PARSONS BRINCKERHOFF

Delta electricity

SUBMISSIONS REPORT

MUNMORAH GAS TURBINE FACILITY

Munmorah Gas Turbine Facility

Submissions Report

May 2006

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Contents

List of Tables

List of Figures

Appendices

1. Introduction

Delta Electricity commissioned Parsons Brinckerhoff to prepare the Submissions Report for the proposed Munmorah Gas Turbine Facility (the proposal) following exhibition of the Environmental Assessment.

Under *State Environmental Planning Policy (Major Projects) 2005*, the proposal is classified as *major infrastructure* (but not *critical infrastructure*), being electricity generation (gas-fired) with a capital investment value over $30 million. Therefore Part 3A of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) classifies the proposal as *state significant development*, requiring the approval of the Minister for Planning (the Minister). The Submissions Report has been written in accordance with the requirements of the EP&A Act and its Regulation.

Delta Electricity is the proponent for the proposal and is seeking *Concept Plan Approval* from the Minister for Planning for the proposal, as amended by this Submissions Report.

1.1 Background

Delta Electricity is a state-owned corporation which produces around 12 per cent of the electricity consumed by customers in South Australia, Queensland, New South Wales, Victoria and the Australian Capital Territory. Most of Delta Electricity's electricity generation occurs at four NSW power stations: Mt Piper and Wallerawang near Lithgow, and Vales Point and Munmorah on the Central Coast. These stations have a combined generating capacity of 4,240 megawatts. Small amounts of renewable energy are produced from mini-hydro facilities located at Mt Piper near Lithgow, Chichester Dam in the upper Hunter Valley and Dungog wastewater treatment plant, bio-mass co-firing at Vales Point and Wallerawang power stations, and a number of sugar mill co-generation projects in northern NSW.

The current and likely future trends in energy supply and demand were described in the *Energy Directions Green Paper* (Green Paper) released by the NSW Government in 2004. The Green Paper states that peak energy demand in NSW is growing at a faster rate than average demand. This diverging trend between average or base load and peak load demand profiles can generally be attributed to the sustained period of strong economic growth and prosperity that has been occurring in Australia over the past 10 to 15 years.

This trend has resulted in an increasing demand for electrical services across all sectors of the economy. This is particularly the case for the residential sector, where increased affordability and affluence are expected to continue to drive demand for electrical goods such as air conditioning units. Air-conditioning is considered to be a major contributor to the increasing peak demand loads being experienced during hot summer days.

The Statement of Opportunities (2004) report produced by the National Electricity Market Management Company (NEMMCO) confirms the trends depicted in the Green Paper and forecasts that NSW is likely to experience a summer peak deficit or shortfall

below the low reserve condition by 2008/09, unless additional generation capacity is provided to cater for this deficit.

Based on the forecasts provided in the Statement of Opportunities (2004) report and Delta Electricity's own analysis of current market conditions and potential future demand scenarios, Delta Electricity has identified the need to provide additional generating capacity to meet the likely short to medium-term shortfall in electrical supply during peak demand periods.

The Green Paper identified the use of gas-fired peaking (peak-load) plants as one of the most effective short-term measures that could be implemented to avoid supply shortfalls during these peak demand periods, until new base-load generation is able to meet the demand. The gas turbine facility proposed by Delta Electricity is based on an open-cycle gas turbine configuration, which is well suited for peak-load operation.

1.2 Overview of the proposal

The proposal, as presented in the Environmental Assessment, is to construct of an open-cycle gas turbine facility, and a lateral gas pipeline to connect the facility to the Sydney-Newcastle natural gas pipeline.

The proposed gas turbine facility would be located in the grounds of the existing Munmorah Power Station. The proposed facility would operate as a peak-load power station supplying electricity at short notice during peak demand periods. It would comprise of several gas turbines with a combined nominal power output of about 600 megawatts. The primary fuel would be natural gas, with distillate as a back-up fuel in case of an interruption to the natural gas supply. Other ancillary plant items would include a black-start emergency generator, storage for distillate fuel and demineralised water, a gas compressor, and an inlet air cooling unit.

The proposed gas turbine facility would be required to operate at any time, during a peak demand condition or in response to a system emergency situation. The concept design has been based, however, on an estimated operating profile of about 500 hours per year, equal to a capacity factor of approximately 5.7 per cent. The operating profile does not include the hours that would be required to operate the plant during emergency situations or support electricity network security.

The proposal includes a new underground pipeline to supply natural gas to the facility. The pipeline would connect the proposed facility to the Sydney-Newcastle pipeline, which is located approximately seven kilometres west and adjacent to the F3 Freeway.

The proposal also includes the subdivision of the land that would be occupied by the proposed facility, from the existing power station site. This would create a separate site boundary and facilitate the establishment of a separate Environment Protection Licence for the facility, allowing it to operate independently from the existing coal-fired operations. *Figure 1.1* provides an overview of the proposal.

Figure 1.1 Proposal overview as presented in Environmental Assessment

1.3 Proposed modifications to the proposal

As a result of the submissions received and further consultation undertaken after the public exhibition period (see *Chapters 3 and 4*), Delta Electricity is proposing to incorporate a number of minor modifications to the proposal originally described in the Environmental Assessment.

Delta Electricity requests that these modifications be considered by the Minister for Planning when issuing the Concept Plan Approval for the proposal. The proposed modifications relate to specific components of the proposal which were identified during the preparation of this Submissions Report.

