised in Submissions

Issue	Where Addressed
Air quality and health impacts	Section 5.1
Visual amenity	Section 5.2
Noise impacts	Section 5.3
Traffic and transport	Section 5.4
Flora and fauna	Section 5.5
Future land use and property impacts	Section 5.6

While the issues outlined in Table 1 were not the only issues that were raised in the submissions, the Department considered that the issues listed in the table were key issues and that all other issues which were raised were either adequately addressed in the Proponent's Environmental Assessment or adequately responded to in the Proponents Response to Submissions report.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

Key issues raised in the submissions in response to the public exhibition of the project and/or identified during the Department's assessment included:

- air quality issues including health related impacts;
- visual amenity impacts;
- noise and vibration impacts;
- traffic and transport impacts;
- flora and fauna impacts; and
- property and land use impacts.

As indicated in section 4.2, all other issues that were raised in submissions are considered to be minor and have been addressed as part of the Proponent's Statement of Commitments or the Proponent's Response to Submissions.

5.1 Air Quality and Related Health Impacts

Issue

The air quality assessment undertaken as part of the Environmental Assessment comprised an assessment of regional air quality, local air quality (within 10 km of the site), greenhouse gas emissions and aviation safety in terms of stack emissions and plume rise to determine compliance with guidelines issued by the Civil Aviation Authority. The Environmental Assessment states that background air quality in the vicinity of the proposed site is expected to be moderate to good given that the site is located away from significant urban development and major industrial activities. The nearest residence is located approximately 1.5 kilometres to the north-east of the site and Appin, a town of approximately 1,600 people is located 4.5 kilometres to the south-east. The predominant wind direction is from the south-west throughout the year.

Local Air Quality

The construction of the project is expected to take approximately 18 months and involve the construction of concrete footing, the formation of unsealed site access roads, installation of the units, construction of a switchyard and transmission connection, installation activities, fencing and commissioning. There is the potential for dust to be generated from construction activities, however, the Proponent has indicated that it would implement mitigation measures as part of a Construction Environmental Management Plan that would include dust suppression, stockpile stabilisation and access road management. The distance to the nearest residential receiver of 1.5 kilometres is such that a sufficient buffer would exist between the main construction area and neighbouring land uses to prevent nuisance dust impacts.

In terms of operational impacts from the project, the Proponent undertook air quality modelling to assess air quality impacts based on three worst-case operational scenarios utilising E class (Alstom GT13E2) turbines, as follows:

- start-up scenario based on two turbines operating under start-up conditions for a full hour (in reality start-up would generally take less than 30 minutes);
- start-up scenario based on one turbine operating under start-up conditions for a full hour while the other turbine ran under normal operational conditions for the hour; and
- full operation scenario where two turbines were operating at full load continuously.

The primary atmospheric emissions from the turbines would be nitrogen (N_2), oxygen (O_2), carbon dioxide (CO_2), water vapour, oxides of nitrogen (NO_x), carbon monoxide (CO) and low concentrations of sulphur dioxide (SO_2) and particulate matter of less than 10 microns in diameter (PM_{10}). The air quality assessment undertook modelling of emissions which predicted worst-case short term (1 hour) predictions based on the plant operating for every hour of the year with all emitted NO_x present as NO_2 . This would not be the case in reality given that emissions of oxides of nitrogen exist in the atmosphere as both NO_2 and NO. The Proponent has also indicated that based on other plants that it operates in Victoria and South Australia, the project is likely to operate between two and 15 per cent of the year, with the actual operating times being dependant on supply and demand conditions in the electricity market. Given the plant is expected to operate up to 15 per cent of the year, the

modelling undertaken represents a worst-case scenario with the impacts likely to be significantly less than those modelled. Table 2 provides the results from the modelling of worst-case air quality impacts against the relevant air quality criteria.

Table 2: Summary of Modelling Results for Worst-Case Air Quality Impacts

Start Up	Averaging Period	Background Concentration $\mu\text{g}/\text{m}^3$	Predicted Impact $\mu\text{g}/\text{m}^3$	Cumulative Impacts $\mu\text{g}/\text{m}^3$	Air Quality Criteria $\mu\text{g}/\text{m}^3$
NO₂	1 hour maximum	134.7	33.2	167.9	246
	Annual average	23.1	0.3	23.4	62
CO	15 minute maximum	3,404	1,469	4,873	100,000
	1 hour maximum	2,580	439.2	3,019	30,000
	8 hour maximum	2,280	158.6	2,439	10,000
SO₂	10 minute maximum	39.4	9.6	48.9	712
	1 hour maximum	27.5	6.8	34.3	570
	24 hour maximum	9.7	1.3	11.0	228
	Annual average	1.5	0.06	1.6	60
PM₁₀	24 hour maximum	43.7	1.12	44.8	50
	Annual average	17.2	0.053	17.3	30
Benzene	1 hour average	-	0.021	0.021	290
Toluene	1 hour average	-	0.188	0.188	360
Ethylbenzene	1 hour average	-	0.049	0.049	8,000
Xylenes	1 hour average	-	0.090	0.090	190
Formaldehyde	1 hour average	-	1.035	1.035	20
Total (PAH) reported as benzo[a]pyrene	1 hour average	-	0.0035	0.0035	0.4
Operating					
NO₂	1 hour maximum	134.7	29.6	164.3	246
	Annual average	23.1	0.2	23.3	62
CO	15 minute maximum	3,404	9.3	3,414	100,000
	1 hour maximum	2,580	7.1	2,587	30,000
	8 hour maximum	2,280	2.1	2,282	10,000
SO₂	10 minute maximum	39.4	10.8	50.1	712
	1 hour maximum	27.5	7.5	35.0	570
	24 hour maximum	9.7	1.2	10.9	228
	Annual average	1.5	0.04	1.54	60
PM₁₀	24 hour maximum	43.7	1.09	44.8	50
	Annual average	17.2	0.04	17.24	30
Benzene	1 hour average	-	0.002	0.002	290
Toluene	1 hour average	-	0.018	0.018	360
Ethylbenzene	1 hour average	-	0.005	0.005	8,000
Xylenes	1 hour average	-	0.009	0.009	190
Formaldehyde	1 hour average	-	0.101	0.101	20
Total (PAH) reported as benzo[a]pyrene	1 hour average	-	0.0003	0.0003	0.4

Table 2 shows that there would be no exceedances of the criteria under worst-case conditions. Selected dispersion contour plots for NO₂, CO, SO₂ and PM₁₀ were provided in the Environmental Assessment and the results have been summarised below.

Nitrogen Dioxide

- the Alstom operating scenario showed a peak impact eight kilometres north-east of the project with the one hour and annual averages shown to have cumulative concentrations of NO₂ below regulatory guidelines;
- the Alstom start-up scenario showed a peak impact approximately 12 kilometres south-east of the project with the secondary impact area approximately 10 kilometres to the north-east of the plant;
- the assessment concluded that the impacts in reality will be significantly less than that modelled given the plant will only operate for up to 15 per cent of the year.

Carbon Monoxide

The maximum cumulative impact on CO was shown to be during the start-up scenario with a predicted concentration of $4,873\mu\text{g}/\text{m}^3$ during a 15 minute averaging period which is well below the criteria of $100,000\mu\text{g}/\text{m}^3$.

Sulphur Dioxide

The modelling results showed that the maximum cumulative predicted ground level concentration of SO_2 was $50\mu\text{g}/\text{m}^3$ as a 10 minute average occurring under the Alstom full operation scenario which is well below the 10 minute criteria for SO_2 of $712\mu\text{g}/\text{m}^3$. Similarly, the 1 hour, 24 hour and annual concentrations of SO_2 were all well below their respective criteria.

Particulate Matter

The maximum measured 24 hour average background concentration of PM_{10} was shown to be $43.7\mu\text{g}/\text{m}^3$ which is below the regulatory limit of $50\mu\text{g}/\text{m}^3$. Taking into account the conservative assumption of continuous emissions throughout a 24 hour averaging period, the maximum predicted increase in PM_{10} from the scenarios modelled was from start-up conditions where PM_{10} was predicted at $1.12\mu\text{g}/\text{m}^3$ and a maximum cumulative impact of $44\mu\text{g}/\text{m}^3$ which is below the regulatory criteria of $50\mu\text{g}/\text{m}^3$.

Hazardous Air Pollutants

The Environmental Assessment identified that even under worst-case operating conditions, all hazardous air emissions were significantly below the air quality criteria.

The Environmental Assessment concluded that the project would not result in any adverse impact to local air quality with all predicted worst-case emissions being well below the relevant criteria. During the construction phase, the project has the potential to generate air quality impacts from dust emissions. The Proponent has explained that any emissions of particulates (dust) would be specifically controlled through the implementation of various mitigation measures which would be incorporated into a Construction Environmental Management Plan for the project.

Regional Air Quality

The Proponent also commissioned a separate regional air quality assessment by CSIRO Energy Technology which focused on the potential impacts the project would have on regional ozone concentrations. Ozone is a photochemical oxidant and the major component of smog.

The Environmental Assessment states that high concentrations of ozone at ground level are a major health and environmental issue. Ozone is not emitted directly into the atmosphere but is formed through a chemical reaction between precursor emissions of volatile organic compounds (VOCs) and NO_x which are stimulated by sunlight and temperature such that peak ozone levels typically occur during warmer periods of the year.

Studies undertaken as part of the Environmental Assessment carried out to assess photochemical smog formation in the west and south west region where the new NO_x plume from the project would be located has shown that the area is subject to high ozone episodes. The photochemical smog modelling undertaken as part of the Environmental Assessment compares the yearly NO_x emissions for a baseline scenario (no power station) with those emissions that would result from a 300 MW plant and the results indicated the following:

- the maximum 1-hour difference in NO_x concentrations shows an increase by up to 0.4 ppb and equates to less than 0.05% of the maximum hourly NO_x ;
- an increase of the 1-hour NO_2 concentration by a maximum of 3.7 ppb over a small area near Penrith;
- an increase of the maximum 1-hour O_3 concentration by up to 1.9 ppb and a potential for decrease of up to 4 ppb resulting from the titration of ozone with the power station nitric oxide; and
- a similar pattern for the maximum 4-hour average O_3 with an increase of up to 1.8 ppb in the west and suppression of up to 3 ppb in the east over the sea.

The Proponent argues that these figures demonstrate that the project will at worst have a minimal impact on key pollutants contributing to regional air quality issues in the Sydney airshed.

The Environmental Assessment concludes that the predicted values of NO_x, NO₂ and O₃ ground level concentrations due to the additional emissions from the project are not significantly increased from existing concentration levels.