The proposed modifications are:

- **Pipeline route:** Delta Electricity requests approval for a *pipeline route corridor concept*, instead of a specific pipeline route. The final pipeline route may need to be modified following further consultation activities with one of the major land owners that would be affected by the pipeline route being proposed in the Environmental Assessment. A pipeline corridor which connects the proposed gas turbine facility with the Sydney-Newcastle gas pipeline has therefore been proposed to provide Delta Electricity with flexibility in the selection of the final pipeline route, following receipt of Concept Plan Approval.

- **Gas turbine facility:** Delta Electricity requests a number of minor modifications to the project description presented in the Environmental Assessment. The requested modifications have resulted from further design information becoming available during the preparation of this Submissions Report. These minor modifications would provide Delta Electricity with the flexibility to procure the equipment for this project without affecting compliance with the intent or conditions of the Concept Plan Approval.

- **Modifications to the General Terms of Approval:** Delta Electricity requests a number of minor modifications to the General Terms of Approval provided by the Department of Environment and Conservation in its submission to the Department of Planning.

Refer to *Chapter 6* for further details on the proposed modifications to the proposal.

1.4 Determination process

Delta Electricity considered and responded to the issues raised by submissions to the Environmental Assessment as exhibited. The issues raised in these submissions, and their associated responses, are detailed in *Chapter 4* of this report.

The Director-General of the Department of Planning will prepare an environmental assessment report which will include a copy of the Environmental Assessment, Submissions Report and any advice provided by public authorities on the proposal. The

Director-General would then submit the report to the Minister for Planning for determination. The Minister would consider the Director-General's assessment report and decide whether or not to approve the proposal.

The Minister's determination and the Director-General's Report would be published on the website of the Department of Planning following the Minister's decision.

If the proposal is approved by the Minister for Planning, Delta Electricity would consider the terms of the approval and decide whether to proceed with the proposal.

1.5 Consultation program

Consultation for the Environmental Assessment has been ongoing since late 2004. Consultation activities undertaken during the preparation of the Environmental Assessment are shown in *Table 1.1*.

Table 1.1 Consultation activities undertaken during preparation of Environmental Assessment

Consultation activity	Date
Planning Focus Meeting	11 May 2005
Newsletter published in regional newspapers	30 June 2005
Media release in local newspapers	August 2005
Letters to land owners affected by the proposed pipeline.	August 2005
Letters to key community groups	August 2005
Attendance and presentation at Chain Valley Bay Progress Association	August 2005
Attendance and discussion at Community Access Regional Environmental (CARE) forum	December 2004, February and August 2005
Web site information	Ongoing

Once prepared, the Environmental Assessment was placed on public exhibition from 11 January through to 10 February 2006. Public submissions were invited and sent to the Department of Planning in the first instance. This Submissions Report is a response to the submissions received from members of the public and government authorities.

Delta Electricity undertook further consultation activities to address some of the concerns expressed following the exhibition of the Environmental Assessment. These consultation activities are listed in *Table 1.2*.

Table 1.2 Consultation activities undertaken following exhibition of Environmental Assessment

Consultation activity	Date
Attendance and presentation at Budgewoi Progress Association	26 March 2006
Distribution of flyers to residents – identifying 1800 line and informing of status of consultation process	25 to 26 March 2006
Operation of a project information line (1800 817 711)	27 March to 21 April 2006
Briefing to Wyong Shire Council	19 April 2006
Face to face meetings with residents and stakeholders, if requested by resident/stakeholder.	2 meetings held
Community newsletter to link issues raised during the post-exhibition consultation with Submissions Report.	At completion of Submissions Report

1.6 Purpose and structure of report

This report reviews the Environmental Assessment and considers the submissions received and Delta Electricity's responses to these submissions. The report also includes details of additional investigations that were undertaken to address some of the key issues raised in the submissions, and a Statement of Commitments, which lists the mitigation measures that Delta Electricity would undertake should the proposal be approved and undertaken by Delta Electricity.

The report provides the following:

- **Chapter 1 – Introduction:** Introduces the proposal and responds to key issues raised.
- **Chapter 2 – Consideration of the Environmental Assessment:** Considers the Environmental Assessment and the proposal described within, including statutory compliance, the proposal justification, and the environmental impact assessment of the environmental impacts of the proposal.
- **Chapter 3 – Community consultation:** Provides an overview of the consultation process undertaken.
- **Chapter 4 – Consideration of submissions:** Reviews the submissions responding to the Environmental Assessment and Delta Electricity's comments on the issues raised in these submissions.
- **Chapter 5 – Additional investigations undertaken after exhibition of the Environmental Assessment:** Summarises additional investigations undertaken during the preparation of this report.
- **Chapter 6 – Modifications to the project:** Describes and justifies the proposed modifications to the original proposal further to the exhibition of the Environmental Assessment.

- **Chapter 7 – Preferred project report:** Outlines the legal framework for modifying a proposal, and assesses the status of the proposed modifications listed in *Chapter 6*.
- **Chapter 8 – Conclusion**
- **Chapter 9 – References**

1.7 Frequently raised issues from submissions to the Environmental Assessment

The following is a summary of the issues raised in submissions received following the exhibition of the Environmental Assessment. Delta Electricity's responses to these issues are provided in *Chapter 4* of this report.

Proposal description

- Selection of the site from internal options and the choice to use Munmorah Power Station.
- Selection of the pipeline route and potential impacts on affected landowners.