Detailed photochemical smog modelling was also undertaken based on a worst case 600 MW power station being located on the site purely to assess the potential worst-case impacts to regional air quality and to overestimate the potential photochemical impacts of the project. Five ozone event days with meteorological conditions known to be conducive to photochemical smog were selected by the DECC for the modelling based on the operation of a four turbine plant continuously for 24 hours on an ozone event day (this is considered to be a significant overestimate given the plant will only operate as a peaking plant for a maximum of 15% of the year and only operate with two turbines). The worst-case scenario modelled found that a four turbine plant would produce a maximum local increase of 6.8 ppb of ozone and 2.5 ppb of NO₂ occurring over small areas to the west or south-west of the plant. The Environmental Assessment states that the impacts from a nominally 300 MW station on the modelled ozone event days would be lower than those modelled for a 600 MW station and that there would be no adverse impact on the formation of photochemical smog.

Health Assessment

The Environmental Assessment included a health assessment undertaken by Associate Professor David McKenzie from Prince of Wales Hospital and Dr Elizabeth Brown, Research fellow, from the Prince of Wales Medical Research Institute. The assessment indicated that the emissions from the plant that would have the highest impact on ambient air quality is likely to be from NO₂ because natural gas is relatively clean burning with low particulate and SO₂ emissions. For the worst-case scenario for the project (during simultaneous start-up of both turbines) the maximum emissions of NO₂ added to the highest ambient pollution levels were predicted to result in levels below the NSW air quality criteria. The conclusions of the assessment stated that any health impacts would be difficult to detect and that at the projected levels of potential pollutants there is unlikely to be any adverse effect on mortality, lung development in children and adolescents, decline in lung function or rates of asthma development.

The air quality assessment presented by the Proponent also more broadly highlights that emissions from the project would comfortably meet established ambient air quality standards. These standards have been developed and applied within New South Wales based on consideration of protection of the environment, human health and amenity.

Issues Raised in Submissions

The majority of submissions received raised air quality and/or health impacts as issues of concern. A large number of submissions indicated that asthma was a serious health issue within the region and that the project would contribute to asthma-related health problems, particularly in children. Many submissions stated that the Macarthur area already has a high rate of asthma and that the project would only exacerbate the issue and should be located outside the Sydney Basin.

The DECC did not provide any specific comments related to the air quality assessments undertaken by the Proponent, however, stated its support for the project subject to a number of recommended conditions of approval which included specific conditions related to air quality.

Campbelltown City Council, in its submission, included a peer review undertaken by Atmospheric Solutions, a specialist air quality consultant. On the whole, the peer review generally supported the view of the air quality assessments undertaken by the Proponent, however, indicated that the modelling results demonstrated that slight increases are predicted to occur to the number of ozone exceedances experienced, the peak concentrations and the areas of land over which the exceedances are forecast to occur and states that this differs from the interpretation provided in the Environmental Assessment. The review, however, did state that the exceedances would still be well below the levels predicted in the Environmental Assessment and that there is not expected to be a significant deterioration of local or regional air quality with the addition of the power plant to the area.

The peer review identified that there was no assessment of partial load scenarios, however, given the intent and scale of the modelling involved, this was considered acceptable noting that conservative operational emissions were used. In addition, the review stated that the modelling assumed that all NO_x emitted from the plant would be NO₂ but in reality that this is likely to be largely NO with a smaller quantity of NO₂. The peer review, however,

stated that this assumption is considered conservative and would lead to the modelled emissions being significantly higher than would be expected from the operation of the plant which is the same conclusion reached in the Environmental Assessment. The peer review stated that the predicted NO₂ levels, with the power station operating, are not forecast to consume a significant amount of airshed capacity leaving sufficient capacity for future urban growth (even at the high forecast growth rates of approximately 3.7 per cent).

The peer review also agreed that the proposed implementation of low NO_x burners were considered the appropriate control technology for the project. Low NO_x burners were considered by Atmospheric Solutions to be the current best practice for peaking plants in Australia and considered suitable for minimising NO_x emissions from the project. The peer review stated that low NO_x burners could reduce NO_x emissions by up to 75 per cent which can have a considerable effect in reducing regional air quality impacts.

Council, in its submission, stated that it requests that the Environmental Assessment include modelling of additional wind directions to enable an understanding of the air quality impacts of the project under a range of conditions other than "worst scenario" conditions. Council also recommended that the Environmental Assessment assess the cumulative impacts of the facility on regional air quality within the context of additional emissions of NO_x within the region associated with the likely future urban growth within Macarthur South and suggested that an assessment be undertaken on the potential impacts of ozone formation associated with the project on surrounding land uses and community health.

One submission included an independent review of the local air quality assessment by Heggies Pty Ltd which outlined a number of deficiencies in the air quality assessment, namely the proportion of NO_x and NO₂ assumed to be emitted from the project. This study stated that the quoted percentages of NO₂ at 100 metres from the source of less than one per cent is highly optimistic and a more realistic approach would have been to assume that NO₂ percentages would be no less than five per cent and to be conservative, a baseline NO₂/NO_x percentage of 10% is suggested. The study also indicated that the plume rise modelling should have used five years of meteorological data as outlined in guidelines published by the Civil Aviation Safety Authority (CASA) and the plume rise assessment was not undertaken in accordance with CASA requirements. Heggies Pty Ltd also conducted a review of the regional air quality assessment which indicated that the growth of the South West Growth Centre and the Macarthur South area should have been taken into consideration in the photochemical study as they may have considerable impacts on both local and regional air quality. The study also sought clarification for the proposed operating times for the project as it stated that there was the potential for the project to operate continuously over 24 hours per day meaning that it could become a significant contributor of photochemical precursors to the Sydney Basin air shed.

Consideration

The Department has reviewed the submissions received during the exhibition period and the Proponent's response to the submissions and considers that an adequate level of assessment has been undertaken to outline the potential air quality and health related impacts from the construction and operation of the project. The peer review, commissioned by Campbelltown City Council, on the air quality assessment also confirms that an adequate assessment was undertaken with the assessment described as being "valid and appropriate with no major shortcomings identified". The Department notes that the peer review considered that many of the assumptions made by the Proponent were highly conservative leading to a significant over-estimate of the potential air quality impacts that are expected from the operation of the project.

Many submissions objected to the project on air quality grounds and indicated that the project would have an adverse impact on future residential development within the locality. However, the local air quality impact assessment presented in the Environmental Assessment has demonstrated, with a reasonable level of conservatism, that the project would comfortably meet established standards for the protection of the environment and human health. Further, if it were possible and desirable to construct residential receivers up to the boundary of the project site, air quality impacts from the project would not be a limiting factor or a reasonable basis for considering potential land use conflicts. It has been demonstrated in the Environmental Assessment that no adverse air quality impacts extend beyond the boundary of the site.

The submission which included the review of the local and regional air quality assessment by Heggies Pty Ltd attached a review which was undertaken in December 2006 which reviewed the air quality assessment of the previous Environmental Assessment, not the document which is the subject of this report. The Department has

reviewed the Proponent's Response to Submissions report which specifically addressed the issues that were raised by this study and the Department considers the response provided by the Proponent to be reasonable.

The Department considers that the Proponent has undertaken a thorough assessment of the potential impacts of the project on local and regional air quality as well as a health impact assessment based on worst case modelling scenarios. Given the importance of air quality within the Sydney Basin, particularly within the south west region where studies have shown that the area can be subject to high episodes of ozone, the Department has recommended a number of specific conditions of approval for the project related to air quality. The recommended conditions of approval include the requirement to meet stringent discharge limits from the exhaust stacks, prepare a report to establish proposed benchmark discharges from the plant over time, undertake continuous air quality monitoring and to report back to both the DECC and the Director-General regarding the air quality performance and verification of the project.

The Department notes that the Environmental Assessment indicated that no adverse impact on photochemical smog would occur as a result of the project's operation. The plume that would result from the operation of the plant would not change ozone levels within the region with some areas expected to experience a reduction in ozone levels. The Environmental Assessment, however, indicated that the Obstacle Surface Limit may be exceeded for approximately 80 per cent of the year and that the plant may need to be designated a hazard to aircraft operations in the area. The Department has therefore recommended, as a condition of approval, that the Proponent consult with the CASA to determine the management of the operation of the project to minimise potential aviation hazards.

The Proponent has demonstrated that the emissions from the plant would meet the relevant criteria based on worst case scenarios that were modelled as part of the air quality assessments. The impacts on local air quality were found to be minor and the conclusions of a health assessment indicated that any resultant health impacts from the operation of the plant would be difficult to detect and would be unlikely to have an adverse impact on health.

5.2 Visual Amenity Impacts

Issue

The Environmental Assessment comprised a visual assessment of the project and the potential visual impacts that are anticipated as a result. The assessment included a number of visual simulations utilising a 30 tonne crane to simulate the location and height of two proposed exhaust stacks which form part of the proposal. The visual assessment determined that the level of visual impact from the project would result from a combination of two factors:

- the level of visibility of the power station structures from surrounding areas; and
- the degree of visual contrast between the power station structures and the surrounding landscape and land uses from various view locations.

The assessment stated that it only took account of views where people were identified as being present at the time of the assessment. If no people were recorded from a particular location, then the visual impact was determined as being nil at that location. Therefore the assessment did not take into account the potential visual impacts of the project based on what future development may or may not occur on the surrounding land in proximity of the Leafs Gully site.

The dominant elements of the project that could be potentially viewed from surrounding areas include the:

- proposed access road;
- power station structure, including two 35 metre high exhaust stacks;
- switchyard and transformer; and
- overhead transmission lines and associated poles/lattice structures measuring between 22 and 36 metres in height and extending for a distance of approximately one kilometre.

The landscape and topography surrounding the project site is generally undulating and existing residential properties are not visually prominent as a result of the topography or existing screening vegetation. The undulating landform also limits views toward the site from Appin Road and the Hume Highway. The primary view catchment of the project is restricted to local views within the site boundary, however, secondary views to the

upper portions of the two proposed exhaust stacks were recorded from view locations at a number of surrounding properties, some of which comprised vacant rural land. There are no views to the project site from any public lookouts.

An assessment of the view locations within the surrounding landscape concluded that 12 of the 28 view locations would result in a low visibility rating, one of the 28 locations would have a moderate rating and none of the locations were determined to have a high rating level. The four existing residences within the project property boundary were not included in the visual assessment as these would be converted to offices or demolished as part of the proposal and would not continue to be utilised as residences.

The visual simulations provided in Chapter 10 of the Environmental Assessment indicated that the two exhaust stacks proposed as part of the project would only be partially visible from surrounding properties as part of distant views. The Proponent has indicated that it proposes to implement a number of mitigation measures to reduce the visual impact of the project, as follows:

- utilise dark tone and non-reflective materials for the colour and texture of structures;
- create an earthen and landscaped mound (measuring six metres in height above existing ground level and with a base of approximately 27 metres and a length of over 600 metres) following the contours of the land on the northern side of the power station to provide visual screening to views from the north;
- undertake broad scale tree and shrub planting within the project site in accordance with a vegetation plan to be developed;
- any lighting would avoid direct line of sight from homesteads to the east of the site;
- top of exhaust stacks would not be lit unless required by the Civil Aviation and Safety Authority and large floodlights would not be used for normal operations; and
- security lighting would not spill onto neighbouring residences or onto the Shale Sandstone Transition Forest endangered ecological community in Leafs Gully.