Surface water

- Releasing heated water into Lake Munmorah and or Budgewoi Lake (thermal pollution) will have a negative impact.

Noise

- Background noise monitoring did not cover all sensitive receptors.
- The impact of operational noise will be unacceptable.
- It was unclear how the noise modelling was conducted for example if it considered all four turbines simultaneously, or if it included the existing Munmorah coal plant within the background measurements.
- The information provided did not enable residents to understand impacts clearly.
- The noise levels will exceed the permitted levels.
- Unclear if there will be vibration impacts.

Air quality

- Concerned about continuous operation (24 hours per day, 365 days per year).
- Heated air emitted from the turbines will have an impact on ambient temperature in the local area.
- There will be unacceptable air pollution impacts on the local area, especially when using distillate.

Land use and property

- The proposed pipeline route will limit future potential land use.
- Development at Munmorah will cause property values to drop and affect the local real estate market.

Hazard and risk

- The transport, storage and use of gas create a risk of fire and explosions.
- Concerns about bushfire risks and emergency planning on surrounding community.

Social and economic

- The proposal will have a negative impact on local quality of life.

2. Consideration of Environmental Assessment

This chapter presents the consideration of the Environmental Assessment, both in terms of its compliance with statutory requirements and its review of environmental impacts and adequacy of mitigation measures.

2.1 Statutory compliance of the Environmental Assessment

2.1.1 NSW statutory framework

The proposed development constitutes a *major infrastructure project* under *State Environmental Planning Policy (Major Projects) 2005* (Major Projects SEPP), being an electricity generating facility with a capital investment greater than $30 million. Under s75B (1a), major infrastructure projects require planning approval under Part 3A of the EP&A Act, with the Minister for Planning identified as the relevant consent authority.

The gas supply pipeline would meet the definition of a 'public utility undertaking' under the EP&A Act Model Provisions 1980 (as adopted by the Wyong Shire Council Local Environment Plan), making the pipeline exempt from the need for development consent. However, the Department of Planning has advised that the pipeline is considered part of the 'Major Infrastructure Project' and should therefore be assessed within the proposal.

As the project is declared a *major infrastructure project* under the Major Projects SEPP, clause 75R(1) of the EP&A Act declares that it is to be assessed under Part 3A of the Act, and provisions in other Parts of the Act. Therefore, an environmental impact statement is not required. Instead section 75F provides that, 'environmental assessment requirements' are to be prepared by the Director-General.

The environmental assessment requirements of the Director-General of the Department of Planning are set out in Appendix A of the Environmental Assessment. As part of these requirements, the Director-General identified relevant government agencies for consultation, in addition to consulting with the community.

Government agencies and authorities who were consulted and provided further requirements were:

- NSW Department of Environment and Conservation
- NSW Department of Energy, Utilities and Sustainability
- NSW Roads and Traffic Authority
- WorkCover NSW
- Wyong Shire Council.

Their responses are provided in Appendix B of the Environmental Assessment.

The Environmental Assessment was lodged with the Department of Planning on 21 November 2005 for an adequacy review, prior to exhibition, in accordance with s75H of the EP&A Act. An application for Concept Plan Approval from the Minister for Planning was made on 9 January 2006, in accordance with s75E of the EP&A Act.

2.1.2 Commonwealth framework

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies to a proposal if it is determined to be a controlled action as defined in the EPBC Act.

An assessment was conducted to determine the existing natural environment and likely impacts of the proposal on plants and animals in the area, particularly threatened species, communities and critical habitat listed under the EPBC Act. This process is documented in Technical Paper 1 of the Environmental Assessment, with key findings summarised in Chapter 9 of the Environmental Assessment. Threatened species of plants and animals in the area are listed in Appendix E and Appendix F respectively of Technical Paper 1, while Appendix G details the significance of issues raised as part of the impact assessment.

Assessments of significance were undertaken for the species identified as potentially occurring in the area, and concluded that the proposal is unlikely to have a significant impact on threatened species and communities. Therefore a referral to the Commonwealth Minister for the Environment and Heritage is not required.

2.2 Development of the proposal

In accordance with statutory requirements, the Environmental Assessment justified the need for the proposal, considered alternatives and described the concept design (see Chapters 2, 3 and 4 of the Environmental Assessment). A summary of these aspects is presented as follows.

2.2.1 Project need and objectives

Project need

In 2004, the NSW Government released the Energy Directions Green Paper (Green Paper), which described the current and future trends in energy demand in NSW. The Green Paper states that peak energy demand in NSW is growing at a faster rate than average demand. This diverging trend between average or base load and peak load demand profiles can generally be attributed to the sustained period of strong economic growth and prosperity that has been occurring in Australia over the past 10 to 15 years.

This trend has resulted in an increasing demand for electrical services across all sectors of the economy, particularly the residential sector. Increased affordability and affluence are expected to continue to drive demand for electrical goods such as air conditioning

units, which are considered to be one of the major contributors to the increasing peak demand loads on hot summer days.

The Statement of Opportunities (2004) report produced by the National Electricity Market Management Company (NEMMCO) confirms the trends depicted in the Green Paper and forecasts that NSW is likely to experience a summer peak deficit or shortfall below the low reserve condition by 2008/09, unless additional generation capacity is provided to cater for this deficit.

Based on the forecasts provided in the Statement of Opportunities (2004) report and Delta Electricity's own analysis of current market conditions and potential future demand scenarios, Delta Electricity has identified the need to provide additional generating capacity to meet the likely short to medium-term shortfall in electrical supply during peak demand periods.