Issues Raised in Submissions

Many of the submissions raised visual impact as an issue of concern, particularly related to the height of the proposed stacks associated with project, as well as citing increased smog and haze in the local area and the Sydney Basin. One submission also indicated that the visual assessment did not clearly highlight that the maximum plume from the power plant would be 900 metres in height and result in significant adverse visual impacts which are considered unacceptable.

Campbelltown City Council considered in its submission that the power station will visually dominate the semi-rural landscape as viewed by commuters south of Campbelltown and therefore create the perception that this area of Campbelltown would be considered an "industrial suburb". Council is also concerned with the impact of lighting of the project on visual amenity. Council further states that no photomontages were provided for the views from the Hume Highway, the Southern Railway or Menangle Road and that this is considered to be a significant omission of the visual impact assessment. Campbelltown City Council also stated that the Environmental Assessment failed to satisfactorily assess the visual impact of the project as it did not take into account the proposed upgrade of the Appin Road/Access Road intersection which may require the removal of up to 44 trees or the greater visual impact that would result in the event that the area is redeveloped for urban purposes in the future. The submission also stated that the visual assessment did not provide any details of the impact of lighting from the project or from security lighting which could accentuate the visual prominence of the project, particularly at night time.

A submission from the Meadow Vale property was concerned with the "moderate" visibility rating assigned to the property and considered that the photomontages that were presented within the Environmental Assessment were not representative of the views of the plant that would be seen from the property or the visual impact that would result, which was described in the submission as "extreme and disastrous". A separate submission from the Mount Gilead property to the north of the site raised similar concerns and outlined that the view locations chosen in the Environmental Assessment were almost identical to those adopted for the previous Environmental Assessment and only included two locations for the Mount Gilead property which is some 800 hectares and covers much of the land area between the site and the Campbelltown suburbs. The submission also stated that there were no locations identified as view locations to assess visual impact within the southern suburbs of Campbelltown. Other concerns raised in this submission included the visual impact of security lighting, light glow

from the plant at night, the industrial nature of the development within a rural setting and that the exhaust stacks and the plant itself are not typical of a rural area.

The submission received from the Leafs Gully Action Group considered that the visual impact was based on the locality remaining as a rural area and that the assessment was flawed in that the selected viewpoints are not typical of the principal viewsheds and that the interpretation of the degree of visibility is masked by the extent of existing trees. The submission states that the visibility of the power station will significantly detract the outlook from existing and future residential areas and diminish the attractiveness of significant parts of the Appin-Gilead corridor and the Douglas Park locality for residential and community purposes. The submission concludes that the visual assessment does not adequately assess areas from which the proposal will be visible or take into account the visual impact on anticipated land use change in the locality.

The Department notes that a number of submissions relied on submissions submitted in relation to the previous application lodged by the Proponent which was subsequently withdrawn. Therefore, some of the comments made in these submissions were no longer relevant to the current application as parts of the Environmental Assessment had been revised.

Consideration

The Department has assessed the visual impact assessment provided in the Environmental Assessment and considers that an adequate level of assessment was undertaken by the Proponent. The Department has reviewed the issues raised in submissions and the Proponent's response and considers that the visual impact of the project is acceptable given that the plant would take up approximately 10 per cent of the site and there would be a sufficient buffer area between the power plant itself and the site boundary as well as the implementation of other mitigation measures to reduce visual impact. The Department notes that the Proponent utilised a crane to simulate the height of the proposed exhaust stacks and to aid in the assessment of the potential visual impacts of the project.

The visual assessment concluded that the majority of views of the project from existing residences would be limited to the upper portions of the exhaust stacks and that the majority of the views would be distant (around or in excess of two kilometres). The Department therefore expects that views of the project from the southern suburbs of Campbelltown would be unlikely to occur given the combination of topography and existing vegetation located between these areas and the site. The assessment clearly states that the exhaust stacks may be seen from a distance and in the context of open and expansive surrounding views but the Department understands that they would form a relatively small element within the total overall view and therefore considers the impact to be minor and acceptable.

Several submissions raised concern about the visual impacts of the project at the Mount Gilead property approximately two kilometres towards the north-east of the project. Given the distance from the project, intervening vegetation and topography, the Proponent has concluded that visual amenity impacts at this location are likely to be low. The Department further highlights that the vegetated bund proposed to be installed by the Proponent between the project and the northern boundary of the project site would reduce potential residual visual amenity impacts at the Mount Gilead property to negligible levels (if in fact any line of site remains after these screening works).

The Department agrees with the Proponent in stating that it can only provide an assessment based on conditions encountered at the time of the assessment and therefore cannot determine potential visual impacts based on what land uses may be developed in the future on the surrounding land. The Department therefore agrees with the Proponent in that it is extremely difficult, and not appropriate, to assess the visual impact of development that does not currently exist. In addition, the Department considers that the assessment of any future development would be extremely difficult to ascertain at this point in time and therefore there would be far too many variables that would need to be considered which would only result in a meaningless visual assessment. The Department also understands that a number of property owners denied access to properties as part of the visual assessment and in these cases only a desktop analysis was possible based on visual character, view catchments and visibility rating.

The Department understands, from the Proponent's Response to Submissions report, the plume from the exhaust stacks would not be visible and therefore would not result in any visual impact within the locality.

The Proponent has indicated that it will implement a number of mitigation measures to reduce the visual impacts of the project including a large earthen mound to aid in screening the proposal from northern properties and minimising the contrast between the project and the surrounding area as much as possible. Additional vegetation would also be planted within the site over a 30 hectare area as well as an enduring conservation area which would contribute to the formation of wildlife corridors between the Georges and Nepean Rivers. These plantings would, with time, also aid in screening the project from adjoining land and minimise the potential visual impacts of the project. The Department has recommended conditions of approval that reflect these commitments, and which require implementation of extensive vegetation screenings using locally endemic native vegetation.

5.3 Noise and Vibration Impacts

Issue

A noise and vibration assessment of the construction and operational phases of the project was undertaken as part of the Environmental Assessment. A worst case scenario was modelled in terms of noise considering neutral and meteorological conditions that enhance noise propagation.

Given the closest existing residential receiver is located at least one kilometre from the project, vibration levels from either construction or operation would not be perceptible and therefore no vibration impacts were predicted from the project. A vibration assessment was also undertaken on the Upper Canal which was identified by the Sydney Catchment Authority as potentially fragile. The Proponent undertook a vibration assessment for this structure based on a stringent 3 mm/s vibration limit which is often used to assess the impact on heritage structures. The predicted vibration levels during construction, however, were found to be less than 0.5 mm/s and much less than this during the project's operation and therefore given the low risk, a detailed vibration assessment was not considered necessary and was not undertaken.

The Proponent assessed noise associated with construction of the project taking into consideration construction traffic utilising Appin Road. The results of the assessment found that there would be minor increases in road noise during peak construction activities, however, there would be minimal risk in exceeding the 2 dB limit (i.e. 62 dBA during the day and 57 dBA at night time with the implementation of all reasonable and feasible mitigation. Operational noise impacts along Appin Road were predicted to be negligible with no noise impact expected attributable to the project. As part of the operational noise assessment undertaken, only one resident agreed to a noise logger next to their residence to collect noise data. As stated in the Environmental Assessment the other noise loggers were required to be placed within the boundary of the site in locations that were deemed representative of the noise currently experienced by nearby residences. The unattended monitoring results were presented in Table 12-2 of the Environmental Assessment which has been reproduced below as Table 3.

Table 3 – Measured Noise Levels

Location	Representative of Residence	Time Period (see notes)	Rating Background Noise Level (dB(A))
Logger Location A	Residences 4, 5 and 6	Daytime	30
		Evening	32
		Night time	33
Logger Location B	Residences 1 and 3	Daytime	36*
		Evening	36*
		Night time	36*
Logger Location C	Residence 2	Daytime	28**
		Evening	31
		Night time	31
Logger Location D	Residence 3	Daytime	30***
		Evening	31
		Night time	28**

Source: Table 12-2 from Proponent's Environmental Assessment (URS, 2008).

Notes: Daytime is defined as 7.00 am to 6.00 pm; evening 6.00 pm to 10.00 pm and night time 10.00 pm to 7.00 am. On Sundays and public holidays, daytime begins at 8.00 am and night time ends at 8.00 am.

* Level likely to be influenced by local environment, possibly wind, insects, frogs, however development of operational noise criteria has not been affected.

- ** The Industrial Noise Policy considers the lowest rating background level as 30 and therefore any measured lower level is assigned a 30 dBA level.
- *** A level of 31 dBA was derived from measured levels however given that there may have been an influence of wind, a level of 30 dBA has been adopted.

Based on noise levels presented in Table 3, Project Specific Noise Levels (PSNL's) were established for both the construction and operational phases of the project based on the Rating Background Level (RBL). Since the preparation of the noise impact assessment, DECC has released the *Interim Construction Noise Guideline (July 2009)*. This document provides contemporary guidance on managing and regulating noise from construction activities and the Department has used the guideline to determine the construction noise objectives for the project which are set at the $L_{Aeq(15min)} = \text{background noise} + 10 \text{ dB(A)}$. Based on the RBL established for the project, levels of between $L_{Aeq(15min)}$ of 40 and 46 dBA will apply for the duration of construction activities at the nearest receivers.

The construction noise assessment presented in the Environmental Assessment indicated that only a negligible 1 dB(A) exceedance was predicted to occur during construction at Residence 3 however this was based on a methodology for construction noise impact assessment which has recently been superseded by DECC's *Interim Construction Noise Guidelines (2009)*. Utilising the new guidelines for the assessment of construction noise indicates that predicted construction noise levels would comply with the guidelines such that no adverse noise impact is expected from construction activities. The Proponent has nevertheless indicated that it would prepare a Construction Noise Management Plan which would confirm the modelling undertaken as part of the Environmental Assessment and investigate reasonable and feasible mitigation measures to reduce construction noise impacts if necessary.

In relation to operational noise, the most stringent criteria is the intrusive criteria and this was adopted for the project which results in a noise criteria of $L_{Aeq,15min}$ of 35 dB(A), which aligns with the most stringent criterion within the NSW Industrial Noise Policy. The primary sleep arousal criteria adopted is 45 dB(A) L_{Amax} during the night time period. The results of the noise impact assessment are summarised in Table 4.

Table 4 – Predicted Noise Levels

Location	Time Period	RBL* dB(A)	Construction $L_{Aeq(15min)}$			Operation $L_{Aeq(15min)}$		
			Criteria (PSNL)	Predicted Noise Level	Meet Criteria	Criteria (PSNL)	Predicted Noise (under enhanced meteorological conditions)	Meet Criteria
Residence 1**	Day	36	40	< 40	Yes	35	25-28	Yes
	Evening	36	N/A	-	-	35	27-29	Yes
	Night	36	N/A	-	-	35	28-29	Yes
Residence 2	Day	30	40	< 40	Yes	35	29-30	Yes
	Evening	31	N/A	-	-	35	30-31	Yes
	Night	31	N/A	-	-	35	30-31	Yes
Residence 3**	Day	30	40	< 40	Yes	35	32-38	No
	Evening	31	N/A	-	-	35	35-39	No
	Night	30	N/A	-	-	35	38-40	No
Residence 4**	Daytime	30	40	< 40	Yes	35	32-33	Yes
	Evening	32	N/A	-	-	35	33-34	Yes
	Night	33	N/A	-	-	35	33-34	Yes
Residence 5**	Daytime	30	40	< 40	Yes	35	31-35	Yes
	Evening	32	N/A	-	-	35	36-37	No
	Night	33	N/A	-	-	35	35-37	No
Residence 6**	Daytime	30	40	< 40	Yes	35	31-34	Yes
	Evening	32	N/A	-	-	35	34-35	Yes
	Night	33	N/A	-	-	35	33-35	Yes

Notes: *Adapted from Table 3 and prepared by the Department

** While the measured noise levels were higher for these residences, the Proponent has assigned 30 dBA for assessment purposes which is considered conservative.

The operational noise assessment found that a minor exceedance of the criteria (by between 1-2 dBA) was predicted for Residence 5 and an exceedance of up to 5 dBA was predicted for Residence 3 based on an adopted intrusiveness criteria of $L_{Aeq, 15 \text{ min}}$ of 35 dBA for all residential receivers.

The Proponent then considered a number of mitigation measures to ameliorate the expected noise impacts from the project. While the final items of plant has yet to be finalised, the Environmental Assessment only outlined typical mitigation measures that could be implemented to meet the criteria of 35 dB(A) at Residence 3, the most affected residential receiver. The Environmental Assessment modelled the effect of the inclusion of a silencer and enclosure around the generator and turbine which indicated that the operational noise criteria could be met at all residential locations with the highest noise level predicted as 33 dB(A) during the evening and night time period at Residence 3, as shown in Figure 8. Therefore, the resultant noise levels with the implementation of these measures are summarised in Table 5.

The Proponent's sleep disturbance modelling indicates that the project would be able to comfortably achieve the DECC criteria of 45 dBA L_{Amax} at all surrounding receivers.

Table 5 – Predicted Noise Levels (with Mitigation)

Location	Time Period	Operation $L_{Aeq(15min)}$		
		Criteria (PSNL)	Predicted Noise (under enhanced meteorological conditions) with mitigation	Meet Criteria
Residence 1	Day	35	22-26	Yes
	Evening	35	24-26	Yes
	Night	35	26-27	Yes
Residence 2	Day	35	23-24	Yes
	Evening	35	24-25	Yes
	Night	35	24-25	Yes
Residence 3	Day	35	28-32	Yes
	Evening	35	29-33	Yes
	Night	35	32-33	Yes
Residence 4	Daytime	35	25-26	Yes
	Evening	35	26-27	Yes
	Night	35	26-27	Yes
Residence 5	Daytime	35	24-27	Yes
	Evening	35	28-29	Yes
	Night	35	27-28	Yes
Residence 6	Daytime	35	25-27	Yes
	Evening	35	27-28	Yes
	Night	35	27-28	Yes

Low Frequency Noise

The Industrial Noise Policy requires a correction of 5 dB(A) to be added to predicted noise levels to take into consideration low frequency noise, where a difference of 15 dB exists between C and A weighted noise levels. Using this approach, the Environmental Assessment identified that the project has the potential for low frequency noise. The Proponent, however, has reviewed overseas research which indicates that the use of the approach in the Industrial Noise Policy is not suitable when the noise levels are low. The Proponent has applied new methodology developed in the United Kingdom to conclude that the proposal is unlikely to generate low frequency annoyance impacts at nearest sensitive receivers and accordingly, a 5 dB(A) adjustment to the operational noise criteria was not applied.

If the Proponent's alternative approach to low frequency noise were not accepted, and the 5 dB(A) penalty applied, only residence 3 would be subject to noise impacts above the Industrial Noise Policy criteria, and then by no more than 2-3 dB(A).

Issues Raised in Submissions

The majority of submissions raised noise as an issue of concern for the project, however, the majority of submissions received were in the form of form letters with the noise issue specified as either from turbine noise or

from construction traffic. The DECC indicated that it did not accept the alternative method presented by the Proponent to assess low frequency noise and stated that the current method specified in the Industrial Noise Policy has been reviewed by industry and community representatives and approved by Cabinet as a "whole of government" policy and therefore it is not appropriate to accept other methods such as outlined in the Environmental Assessment without stakeholder consultation and further policy development, if necessary. The DECC has indicated that it is able to consider any reference material the Proponent may wish to provide which would be considered when the Industrial Noise Policy is next reviewed. In the interim, the DECC has indicated that its recommended conditions of approval in relation to noise requires correction factors to be included in accordance with the Industrial Noise Policy.

A submission was also received from the Meadow Vale residence which is Residence 3, referred to in the noise impact assessment. This submission states that the highest noise levels will be experienced at the property, and because the assessment has been based on the Industrial Noise Policy, this demonstrates that the surrounding rural landscape will be transformed into an industrial landscape and will allow further heavy industry to be developed in the area. The submission states that the peace and tranquillity of the existing rural environment and the rural setting of the property will be destroyed.

Another submission stated that the introduction of an industrial land use into an established rural area in close proximity to the property boundary is not considered to be resolved through noise controls. The submission states that noise goals and landscaped bunds will not disguise the fact that there is a heavy industrialised land use in very close proximity to Mount Gilead and will effectively sterilise the land adjacent to the southern boundary of Mount Gilead for anything other than low intensity grazing or cropping.

The submission further states that noise from the project will significantly affect the Meadow Vale property and compromise a significant part of the Mount Gilead property and that this could only be resolved if the plant itself was located further to the south towards the central area of the site which would result in greater buffer zones and separation distances between the plant and established land uses.

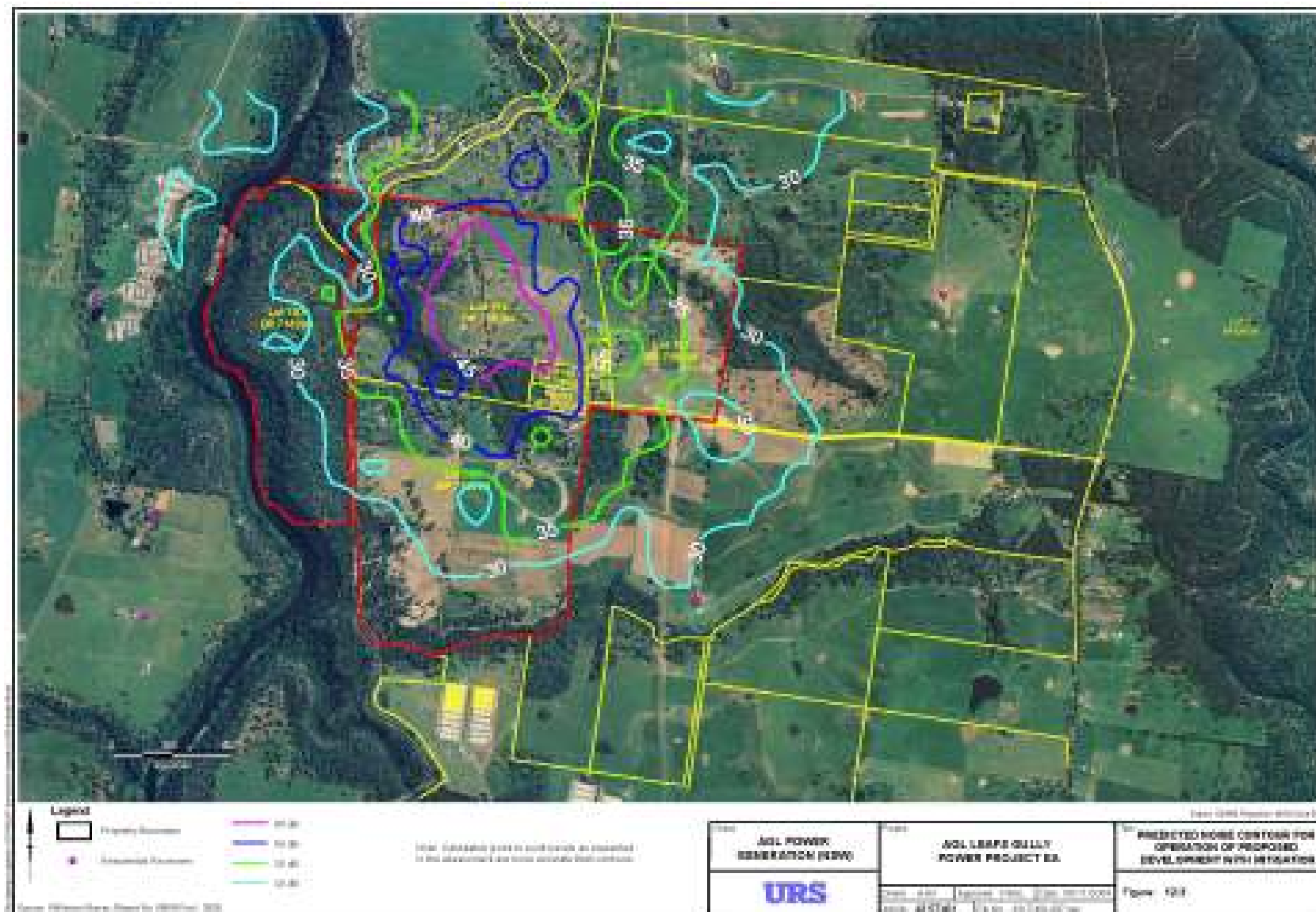
One submission indicated that noise impacts from the project would be severe on lands owned by the Mir Group to the south and east of the site and will affect the potential for these lands to be developed for urban development. The submission states that these lands are elevated above the site and no effective barrier is provided.

The submission prepared on behalf of the Leafs Gully Action Group has been based on the premise that the Macarthur South land will be developed for urban purposes and that a district centre is proposed to be located adjacent to the Leafs Gully site in accordance with a Master Plan which was developed in 1991. The submission notes that the noise assessment indicated that it would be possible to achieve a maximum of 40 dBA $L_{Aeq,15 \text{ min}}$ at the boundary of the site, however, due to the extremely quiet setting of the project, the Proponent should be able to achieve a maximum noise level of 35 dB(A) at the boundary of the site. This submission is sceptical of the size of the project when compared to the size of the site such that it raises the possibility of the project becoming a base load plant and also indicates the likely location of a second plant on the site to result in the combined electricity output of 1200 MW (nominally 1440 MW). In terms of noise, the submission raises concerns that the operation of the power station over longer period of time would raise the $L_{Aeq,15 \text{ min}}$ to substantially higher noise levels.