Peak-load or peaking plants can supply electricity to the grid at relatively short notice during these relatively short but high intensity peak demand periods. The Green Paper identified the use of these types of plants as one of the most effective short-term measures that could be implemented to avoid supply shortfalls during these peak demand periods, until new base-load generation is able to meet the demand.

Delta Electricity commissioned TransGrid to assess potential system reliability issues during a severe system failure or blackout in the NSW electricity network. The assessment determined the network lacked adequate re-start or black-start resources in the northern part of NSW. It concluded that the provision of a quick-start 600 megawatt gas turbine facility with black-start capability at Munmorah Power Station would provide a number of significant system security benefits in the event of a state-wide system shutdown.

The proposed gas turbine facility, based on open-cycle gas turbine technology, provides the most sound and effective way of addressing the projected peak demand requirements and system security issues.

Project objectives

The key objectives of the proposal are to:

- provide electricity at relatively short notice during periods of peak demand
- provide black start capability to improve system security, stabilisation and emergency response
- provide electricity using best available technology and low greenhouse gas emissions
- establish electricity supply that is market-competitive and consistent with current trends and future energy demands
- produce socially acceptable environmental outcomes.

2.2.2 Proposal alternatives

Alternatives and options considered during the development of the proposal presented in this environmental assessment included peak demand supply options, plant location options, gas pipeline route options, gas supply options, gas turbine design options and water supply options. The 'do nothing' option was also considered and assessed.

Developing alternative options generally involved a two-stage process. The first stage examined a broad range of options at the concept design phase leading to the selection of the preferred set of options. The second stage involved the refinement of the preferred options by examining each option in greater detail to ensure the proposal objectives are achieved.

The conclusion of the option selection process resulted in a proposal that satisfies the project needs and objectives.

The 'do nothing' option was examined and found to be unacceptable. Without additional peak power generation facilities, electricity shortages and blackouts are likely to result when peak electricity demand extends beyond the available supply. Supply-demand projections indicate that this scenario is likely to occur over the next three to five years. For these reasons, the 'do nothing' option was not considered feasible.

2.2.3 Benefits of the proposal

Implementing the proposal would benefit the local and regional community on a number of levels. Potential benefits include:

- increased reliability of supply during peak demand periods
- improved security of electricity supply during system emergency or blackouts
- improved environmental outcomes due to lower greenhouse gas emissions per unit of output in comparison to conventional power generation technologies
- providing social and economic benefits associated with the ability of the NSW supply network to meet peak energy demands

2.3 General description of the proposal

2.3.1 Design and operation

The proposal entails the construction of an open-cycle gas turbine facility and lateral gas pipeline connecting the gas turbine facility to the Sydney-Newcastle natural gas pipeline. A concept design which specifies how the gas turbine facility and gas pipeline would be constructed and operated has been the basis of the proposal description provided in *Chapter 4* of the Environmental Assessment.

The proposed facility would be located within the grounds of the existing Munmorah Power Station and operated as a peak-load power station, It would comprise several gas turbines with a combined power output of about 600 megawatts. The gas turbines

would be capable of running on natural gas (primary fuel) and distillate fuel (back-up fuel) in the case of an interruption to the natural gas supply. The proposed facility would also include ancillary plant items, such as a black-start generator, distillate fuel and demineralised water storages, a gas compressor and an evaporative inlet air cooling unit.

The proposed gas turbine facility would be required to operate at any time of the day or night in response to peak demand or a system emergency. The concept design has been based, however, on an estimated operating profile of about 500 hours per year, equating to a capacity factor of approximately 5.7 per cent. The operating profile does not include operation of the plant during emergency situations or to support electricity network security.

Power from the proposed gas turbine facility would enter the electricity grid via a new dedicated bay to be constructed adjacent to the existing switchyard located north-west of the proposed gas turbine facility. The existing overhead high-voltage transmission conductors would also be used in exporting the electricity generated to the electricity network.

Natural gas would be supplied via a new underground pipeline, connecting the facility to the existing Sydney-Newcastle pipeline that is located approximately seven kilometres west of the facility and adjacent to the F3 Freeway.

The proposal also includes the proposed subdivision of the land that would be occupied by the gas turbine facility, from the existing power station site. This would create a separate site boundary and facilitate the establishment of a separate Environment Protection Licence for the facility, allowing it to operate independently from the existing coal-fired operations.

2.3.2 Construction

The proposal is based on a 22 month program of works, which includes detailed design, construction and commissioning phases.

A detailed construction staging plan and method would be determined by the nominated contractor prior to commencement. This plan would need to be in agreement with all applicable conditions of approval and other statutory requirements. Details of the actual construction method and staging could vary due to detailed design changes and subsequent stakeholder consultations.

Construction hours would be limited to 7 am to 6 pm during week days and 7 am to 1 pm on Saturday mornings. If the proposal requires construction activities outside these hours, approval from the relevant regulatory authorities and affected landowners would be sought prior to undertaking these activities.

2.4 Environmental issues overview

2.4.1 Key issues

Air quality

The existing environment and potential impacts of the proposal on local and regional air quality are detailed in Chapter 11 of the Environmental Assessment.

Potential impacts during construction relate to the dust generation by excavation works and emissions from construction of the proposal. These impacts are minor and of short duration, and would be addressed through mitigation measures listed in the Environmental Assessment and Statement of Commitments. These would be implemented through the construction environmental management plan for the project.