Consideration

The Department has reviewed the noise impact assessment provided as part of the Environmental Assessment, the issues raised in the submissions and the Proponent's response to the submissions and considers that potential noise and vibration impacts have been adequately addressed for the construction and operation of the project, with the exception of the assessment of low frequency noise which has not applied the correction factor as required by the Industrial Noise Policy and is further discussed below. The Industrial Noise Policy is the correct policy to assess the development against as the project itself is industrial, however, the Department does not consider that this fact indicates that the region will be transformed to an industrial landscape in the future, as stated in some of the submissions received.

Figure 8 –Noise Monitoring Locations



Source: Figure 12-2 of the Proponents Environmental Assessment (URS, 2008)

The Department notes that the Proponent proposes to implement mitigation measures to the plant to minimise the generation of noise such that the operational noise criteria at the closest residential receivers are met. While the Proponent has indicated that it is difficult to confirm the specific mitigation measures that will be implemented on the plant at this stage as the plant selection has yet to be finalised, the Department considers that the project should be made to comply with the operational noise criteria and has therefore recommended noise limits at the nearest residential receivers as part of the recommended conditions of approval. Further, the Department is satisfied that engineering solutions exist to enable the project to be designed and operated to achieve these limits. The exact nature of the engineering solution, however, is a matter that should be left to the Proponent to determine, rather than mandating a particular mitigation strategy through the conditions of approval.

The Department has considered the issues which have been raised in the submissions and reiterates that the requirement of the Proponent to meet stringent operational noise limits at the nearest residential receiver will ensure that the surrounding rural environment is not adversely affected by noise. The submission from the Leafs Gully Action Group has based much of its concerns on a Master Plan developed for land within Macarthur South by the Department in 1990/91. This study, which is nearly 20 years old, is no longer relevant to the development of this area having been superseded by the Metropolitan Strategy. The Metropolitan Strategy has clearly stated that although the Macarthur South area has been identified as being suitable for urban development, lands outside the growth centres which are not part of the Metropolitan Development Program are not required for urban development prior to 2031. The only land within any medium-term potential for urban development is located two kilometres from the boundary of the site and therefore would not be affected by the project in any way. It is worth noting that if the site and surrounding lands was already developed for urban purposes, it would attract a significantly higher amenity noise level of 45 dB(A) and it is likely that the intrusive noise criteria would also increase commensurate with the increase in population density. Further, it is clear from consideration of the noise contours generated as part of the Proponent's noise assessment that land affected by 35-40 dB(A) from the project is minimal and generally only around the northern boundary of the project site and to a lesser degree to the south east. This limited extent of impact is not expected to significantly affect the potential for development of surrounding land should a decision be made in future that additional urban development on that land is warranted and appropriate.

The submission from the Leafs Gully Action Group also states that there is the potential that the project will be transformed into a base load plant in the future or even duplicated on the site such that up to 1200 MW (nominally 1400 MW) of electricity could potentially be generated. The Department does not consider it appropriate to speculate about uncertain potential future developments as part of this assessment. Approval for the project is for a nominal 360 MW facility only and any future application to change or expand the project would require a separate application to be made. The Department has recommended a condition of approval requiring the Proponent to demonstrate satisfactory environmental performance of the nominal 360 MW before seeking to expand or intensify the operation beyond that level.

The Department considers that the construction noise impacts predicted in the Environmental Assessment are reasonable given that construction traffic will be mixing with high traffic volumes on Appin Road and notes that the volumes as a result of the construction of the project would only represent two percent of total traffic flows which is considered to be negligible. The Proponent has indicated that it would prepare a Construction Noise Management Plan to ensure that noise from construction works is minimised and that reasonable and feasible noise mitigation measures are investigated and implemented where necessary. The Department has outlined the required scope of such a Plan as part of its recommended conditions of approval and requires it to be prepared in accordance with the DECC's recently released *Interim Construction Noise Guideline* (2009).

With respect to low frequency noise, the Department notes that the Proponent has utilised new methodology developed by the United Kingdom's Department of Environment, Food and Rural Affairs (DEFRA) to assess the likelihood of the project to generate low frequency noise, in preference to the approach outlined in the NSW Industrial Noise Policy. The Proponent has argued that low frequency noise is low enough to be below the threshold of hearing and has indicated that low frequency noise associated with the operation of the plant is not expected to be an issue of concern.

The Department is satisfied that the alternate methodology proposed by the Proponent provides a robust basis for the consideration of low frequency noise impacts such as to not warrant the inclusion of a 5 dB(A) correction to predicted noise levels to account for low frequency noise. While this is contrary to recommendations made by the DECC in its submission about the project, the Department is satisfied that the assessment methodology adopted by the Proponent is consistent with world's best practice and demonstrates that the project can be designed so as to achieve acceptable low frequency noise limits at nearest surrounding receivers.

The Department has also received separate advice from Dr Norm Broner, who is currently the President of the Australian Acoustics Society and a leading world authority on the assessment and effect of low frequency noise particularly with regard to gas-fired power stations. Following receipt of the abovementioned advice, the Department understands that low frequency noise impacts usually occur where the difference between the C-weighted noise levels and the A-weighted noise levels are in the range of 25-40 dB. In basic terms, A-weighted noise levels reflect the response of the human ear to noise at different frequencies, and places less weight on lower frequencies (to which the human ear generally does not respond as much). C-weighting does not make such a sharp distinction of response based on frequency, and is typically employed when considered peak noise or noise sources with significant bass qualities.

The advice from Dr Broner indicates that low frequency noise problems could occur where the difference between A-weighted and C-weighted noise is as low as 15 dB. However, scenarios in which this difference could be expected to occur are rare, and would typically only occur where C-weighted noise exceeds an L_{eq} of 65 dB(C). For the Leafs Gully Power Project, the dB(C) sound pressure level at the nearest residential receiver was calculated as 48 dB(C) (significantly below L_{eq} 65 dB(C)), meaning that low frequency noise is not expected to result in any perceptible impacts.

The Department has recommended that a condition of approval be provided regarding low frequency noise which states that the modification factors outlined in the NSW Industrial Noise Policy specifically in relation to low frequency noise, only apply where the difference between the C-weighted and A-weighted noise level are equal to or greater than 15 dB and where the dB(C) noise level is greater than L_{eq} 65 dB.

5.4 Traffic and Transport Impacts

Issue

An assessment of the existing traffic and transport network in the vicinity of the site and the potential impacts from the construction, operation and maintenance of the project was undertaken as part of the Environmental Assessment.

The principal link to the site is via Appin Road, defined as State Route 69. It is a sealed, two lane road with a posted speed limit of 80 km/hour which is maintained and controlled by the NSW Roads and Traffic Authority. Surveys undertaken in 2006 on Appin Road indicated that two way traffic flows on Appin Road were approximately 9,330 vehicles per day with heavy vehicles making up 9.5 per cent of the total traffic flow. The road has been described as operating with a performance level of service "E" which by definition, indicates that traffic volumes are at, or close to, capacity.

The site is presently accessed via a private narrow 10 metre wide road reserve which is 2.3 kilometres in length with limited passing opportunities. The level of service currently provided by the intersection with the private access road and Appin Road is "A" which is classified as "good". The access road is proposed to be upgraded as part of the project together with its intersection with Appin Road.

The project is expected to take 18 months to construct with approximately 271 heavy vehicle movements and 694 light vehicle movements per month (12 heavy vehicle and 32 light vehicle movements per day) expected on both Appin Road and the private access road. The Environmental Assessment states that the large gas turbines, generator and high voltage transformer components would be imported into Australia and transported from the Wollongong area to the site by special road convoy utilising over-dimensional and/or over-mass escorted truck convoys. With the exception of the Appin Road intersection with the private access road and the associated right turn bay widening and sealing the shoulder of Appin Road, no improvements or temporary upgrades of the state road network are proposed as part of the project. In terms of impacts on traffic flows along Appin Road, the

Environmental Assessment indicates that the change in midblock traffic volumes from construction would be small (less than two per cent) and the level of service along Appin Road would not change as a result of project construction. The Proponent has stated that the proposed right turn lane providing access to the site for southbound traffic on Appin Road would result in unimpeded traffic flow along Appin Road.

The Environmental Assessment states that the narrowness of the existing Appin Road and the private access road combined with the skewed angle of entry would constrain the configuration of the intersection and restrict heavy vehicle movements. Large vehicles (greater than 12.5 metres) approaching the site from the south would not be able to turn left into the access road and would be required to continue along Appin Road and return via the Copperfield Drive roundabout, entering the site using the newly constructed right turning lane. The modelling of construction traffic flows on the Appin Road/access road intersection indicates that the intersection would continue to operate with a "good" level of service.

During the operational phase staff levels are expected to average five full time persons generating eight to 10 vehicle trips during the morning and evening peak periods which is similar to the current traffic generated by the four residential properties located on the site and therefore would not result in any adverse traffic or transport impacts.

The Environmental Assessment indicated that maintenance periods would generate approximately 87 vehicles in the peak hour and approximately 180 over the day and last for approximately four to six weeks, once every three years or more. Analysis of the intersection performance during the maintenance period indicated an acceptable level of service.

Issues Raised in Submissions

Apart from form letter submissions which raised the construction of the project as an issue of concern with respect to traffic congestion on Appin Road, the only other submission received regarding traffic and transport issues was from the RTA.

The RTA has indicated that it endorses the recommendation that a type "CHR" intersection treatment be constructed for right turn movements into the private access road from Appin Road and to widen and seal the existing road shoulder on the western side of Appin Road, however, it raised concerns associated with the tightness of a vehicle larger than 12.5 metres being about to turn left from the northbound carriageway of Appin Road into the private access road. The RTA has further stated, that although the Proponent has recognised the difficulty for trucks turning left from Appin Road, erecting a regulatory "No Left Turn" sign at the driveway access facing northbound motorists would not be legally enforceable as the private access road is not classified as a public road. The RTA provided a number of other design requirements in relation to the proposed intersection between Appin Road and the private access road which it requested be included in any conditions for the project.

Consideration

Traffic and transport was not an issue that was raised repeatedly as part of the issues raised in the submissions, however, the Department considers it an issue that requires discussion due to the proposed upgrade of the intersection between Appin Road and the private access road and the associated proposed widening of Appin Road within the locality to cater for a right turn movement into the project site from the southbound carriageway.

The Department has reviewed the traffic and transport assessment provided in the Environmental Assessment and the issues raised in the submissions and the Proponent's response and considers that construction traffic impacts would not be significant for the duration of construction activities. Although there may be times when large items of equipment will need to be transported to the site which may cause minor traffic impacts, these occurrences would be infrequent and not unduly impact on road users. The Environmental Assessment states that detailed route assessment studies will not be undertaken until the detailed design stage when the equipment supplier is selected and the port for delivery of overseas equipment is known. The Proponent has stated that management by experienced haulage contractors and liaison with the RTA, Police and local government would be mandatory to ensure the safety and amenity of the greater community. The Department considers that this approach to traffic management during the construction phase of this project is reasonable.