An assessment of the potential air quality impacts of the proposed gas turbine facility on the local air-shed was undertaken using the CALPUFF computer-based dispersion model under a range of operating scenarios and meteorological conditions. The modelling assumed the gas turbine facility would operate continuously over the modelled year, to account for the proposed intermittent operation of the facility i.e. the proposed gas turbine facility could be required to operate at any time of the day or night, on any day of a given year.

The modelling also considered the air quality impacts of using distillate. Running on distillate is non-economic except during emergencies or exceptional situations where the gas supply is unavailable to start the gas turbines. Long-term operation using distillate would not comply with the turbines' operating specifications. The potential air quality impacts associated with the use of distillate were however considered as occurring throughout the modelled year to ensure the assessment was complete.

The impact of the proposed gas turbine facility on photochemical smog levels in the Sydney basin and surrounding areas has been investigated using the prognostic meteorological and chemical transport model TAPM-CTM. Four case-assessment days of moderate-high ozone levels were selected for modelling. These days had previously been identified as days on which emissions from power stations north of Sydney were transported to the Sydney basin.

The assessment concluded that emissions from the proposed gas turbine facility would result in no exceedances of air quality goals and standards or adverse effects on concentrations of NO_2 and O_3 in the Sydney basin.

The modelled results indicate that the proposed gas turbine facility would have a minor effect on the existing ambient air quality levels and therefore readily comply with the relevant air quality goals set by the Department of Environment and Conservation. A range of mitigation measures have been proposed to ensure the modelled predictions and conclusions of this assessment remain valid during the commissioning and operational phases.

Although the proposal would be a net generator of greenhouse gas emissions, the proposed gas turbine facility average greenhouse gas emissions of 0.58 tCO_2-e per megawatt hour. This is substantially lower than the NSW pool coefficient set for 2005 (0.913 tCO_2-e per megawatt hour) and 2006 (0.928 tCO_2-e per megawatt hour), and the greenhouse intensity factor for the National Electricity Market, which averages just above 1 tCO_2-e per megawatt hour.

The proposal would have a limited but positive impact on the NSW pool coefficient. This is considered to have important State-wide significance in helping to reduce greenhouse gas emissions per unit of output in NSW to achieve the ultimate goal of 7.27 tCO_2-e per capita by the year 2012, as set by the NSW Greenhouse Gas Benchmark Scheme.

Noise

The existing environment and potential impacts of the proposal on the local noise environment are detailed in Chapter 10 of the Environmental Assessment.

Construction noise associated with the proposed gas turbine is predicted to meet the criteria at all residences. During construction of the proposed pipeline, however, some exceedances may occur when activities are within 100 to 150 metres from residences. This noise is expected to be of relatively minor severity, and any short-term impacts would be adequately mitigated using the measures proposed.

Modelling was conducted to assess the noise of the proposed facility during full operation. The gas turbine facility being proposed would normally only operate during peak demand conditions, typically during extreme hot summer days. However, the noise modelling considered the plant operating at any time during a given year under a range of meteorological conditions, including adverse or noise-enhancing meteorological conditions, which tend to generally occur during cold, still winter mornings.

It is possible that the proposed facility's intermittent operation would include night-time operation. Hence, the noise impact assessment focussed on assessing the potential noise impacts associated with the night-time operation of the proposal.

Under neutral weather conditions the predicted noise levels would meet the project-specific criteria at all residences. Under typical adverse conditions, however, a marginal exceedance of 1 dBA above the project-specific criteria was predicted at one modelled receptor area located east of the proposed facility.

Construction hours would be limited to minimise impacts, and a noise management plan for construction would incorporate these and other measures. Post commissioning (operational) noise and ambient noise would be measured on a periodic basis. An operational environmental management plan would be developed, and this would clearly outline the procedures necessary to manage the noise, as required. Section 10.3 of the Environmental Assessment details the mitigation measures identified.

Additional studies were conducted to provide further information and clarification in response to a number of submissions. These are provided as *Appendix C* and *Appendix D* and key findings are discussed in *Sections 5.1* and *5.2.*

Surface water

The existing environment and potential impacts of the proposal on surface water are detailed in Chapter 8 of the Environmental Assessment.

Construction of the proposal has the potential to expose and mobilise sediment, fuels, chemicals and other materials to local drainage lines. This could potentially impact the water quality in the local drainage systems.

The proposed pipeline would cross Spring Creek, a swamp area and a number of relatively minor drainage lines. Construction associated with the pipeline crossing within and/or beneath these drainage lines and tributaries has the potential to temporarily affect the water quality of these water bodies.

It is proposed to use directional drilling to cross creeks, swamp areas and other environmentally sensitive areas, which would significantly minimise impacts associated with pipeline construction on these areas.

During operation, potential for impacts on waterways is considered to be low. The stormwater system would be isolated from the rest of the power station by a sluice valve, and bunding would be used for the distillate storage and tanker unloading facilities. Only small volumes of contaminated wastewater and waste oils would be generated.

The proposed open-cycle gas turbine does not use large volumes of water, creating minimal impact on water demand in the area. No cooling water is required for this type of plant, and no heated water would be generated or discharged. Therefore no thermal pollution impacts are anticipated for Lake Budgewoi.

Mitigation measures include the development of a surface water management plan, an acid sulfate soil management plan and an erosion and sediment control plan for construction activities. During operation, the wastewater treatment system at Munmorah Power Station would be used to treat the small volumes of wastewater generated by the facility, with bunding of storage and transfer sites. Further details are provided in Chapter 8 of the Environmental Assessment.

Land use and property impacts

Potential impacts on surrounding land uses are noise, air quality, visual amenity and traffic. These are described in the Environmental Assessment and have been assessed as minor impacts. Disturbance to landowners during pipeline construction may include dust and noise and would be mitigated through a construction environmental management plan.

The proposed gas turbine facility and delivery facility would be located within the existing Munmorah Power Station and would be consistent with the zoning and land uses of the station.

The preliminary hazard analysis (Technical Paper 6 of Environmental Assessment) identified that a 32-metre non-residential buffer zone from the pipeline centreline could potentially apply to future residential land uses. As the pipeline is proposed within an existing electricity easement, and for much of its length is bordered by public road reserves, this is not considered a major constraint on future development.

Further severance of land would be mitigated by using the existing electricity transmission easement to locate the gas pipeline. Establishing a gas pipeline easement would therefore have a minimal impact on adjacent land use, as restrictions would be consistent with those currently arising from TransGrid's operation of the transmission line. Restrictions on more sensitive developments, such as residential uses, would not apply to less sensitive developments such as commercial and industrial developments. Less sensitive developments could theoretically be constructed to the edge of the proposed pipeline easement.

The mitigation of impacts on land use is generally discussed within the Environmental Assessment in relation to the specific issue being considered. Minimal impacts on permanent residents are anticipated during the construction phase and implementation of the measures noted should ensure impacts are not significant. It is proposed that ongoing discussions would be held with landowners and the Mine Subsidence Board to minimise potential land use conflicts and negotiate conditions and consent while establishing the easement corridor. Land required for the inlet facility could be either purchased or leased. Further details are provided in Section 15.3 of the Environmental Assessment.

Hazards and risks

The proposal was assessed under *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33), as the nature of the activities associated with the proposal are considered to be 'potentially hazardous'. Consequently, a preliminary hazard analysis was prepared in accordance with the relevant guidelines. The results showed the proposal meets the land use safety criteria defined by the Department of Planning providing the proposed mitigation measures are implemented.

The risks considered, and the criteria against which they were assessed, are documented in Chapter 16 of the Environmental Assessment, with a detailed analysis presented in Technical Paper 6. Key risks considered included:

- gas releases from the pipeline including generation of fires
- storage of distillate including risks of leaks and fires
- gas leaks generally
- potential aviation hazards.

Specific mitigation measures are detailed in Chapter 16 of the Environmental Assessment and comprise technical design of safeguards into the facility as well as procedures and systems to be incorporated at both the construction and operational stages.

Social and economic impacts

The construction of the proposal has the potential to increase economic activity in the vicinity of Munmorah Power Station. Indicative average workforce numbers at any time during construction would be in the order of 50 employees for the construction of the proposed gas turbine facility and 40 to 50 employees for the construction of the gas pipelines and ancillary infrastructure.

It is expected that economic benefits would flow throughout the local community during the two-year construction period. It is anticipated that a number of local businesses would benefit from increased expenditure associated with construction activities, and therefore, that the overall economic effect of construction would be beneficial to the local area.

Currently, and in the absence of adequate peak supply, the costs of electricity rise significantly during peak periods. The proposal is likely to have the effect of stabilising electricity pricing in the future. The increased electricity supply capacity could facilitate state-wide economic growth through improved reliability and reduced supply costs. The 'black start' capability of the proposal would further enhance the security of the NSW electricity network in the event of a major failure in the central and northern regions of NSW.

Further details on the social and economic impacts, mitigation measures, and assessed outcomes are provided in Chapter 17 of the Environmental Assessment.

2.4.2 Other issues

Flora and fauna

A detailed assessment of the potential impacts of the proposal on threatened species is documented in Technical Paper 1 of the Environmental Assessment. The assessment included site surveys, database searches, habitat assessments and then assessed impacts for species which were recorded in the assessment area and could be affected by the proposal.

Five vegetation communities were recorded on the site, all of which were in moderate to good condition. Within the area, more than fifty threatened flora species, listed under the *Threatened Species Conservation Act (NSW)* and *Environmental Protection and Biodiversity Conservation Act (Commonwealth)* have been recorded. Following a site survey , likely species and communities were identified, and tests of significance of impacts were conducted in accordance with the legislation. Impact assessments were carried out for five threatened flora species and twelve threatened fauna species (eight species of microchiropteran bats were considered together as a group and two species of owl were considered together).

Impacts to the ecological integrity of the assessment have been largely avoided through the pipeline route selection process and proposed mitigation measures. The assessments concluded that the proposal is unlikely to have a significant impact on the

threatened species, populations or communities found in the assessment area. Chapter 9 of the Environmental Assessment provides the key findings of the assessment.

Landscape and visual

Munmorah Power Station is a dominant element in the surrounding visual environment. It can be seen from most locations around Lake Munmorah (Budgewoi, Toukley, Lake Munmorah), the Pacific Highway (near Doyalson) to the east. The two existing 150-metre boiler stacks are visible from as far away as Belmont to the north, The Entrance to the south and the Watagans to the west.

The height of the proposed stacks (35 metres) is similar to a number of the existing buildings at Munmorah Power Station, and well below the existing main stacks. The stacks would therefore not protrude above the existing buildings and would not be as visually dominant as the two existing stacks.