In terms of the proposed intersection upgrade between Appin Road and the private access road, the Department agrees with the issues raised by the RTA in its submission and recommends that specific conditions be included in the project approval to require that the proposed intersection design treatment between Appin Road and the private access road be undertaken to the satisfaction of the RTA and that a separate swept path analysis and road safety audit be undertaken and submitted to the RTA to ensure that heavy vehicles accessing the site from the northbound carriageway along Appin Road can continue north and utilise the Copperfield Drive roundabout to u-turn and access the site from the southbound carriageway of Appin Road. The recommendations outlined by the RTA in its submission have been included within the recommended conditions of approval for the project.

The Department considers that the operational traffic impacts of the project would be negligible and no additional mitigation measures to reduce traffic impacts are required to be implemented by the Proponent.

5.5 Flora and Fauna Impacts

Issue

The Environmental Assessment included the results of a botanical survey and a fauna survey that was undertaken on the site by the Proponent and its specialist consultants. A total of 88 flora species were identified during the surveys, 20 of which were exotic to the area including noxious weeds. One threatened species, *Pultenaea pedunculata* was recorded on the site, this species being listed as endangered in Schedule 1 of the *Threatened Species Conservation Act, 1995*. This plant would not be impacted by the project and would be fenced to reduce the likelihood of accidental impact during construction and operational activities.

Shale Sandstone Transition Forest, an endangered ecological community (EEC) listed under the *Environment Protection and Biodiversity Conservation Act 1999* and the *Threatened Species Conservation Act 1995* was also identified on the site with remnants of this community occurring throughout the site. The Environmental Assessment, however, indicates that the footprint of the project was repositioned to avoid any impact to Shale Sandstone Transition Forest EEC within the site. Mitigation measures such as the implementation of fencing and the set back of any plant and equipment 40 metres from the boundary of the EEC would also ensure that there would be no significant impact from the project on this community. The Environmental Assessment described the habitat that occurs within the site based on each lot that makes up the site which has been summarised as follows:

- lot 101 is generally cleared and has been used for grazing purposes in the past. A tributary to the Nepean Creek runs through the northern portion and is lined with remnants of Shale Sandstone Transition Forest EEC and provides habitat to native fauna especially reptiles and amphibians. Forest Red Gum, a known Koala feed tree also occurs abundantly within the lot;
- lot 102 is generally cleared, however, contains a large remnant of Shale Sandstone Transition Forest EEC within its eastern portion. The Grey Gum, a known Koala feed tree also occurs abundantly within the lot. The cleared areas of the lot support native grasses and given their proximity to large stands of native vegetation would provide optimal feeding habitat for a range of native mammals. Several farm dams within the lot would provide habitat for a number of water birds. The lot includes the Leafs Gully watercourse which supports a range of habitats for reptiles and amphibians;
- lot 103 is dominated by Shale Sandstone Transition Forest EEC and is not proposed to be developed in any way As part of the project; and
- access Road/Appin Road – the mature trees located along this corridor were surveyed for hollows and evidence of Koala activity however none was observed.

In terms of fauna, the surveys recorded two species of reptiles, 38 species of birds and 21 species of native mammals. Six of the native fauna species that were recorded, all of which are bat species, are listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* and/or the *Threatened Species Conservation Act, 1995*. In addition, several Grey Headed Flying Fox were observed flying over the site during spotlighting surveys, these species of which are listed as vulnerable under both the *Environment Protection and Biodiversity Conservation Act 1999* and the *Threatened Species Conservation Act, 1995*. The Environmental Assessment concluded that the project would not result in significant impacts to these species.

While Koalas were not recorded on the site they have been recorded within five kilometres of the site with healthy habitat occurring in the Wedderburn and Dharawal State Conservation Area on the western side of Appin Road.

The Environmental Assessment states that it is not expected that Koalas would commonly frequent cleared areas of the site due to its high level of disturbance for agricultural uses and the presence of domestic animals and other predatory animals such as foxes. Two species of feed trees (Forest Red Gum and Grey Gum) were recorded on the sites within cleared paddocks, however, the Shale Sandstone Transition Forest EEC contains a greater number of these trees and a greater diversity of Koala feed trees and therefore the Environmental Assessment concluded that habitat quality within the cleared paddocks for the Koala was low, with them expected to utilise less disturbed areas of higher habitat value.

As part of the Environmental Assessment, an evaluation of the current and future potential of the site for Koalas was undertaken in addition to the flora and fauna assessment. The study indicated that Koala habitat on the site exists primarily within the vegetation along Malley Creek, Leafs Creek, Nepean River Gorge and the "Northeast" Creek. The study site has been mapped as preferred Koala habitat by Campbelltown City Council in 2005 and the presence of Koala feed trees and the proximity to known Koala areas indicated to the Proponent that the site could be utilised by a resident Koala population and has the potential to facilitate the movement of Koalas. The Environmental Assessment states that the site is considered to be situated to enhance connectivity for the Koala between known populations at Campbelltown, to other populations to the south and to the Blue Mountains in the west. A number of habitat corridors are proposed to be provided as part of the project which would be supplemented with the planting of native species found on site inclusive of Koala feed trees which would increase the Koala habitat on the site. The location of significant vegetation on the site and the proposed habitat corridor plantings to be undertaken by the Proponent are shown on Figure 9.

As indicated in Figure 9, the Proponent also proposes the establishment of a *Pultenaea* Recovery Area to improve the likelihood of regeneration of this species. As part of this, the Environmental Assessment states that certain management measures will be implemented in this area to allow for the future survival and natural germination of the species including cessation of grazing, control of exotic grasses, monitoring and conducting a low intensity burn to facilitate germination from the seed bank.

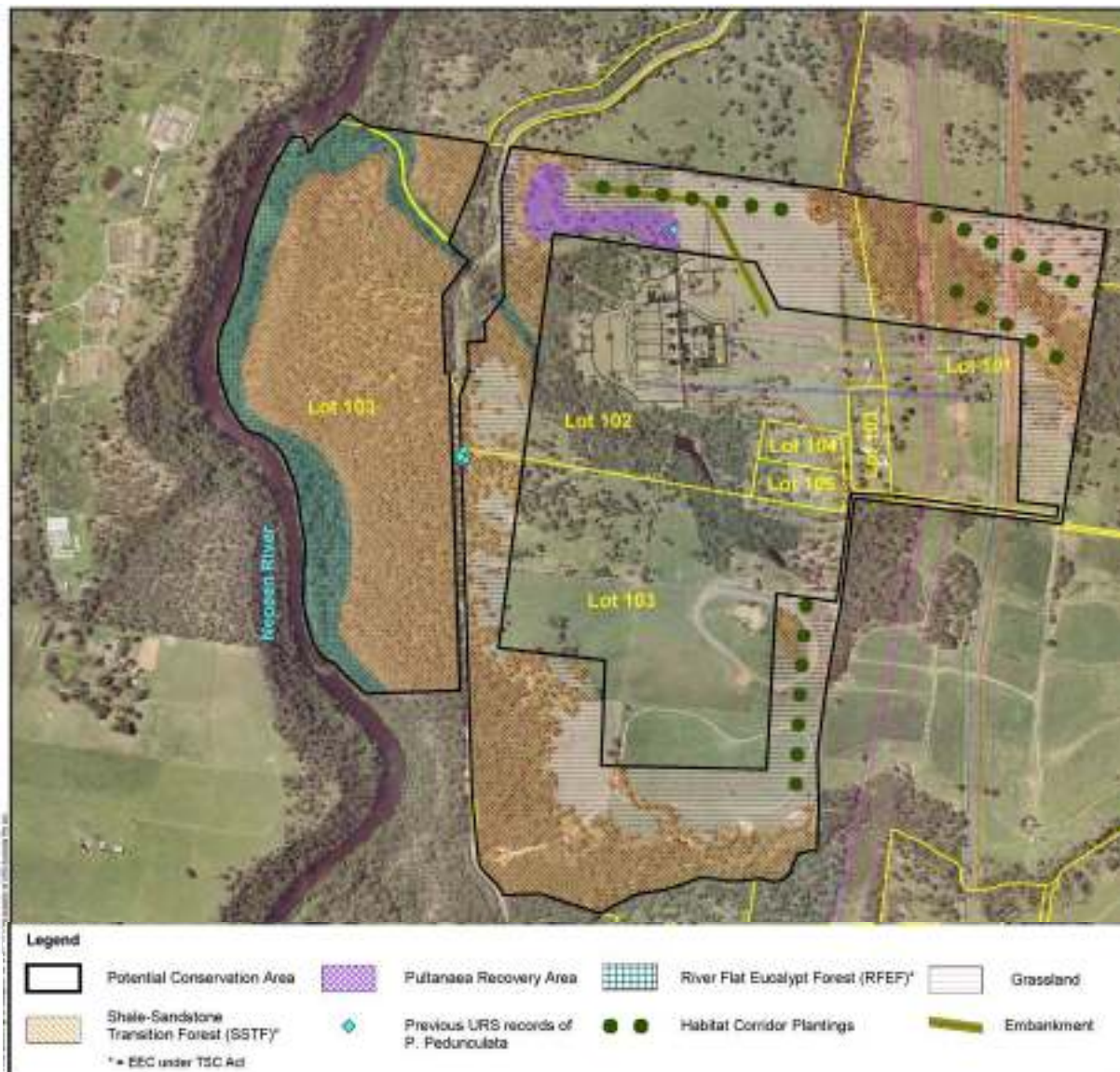
In terms of the upgrade of the access road and the intersection of the access road and Appin Road, the Environmental Assessment indicates that a worst case scenario was assessed which was based on the removal of 44 trees as part of the carriageway widening along Appin Road. The Environmental Assessment states that if the design of the road can utilise the existing road formation, the number of trees that require removal would be reduced. Of the total trees which may require removal, 61 per cent comprise mature trees with either branch or trunk hollows with Grey Gum being the dominant species. The trees ecological significance and suitable habitat for fauna is degraded given their proximity to Appin Road and the resultant interference of traffic and associated headlight impacts for foraging.

The Environmental Assessment indicates that the proposed pipeline connecting the power plant to the Sydney Catchment Authority's Upper Canal would be designed not to require the removal of any trees. Similarly, the transmission lines and gas pipelines are located within cleared areas of the site and would not result in any impact to significant vegetation.

The Proponent has indicated that it proposes to set aside and maintain a large portion of land for conservation purposes in perpetuity totalling an area of 172.4 hectares. The land would be re-titled for conservation purposes either through a Voluntary Conservation Agreement or the Proponent would enter the land into the NSW Biobanking Scheme or some other enduring protection mechanism.

The key features of the area, as stated in the Environmental Assessment, include:

- 119 hectares of native bushland which comprises vegetation of high conservation value (i.e. EECs);
- conservation of habitat for *Pultenaea pedunculata* and other threatened plants that may occur within the locality;
- protection of large tracts of vegetation that provide habitat for threatened fauna, including the local population of Koalas; and
- protection of a wildlife corridor that links riparian vegetation.

Figure 9 – Endangered Vegetation and Proposed Management Measures

Source: Figure 13-2 from the Proponent's Environmental Assessment (URS, 2008)

Issues Raised in Submissions

A large number of submissions raised flora and fauna as an issue of concern. The majority of submissions were form letters and other submissions that made simple statements commenting on flora and fauna issues associated with the project which can be summarised as follows:

- disturbance to wildlife/destruction of habitat no matter how much mitigation work is done;
- danger of wildlife being run over from increased traffic along the access road, particularly during construction;
- the area needs to be left for wildlife; and
- prefer the local bushland to remain for people to enjoy.

Other submissions provided more detailed comments regarding the project's potential flora and fauna impacts with a number of rural residential property owners in the surrounding area stating that flora and fauna issues seemed to be given more importance by the Proponent than the impacts of the project on air quality and health and that Koalas have not been seen in close proximity to the site for a considerable amount of time. The Meadow Vale property owner indicated that the statement made by the Proponent that the project would "enhance habitat connectivity and quality for the Campbelltown Koala population" was considered to be ludicrous.

and also indicated that a Koala has not been sighted on the property for at least 40 years. This was also supported by a similar submission received from the Mir Group which indicated that Koalas have not been sighted on its land for at least three decades. The submission from the Mir Group also considered the suggestion that the site be used as a koala sanctuary to be ill-informed.

Another submission stated that the Proponent would need to have the protection of a permanent Conservation Agreement entered into with the DECC in order to secure its enduring tenure and ongoing appropriate management.

Consideration

The Department considers that an adequate assessment of the potential flora and fauna impacts of the proposal was undertaken as part of the Environmental Assessment. The proposed plant will be located in a paddock which is generally cleared of any significant vegetation and therefore the impact on biodiversity values would be negligible. The Department supports the Proponent's commitment to undertake native vegetation planting on approximately 30 hectares within the project boundary which would develop habitat and movement corridors across the site over time in addition to the establishment of a Pultenaea Recovery Area to improve the habitat quality of this endangered species. The Department also notes that the Proponent is proposing to establish a Conservation Area spanning Lots 101, 102 and 103 totalling an area of approximately 170 hectares which would be re-titled and conserved in perpetuity. The Department understands that the enduring protection mechanism for this area would be resolved following discussions with the DECC. The Department has recommended a specific condition of approval that requires the Proponent to have agreed on a conservation mechanism with the DECC and the Director-General within 12 months of the commencement of construction.

5.6 Property and Land Use

Issue

The Environmental Assessment states that the site is located 4.5 kilometres north-west of Appin township with the surrounding land use comprising rural residential development generally on medium sized land holdings. Ingham's Appin Broiler Complex adjoins the southern boundary of the site and the Nepean River forms its western boundary. The Mount Gilead group of properties is listed in the local environmental planning instrument, classified by the National Trust and listed under the Heritage Act 1977. This site is located approximately three kilometres from the boundary of the development site and the Environmental Assessment indicates that they would not be impacted by the project. Meadowvale is an early Hume house which is located approximately 1.5 kilometres north east of the site which is also listed within the local environmental planning instrument and classified by the National Trust.

The project would change the land use of the site as it is currently used primarily for grazing, however, the implementation of mitigation measures for noise levels, air quality, water quality, traffic and transportation and visual amenity would mean that the surrounding existing and future land use is not expected to be affected by the construction or operation of the project. The Environmental Assessment indicates that the project is unlikely to have a significant impact on surrounding land uses given it is only proposed to operate for up to 15 per cent of the year and occupy a small proportion of the site. Additionally, a large buffer would exist between the proposed power station and existing surrounding residential dwellings.

In terms of future land use characteristics, the Environmental Assessment relied on information from the Sydney Metropolitan Strategy and the Metropolitan Development Program. The Environmental Assessment states that these documents indicate that the South West Growth Centre is the focus for future residential development within the region although the Mount Gilead release area (which is located approximately two kilometres from the boundary of the site) was identified in the Metropolitan Development Program as potentially able to provide 1,340 dwellings when zoned and serviced. The Environmental Assessment states that a strategic review undertaken in 2007 determined that the development of the Macarthur South area was not required to address regional and metropolitan housing needs.

Issues Raised in Submissions

Consultation undertaken as part of the Environmental Assessment provided a range of views regarding land use and property impacts. The Proponent stated in the Environmental Assessment that as a result of community consultation some landowners indicated that they had invested in the area based on the potential for future subdivision and urban development while others indicated their preference for the area to retain its rural character. These alternate views were also reflected in submissions received by the Department during the public exhibition period with some submissions received from community members stating that they oppose the project as it will adversely impact on the rural character of the area while others, including property developers and Campbelltown City Council, were concerned that the project would adversely impact property values and compromise the potential for future urban development in the locality. A number of submissions raised the industrial nature of the project and raised concerns that approval of the project may lead to further industrial development within the locality.

Campbelltown City Council further stated in its submission that the strategic co-location of electricity transmission line networks and natural gas pipelines in the vicinity of Mt Gilead and elsewhere in the Macarthur South area would mean that an approval of the project could set a precedent for the construction of other additional power generating facilities in the locality. Campbelltown City Council indicated that the proximity of one or multiple such facilities in the Macarthur South area would lead to the sterilisation of the future potential urban development of the area to Sydney's future housing disadvantage. Campbelltown City Council considered that any future development within the immediate locality would only be sustainable as low-density development, however, that the value of land would be less than would otherwise be the case if the project was not constructed.

One submission also stated that the project could only be appropriate if a significant buffer zone or separation distance was created between the proposal and the established and long standing uses of the area and that this could only be achieved by locating the plant further south within the site.

Consideration

The Department has taken into consideration the views expressed by the community and other stakeholders in the submissions received during the exhibition period and has reviewed the relevant sections of the Environmental Assessment and the Proponent's response to the submissions. The Department considers that the site is appropriate for the construction and operation of the project being strategically located in close proximity to gas supply and electricity transmission infrastructure. In addition, the Department considers that the plant would occupy a small proportion of the site with the remaining area being available to buffer the plant from surrounding existing land uses. The location of the plant within the site has also been assessed and the Department accepts the Proponent's reasons for not locating the plant centrally within the site as this would have disadvantages for utility connections and potential impact to endangered ecological communities.

The fact that the plant would only operate for up to 15 per cent of the year would also ameliorate any potential adverse impacts in relation to noise and air quality on surrounding land uses. The conservation of a large proportion of the site including the additional planting of vegetation over an area of 30 hectares and the implementation of a large vegetated earthen mound is expected to further buffer the plant within the site from adjacent land uses. The Department also understands that the nearest residential dwelling is located over a kilometre from the project which is considered to be a substantial distance however, notes that this may change in the future.

As stated in previous sections of this report, the Department does not consider that the locality will be developed for urban purposes in the future. While Mt Gilead may be developed for urban purposes in the long term, this area is located approximately two kilometres from the site and therefore the Department considers that due to the distance between the two land uses, the resultant impacts from the operation of the plant on this area would be either nil or negligible. The Metropolitan Strategy clearly states that land outside the growth centres that are not identified on the Metropolitan Development Program are not expected to be developed for urban purposes and therefore the Department does not envisage large scale urban development within the locality of the project site in either the short, medium or long term. The strategic review undertaken by the Department in 2007 further confirms this view stating that development within Macarthur South is not required to address regional and metropolitan housing needs. Nevertheless, the Proponent has indicated that it would implement mitigation

measures to reduce air quality, noise, visual, traffic and transport and water quality impacts from the project. The Department has recommended further strict environmental controls as part of its recommended conditions of project approval which would further ameliorate potential impacts from the project and protect existing and future land uses in the locality.

The Department cannot comment on the perceived precedence of further industrial or other electricity generating development that may wish to be located within the locality other than to state that any such applications would be subject to rigorous assessment and approval under the relevant legislation.

5.7 Other Issues

5.7.1 Water Management

Issue

The Environmental Assessment outlined the project's operational water requirements, wastewater production, stormwater management and flooding potential. The document states that the source of process water for the project will either be sourced via a water main to be located on the site, from Sydney Catchment Authority's Upper Canal which forms the site western boundary or from recycled water from a proposed sewage treatment plant planned at Appin. The project would include rainwater tanks which would be supplemented by mains water for maintenance and domestic water needs and possibly fire fighting.

Process wastewater would be generated from the project and would be collected in evaporation ponds located on the site. The Environmental Assessment stated that these ponds would be fully lined to minimise water infiltrating into the natural groundwater system. Sedimentation ponds would also be constructed to collect stormwater flows and rainfall runoff from bunded areas. The Environmental Assessment indicated that management strategies would be implemented on the site to maintain zero discharge from the site with the exception of natural flows.

Issues Raised in Submissions

The majority of submissions raised water quality and water quantity as an issue of concern for the project, however, the majority of submissions received were in the form of form letters where the water quality issue raised was more a concern from the pollution of water supplies such as rainwater tanks and the Upper Canal from emissions rather than water quality and water quantity issues associated with water management on the site. The use of the region's scarce water resources was also raised.

Sydney Water, in its submission, stated that it was not concerned with water for fire-fighting and trade waste processes as these would not utilise Sydney Water systems. In terms of the proposed connection to the proposed STP at Appin to gain access to recycled water, Sydney Water indicated that it would only provide recycled water to the area where it is deemed economically viable. Sydney Water also stated that developer must fund any adjustments needed to Sydney Water infrastructure as a result of the project.

The Department of Water and Energy considers that a reliable water supply was a critical issue for the project. The option for obtaining water from any surface water source such as the Nepean River is unlikely to be available without the purchasing of existing available water licences, due to current surface water embargoes. The Department of Water and Energy considers that the Upper Canal is a valuable potable water supply for the Sydney area and it considered a conflict to use drinking water for industrial developments.

Conversely, Sydney Catchment Management Authority considered issues relating to the protection of water quality in the Upper Canal were satisfactorily assessed and the proposed mitigation measures outlined in the Environmental Assessment were considered adequate. Sydney Catchment Authority also considered the possibility of sourcing water for the project's needs from the Upper Canal as being acceptable and understands that the Proponent has committed to further consultation with the Authority if this option is considered to be the preferred water source.

Consideration

The Department has reviewed the Environmental Assessment and the Proponent's Response to Submissions report and is satisfied that water quality and water quantity issues have been adequately addressed. Due to the

type of development that is being proposed and the surrounding land use including the proximity of the Upper Canal, the Department has recommended as a condition of approval that the Proponent be required to submit for the approval of the Director-General, design and operational details for management of the water cycle of the project.