The main visual impact would be a small increase in the overall visual bulk of the existing power station when viewed from surrounding residential areas, Lake Munmorah and other lakeside reserves and land uses. The closest views would be from about 1 kilometre away, at a small number of houses to the north-west, and a short section of the Pacific Highway at Doyalson. Visual changes associated with the proposal from these locations would be barely noticeable. While the stacks and buildings may be intermittently visible at greater distances, they would unlikely have a significant impact on the visual landscape.

No specific mitigation measures were identified that were additional to those currently used by Delta Electricity for the remainder of the infrastructure at Munmorah Power Station. The assessment and current mitigation measures are in Chapter 12 of the Environmental Assessment.

Other potential impacts

Other potential impacts included soils and geology, heritage, and traffic and transport. These were considered in Chapter 7, Chapter 13, and Chapter 14 respectively of the Environmental Assessment.

Potential impacts on local soils and geology included potential acid sulfate soils and erosive soils, as well as a potential mine subsidence zone. Mitigation measures are detailed in Chapter 7 of the Environmental Assessment, including preparing an acid sulfate soil management plan, preparing an erosion and sediment control plan, and consulting with the Mine Subsidence Board. As a result, no significant adverse effects are expected from the proposal.

An indigenous heritage assessment was conducted, as detailed in Chapter 13 of the Environmental Assessment. A database search, consultation and a field survey were conducted. A testing and monitoring program was identified to minimise or avoid the extent and severity of potential impacts on the cultural heritage values of the area.

Potential traffic impacts were identified primarily during the construction phase. Chapter 14 of the Environmental Assessment details the impact assessment and mitigation measures, such as preparation of a traffic management plan, and licences to

be obtained. Only temporary disruptions are expected during construction. Changes resulting from the operation phase would see low additional traffic, resulting in volumes similar to existing levels.

2.4.3 Mitigation measures and Statement of Commitments

The Director General's requirements for the Environmental Assessment include "a draft Statement of Commitments, detailing measures for environmental mitigation, management and monitoring for the project." This is included in the Environmental Assessment as Appendix D. Part 3A of the *Environmental Planning and Assessment Act 1979* also requires the proponent to provide a draft Statement of Commitments which demonstrates their commitment to the implementation of the proposed mitigation and management measures.

The Statement of Commitments attached to *Appendix E* contains the mitigation and management measures which Delta Electricity is committed to implementing to mitigate the specific issues identified and described in the Environmental Assessment and this report.

3. Community consultation

3.1 Consultation during preparation of the Environmental Assessment

3.1.1 Overview of process

Key community and government stakeholders were consulted during the preparation of this environmental assessment to identify and address the key issues of concern. Community, local environmental groups and government agencies were contacted following selection of the preferred technology and pipeline routes options, and during the environmental assessment process.

A consultation plan was prepared, and the following objectives were recommended:

- to achieve community and stakeholder acceptance for development of the proposed gas turbine facility on the site;
- to keep local communities well informed of the project;
- to establish a consultation process that has integrity and meaningful dialogue; and
- to establish and retain good relationships with key internal and external stakeholders.

Stakeholders and groups identified for the proposal included

- Federal, State and local elected representatives
- Federal, State and local government authorities
- Utilities and service providers
- Local community and interest groups, including residents and affected landowners

3.1.2 Consultation tools and activities

A range of consultation activities have been undertaken to identify key community and stakeholder issues.

Government stakeholders were consulted by providing a briefing paper, and invited to attend a planning focus meeting, which was held on 11 May 2005. Agencies then provided written submissions to the Department of Planning, and these were incorporated into the Director-General's requirements in accordance with Part 3A of the *Environmental Planning and Assessment Act 1979*.

Consultation with the community included targeted and broad-scale strategies. The following techniques were employed to engage community feedback on the proposal:

- *Publication of a project newsletter* – this newsletter, identified as Newsletter 1, June 2005, provided an overview of the proposal. The proposal was described, including the procedures to be followed during the planning; a copy is provided in Appendix C of the Environmental Assessment.
- *Letters to landowners affected by the proposed pipeline* – landowners were contacted at the same time as field survey access was requested. A follow-up phone call allowed landowners to discuss issues and identify concerns. An overview letter and copy of Newsletter 1 were sent to affected landowners in August 2005, and contact was also made in September 2005 as the second round of field surveys took place. In particular, discussions aimed to identify proposed future land use and potential conflicts.
- *Publication of a media article* – this was published in two local newspapers in August 2005 – the Pelican Itch, Northern and Budgewoi editions; and the *Windmill News* – and a copy is provided in Appendix C of the Environmental Assessment.
- *Operation of a 1800 project information line* – this was established in the pre-exhibition phase and staffed by Delta Electricity's project manager, with all enquiries registered and actioned.
- *The Community Advisory Regional Environmental (CARE) forum* – co-ordinated by Delta Electricity and including representatives from progress associations and the Central Cost Environment Council, information was provided to this forum and feedback received and responded to. This occurred on three occasions: December 2004, February 2005 and August 2005.
- *Provision of a project website* – additional information was included on Delta Electricity's corporate website, www.de.com.au.
- *Letters to key community groups* – letters were sent in August 2005, and a copy of Newsletter 1 was included; organisations are listed in Appendix C of the Environmental Assessment. The Chain Valley Bay Progress Association requested and received a presentation from Delta Electricity in August 2005.