5.7.2 Hazards and Risk

Issue

The Environmental Assessment included a Preliminary Hazard Analysis which identified the main hazard of the project being the handling of natural gas which is a flammable gas held under pressure. Other less significant hazards were also identified and included the handling of flammable and combustible liquids. The risk assessment took into consideration the supply pipelines carrying natural gas and the gas-fired power plant and was undertaken in accordance with the Department's Hazardous Industry Planning Advisory Paper (HIPAP) No. 6 – *Guidelines for Hazard Analysis* and HIPAP No. 4 – *Risk Criteria for Land Use Planning*. The study concluded that the risk associated with the project is very low with the most stringent risk criteria being met.

Issues Raised in Submissions

Only one submission raised hazards as an issue of concern primarily related to land stability issues.

Consideration

The Department considers that the Environmental Assessment adequately addresses potential hazards and risks associated with the construction and operation of the project. Due to the nature of the project, the Department has recommended a number of conditions related to hazards and risks and these include the requirement for the Proponent to undertake pre-construction and pre-commissioning hazard studies, appropriate bunding and spill management, to consult with the Civil Aviation Safety Authority in relation to potential aviation hazards associated with the exhaust stacks and to undertake hazard compliance within three months of normal operations and a further Hazard Audit Report following 12 months of normal operations.

In relation to land stability issues, the Department understands that the site is located within Area 5 of West Cliff Colliery and above proposed longwall mining panels 34 and 35. Mining under the site may therefore result in subsidence impacts on the site and surrounding land. The Department has reviewed the Environmental Assessment in relation to subsidence issues and notes that the Mine Subsidence Board stated in its submission that the parameters considered by the Proponent in the Environmental Assessment were appropriate for the prediction of subsidence impacts based on current mining plans. The Mine Subsidence Board, however, suggested that the project be staged around proposed mining to limit any risk to the Mine Subsidence Board's compensation fund. The Department understands from the Proponent's Response to Submissions that this is not possible as the timing of mining is not exact and is dependant on a variety of factors including emerging mining technologies, changes in global coal prices and uncertainty of subsurface conditions. The Department agrees with the Proponent regarding the timing of the project. The Department further notes that the Proponent would seek to design the plant in accordance with mine subsidence parameters and would seek approval of the detailed design of foundations from the Mine Subsidence Board. The Department has also recommended that the project be designed to take into account potential subsidence impacts and to seek approval of the design from the Mine Subsidence Board.

5.7.3 Bush Fire Risk

Issue

Parts of the south-western and western areas of the site have been mapped as "bush fire prone land" by Campbelltown City Council and therefore the Proponent has referred to the guidelines set out in *Planning for Bush Fire Protection* (Rural Fire Service, 2006) as a guide to site planning and risk mitigation. The Proponent has stated that a Bush Fire Management Plan would be prepared for the site and that consultation would be undertaken with the Rural Fire Service during the detailed design stage regarding access, water supply and defensible space. The Environmental Assessment indicates that asset protection zones would be implemented to reduce the risk of bush fire to the plant.

Issues Raised in Submissions

The only submissions that raised bush fire risk as an issue of concern were the form letter submissions that were received during the exhibition period. Only a general statement, however, was made with the issue of concern being the construction and operation of the project within a bush fire prone area. No further details regarding this issue were articulated in the submissions.

Consideration

The Department has reviewed the bush fire assessment prepared as part of the Environmental Assessment and considers that an adequate assessment has been undertaken and notes that the Proponent proposes to design and manage the project to minimise the risk of bush fire attack through the preparation of a Bush Fire Management Plan and the implementation of asset protection zones, the installation of hydrants for fire fighting, appropriate design and management of the conservation area to avoid the creation of a new bush fire hazard and the installation of protection systems which mitigate flame and heat attack during a bush fire. The Department also notes that the Proponent will consider amending the layout of the site during the detail design stage to reposition above-ground storage of flammable substances away from the perimeter of the site. The Department has recommended, as a condition of approval, that the Proponent investigate the repositioning of flammable storage facilities during the detail design stage in order to minimise bush fire risk to the extent practicable and to minimise the need to clear endangered ecological communities and/or threatened species for the establishment of asset protection zones for the project.

5.7.4 Heritage Impacts

Issue

The Environmental Assessment included an assessment of potential heritage impacts associated with the construction and operation of the project. The heritage assessment was prepared in accordance with the DECC's draft *Guidelines for Aboriginal Cultural Heritage Assessment and Community Consultation (2005)*. A separate assessment of the potential impacts to European heritage was also undertaken.

The assessment indicated that there were no registered Aboriginal sites within the study area, although nine sites, artefact scatters and art sites were listed within a two kilometre radius. No Aboriginal sites or objects were identified within the site as part of the current survey with the exception of one area of potential archaeological deposit (PAD) in the western area of the site, a portion of which coincides with the footprint of the power plant. The Environmental Assessment states that the heritage significance of the PAD can only be determined following consideration of the results of a subsurface archaeological testing program which is proposed to be undertaken during the detail design stage of the project.

In terms of European heritage, one historic site was located along the western boundary of the site, being the Sydney Water Upper Canal System. This site is of State heritage significance and is managed by the Sydney Catchment Authority. The Meadow Vale homestead is a historic site located approximately 1.4 kilometres to the north of the project site and the Mount Gilead historic site is located approximately 2.9 kilometres to the north-east. Both sites have local heritage significance being listed on the heritage schedules of the *County of Cumberland Interim Development Order No. 15*, the local environmental planning instrument and would not be directly impacted on by the project.

The Environmental Assessment states that the Sydney Water Upper Canal System may be impacted by the project as the Proponent is considering an option to construct a pump station and a pipeline connecting the power station to the canal to provide the required water supply for the operation of the project. The documentation indicates that the pipeline connection would involve only minor impact to the fabric of the canal with all works undertaken in accordance with the requirements of the Sydney Catchment Authority and the provisions of the existing *Conservation Management Plan for the Upper Canal, Pheasants Nest to Prospect Reservoir* prepared by Higginbotham and Associates in 2001.

Issues Raised in Submissions

Three submissions were received during the exhibition period that raised European heritage as an issue of concern. The submissions were from the owners of both the Meadow Vale property and Mount Gilead and the Sydney Catchment Authority in relation to the Sydney Water Upper Canal System.

One of the submissions stated that the area to the north of the project site has significant links that date back to the early settlement of NSW and that the Proponent has not accepted that a change in land use would compromise the heritage value of the area. This submission also indicated that the Environmental Assessment did not address the potential impact of an industrial area rather relying on the power station being an isolated industrial development within a rural land use which was considered to be flawed.

The submission from the Meadow Vale property states that the property is of heritage significance and the project's visual intrusion would have a dramatic impact on the house. Neither of the submissions from the Meadow Vale property or the Mount Gilead property raised specific concerns in relation to the potential impacts of the project on heritage. The visual impact of the project was previously assessed in section 5.2.

The submission from Sydney Catchment Authority states that issues relating to impact on the heritage significance of the Upper Canal have been satisfactorily assessed and the proposed mitigation measures in the documentation are considered adequate.

Consideration

The Department considers that the Environmental Assessment has adequately addressed the potential heritage impacts of the project and considers that the project would not result in any heritage impact to either the Meadow Vale or Mount Gilead properties given the distance and rolling topography between these properties and the project site. The Department has not recommended any conditions as part of the project approval in relation to heritage as the Environmental Assessment and the Proponent's Response to Submissions sufficiently outlines what mitigation measures will be implemented to minimise heritage impacts, particularly in relation to the possible option of connection to the Sydney Water Upper Canal which includes further consultation with Sydney Catchment Authority.

In relation to Aboriginal heritage, the Department notes that a sub surface investigation is to be undertaken for the PAD area in the vicinity of the proposed footprint of the power station to determine the nature and significance of any Aboriginal objects that may exist. The Department has recommended, as a condition of approval, specific requirements for the subsurface testing program in accordance with advice received from the DECC, as outlined in their submission to the project. The Department has also recommended specific requirements to be considered with regard to heritage in the Construction Environmental Management Plan which is required to be prepared and submitted to the Director-General for approval.

6. CONCLUSIONS AND RECOMMENDATIONS

The Department has undertaken a detailed assessment of the Leafs Gully Power Project, having regard to the Proponent's Environmental Assessment and Response to Submissions Report, the issues raised in the 481 submissions received and the technical support provided by the DECC.

Based on its assessment, the Department is satisfied that the Leafs Gully Power project can be constructed and operated with minimal environmental impacts and within acceptable environmental limits. The Department's recommended conditions place a strong focus on best environmental practice and measures to ensure the minimisation of impacts to the greatest extent possible. The Department has noted that only a small portion of the site will be developed for the project with a large area of the remaining land to be supplemented with addition plants and dedicated to conservation purposes and conserved in perpetuity in accordance with an agreement to be reached by the Proponent and the DECC. The Department considers that the mitigation measures proposed by the Proponent and the additional measures required to be implemented by the Proponent as recommended by the conditions of approval will ensure that the operation of the project can occur with negligible impacts to both the surrounding and the broader community.

While construction of the project is expected to take a number of years, the Proponent has indicated that it will implement mitigation measures to minimise potential environmental impacts to surrounding residents and users of the road network along Appin Road. The noise impact assessment clearly shows that construction of the project can take place with negligible noise impacts to surrounding properties.

During operation, the project will only operate for a maximum period of 15 per cent of the year in line with energy demand and therefore operational impacts from the project are considered to be manageable. The Department has recommended specific conditions in relation to air which requires that the Proponent continuously monitor air quality from the exhaust stacks to ensure that it is compliant with the conditions of approval. Similarly, the recommended conditions of approval requires the Proponent to undertake noise monitoring of the operation to ensure that the noise limits within the recommended conditions of approval are being met from the plant. The Department considers that these two recommendations alone which require the Proponent to meet stringent conditions will ensure that the community surrounding the site is adequately protected against any adverse operational environmental impacts.

While the exhaust stacks from the project will be partially visible from some adjoining properties and from distant views, the Department considers that due to the surrounding undulating topography as well as the distance between the project and the viewer, the resultant impacts would be negligible. The Department notes that existing vegetation screens occur around existing residential dwellings and these, in addition to the mitigation measures proposed by the Proponent would aid in minimising the visual impacts of the project to surrounding lands.

The Department considers that the Proponent has undertaken an adequate and appropriate level of environmental assessment of the project and has therefore recommended full project approval, subject to a number of strict conditions.

The Department recommends that the Minister for Planning:

- consider the findings and recommendations of this report;
- approve the project application, subject to conditions, under section 75J of the *Environmental Planning and Assessment Act 1979*; and
- sign the attached project approval (Tagged "A").

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – STATEMENT OF COMMITMENTS

APPENDIX C – RESPONSE TO SUBMISSIONS

APPENDIX D – ENVIRONMENTAL ASSESSMENT