3.1.3 Issues raised and addressed

Responses from government agencies were documented in Appendix A and Appendix B of the Environmental Assessment. These typically included requirements for information to be provided within the Environmental Assessment, and requirements for specific procedures or outcomes to be incorporated into the design. Table 6.1 of the Environmental Assessment summarises the requirements of the Director-General of the Department of Planning, and where they are addressed within the Environmental Assessment. Table 6.2 of the Environmental Assessment summarises the requirements of other government authorities, and where they are addressed in the Environmental Assessment.

Responses from the community are documented in Table 6.3 of the Environmental Assessment, including noting where the issues raised by the community at this time were addressed. Of the responses, six calls were received via the 1800 line, and two emails were received. In addition, selected land owners provided information about proposed land uses for affected lands, and this is documented in Chapter 15 of the

Environmental Assessment. The pre-exhibition consultation led to ongoing consultation being planned, including the provision of additional project information, and the seeking of further community input.

3.2 Exhibition of the Environmental Assessment

Once prepared, the Environmental Assessment was placed on public exhibition from 11 January through to 10 February 2006. Public submissions were invited and sent to the Department of Planning in the first instance. This Submissions Report is a response to the submissions received from both members of the public and government authorities.

3.2.1 Consultation tools and activities

The Department of Planning announced the Environmental Assessment, to inform the local and regional community. The announcement detailed the locations where people could access copies of the Environmental Assessment and the relevant contact person from the Department of Planning. Delta Electricity's 1800 number operated throughout the public exhibition phase.

3.2.2 Submissions received

Submissions to the Environmental Assessment were provided to the Department of Planning. The Department of Planning provided a complete set of the submissions received to Delta Electricity for review and comment in the Submissions Report (this report), which is to be issued to the Department of Planning for further consideration during the determining of the proposal by the Director General.

3.3 Consultation following exhibition of the Environmental Assessment

The approach to the post exhibition consultation was to build on consultation undertaken during the preparation of the Environmental Assessment, fill information gaps and address issues raised in the submissions received during the Environmental Assessment exhibition period. Consultation activities following the Environmental Assessment exhibition are described in this section.

3.3.1 Letters to council, councillors and MPs

A letter was sent to Wyong City Council and local Councillors and MPs explaining Delta Electricity's response to the submissions received and outlining the post-exhibition consultation process.

3.3.2 Flyer to residents

A flyer (titled Newsletter No.3) was distributed on the weekend of the 25th and 26th of March to residents within a 2.5 kilometre radius of the proposed gas turbine facility. In total the flyer was distributed to 3405 homes. The flyer provided background to the proposal and the Environmental Assessment process and also outlined the opportunity for residents to speak to the Environmental Assessment team about the proposal via the 1800 information line (see *Section 3.3.4*).

3.3.3 Meetings

The following meetings were held with relevant stakeholder groups:

- *Wyong Shire Council* – Delta Electricity presented to members of Council at a meeting held on 19 April 2006
- *Rowena Hamilton, proprietor of Bevington Shore Manufactured Home Village* – discussions were held over the phone and during the noise monitoring program undertaken as part of this report (refer to *Section 5.1* for details).
- *Woodbury Park Estate and Andrews Neil* – Delta Electricity and Parsons Brinckerhoff met with representatives of Woodbury Park Estate and Andrews Neil to discuss concerns and issues regarding the proposed pipeline route.

3.3.4 1800-line

Calls to the existing 1800-line were returned by members of the Parsons Brinckerhoff Environmental Assessment team. The Environmental Assessment team was available to explain the relevant technical details of the proposal, direct callers to appropriate sections of the Environmental Assessment, and provide information on the additional noise monitoring and site comparison studies that were being conducted. The 1800 line also provided residents with the opportunity to register their concerns regarding the proposal. The details of the calls and responses were logged and the information relayed to Delta Electricity.

3.3.5 Letters to residents

Letters were sent to residents explaining the need for additional background noise monitoring and requesting permission to establish the noise logging equipment on their properties. The letters provided details of the commencement and duration of the monitoring and provided assurance that the logging equipment would not interfere with any other activities on their properties.

3.3.6 Response to issues

Fourteen unique calls were made to the 1800-line. Eleven of these calls provided call-back numbers and the calls were promptly returned. The main issues raised were regarding noise, air quality and the selection of site E rather than site A for the proposal. Callers were provided with answers over the phone and the opportunity to lodge comments regarding the proposal. Refer to *Appendix B* for further details.

4. Consideration of submissions

4.1 Summary of submissions and analysis process

4.1.1 Overview

The Department of Planning received 20 unique submissions from the exhibition of the Environmental Assessment. These consisted of nine letters from individuals or local residents, one type of form letter (a total of 416 form letters were received), four submissions from government agencies, and six letters from private companies or business entities. A copy of all submissions received by the Department of Planning was provided to Delta Electricity for review.

During the post-exhibition consultation phase (see *Section 3.3*), Parsons Brinckerhoff received 14 unique phone calls on the 1800-line, all of which were from individual residents. Parsons Brinckerhoff and Delta Electricity also attended a number of face-to-face meetings with respective stakeholder groups to discuss the issues raised.

Delta Electricity's responses to the issues raised in the submissions received in both the exhibition and post-exhibition phases form the basis of this section.

4.1.2 Analysis process

Upon receipt, each submission was assigned a unique number and analysed to determine the key issues it raised (these are listed in *Section 4.1.3*). Details of the submission and key issues raised were entered to a database.

One of the submissions was identified by the Department of Planning as a sample of a form letter, of which 416 individually signed submissions were received. Each letter was an identical copy with a space provided to write the name, signature and postal address of the respondent. As the issues noted in each form letter were identical, these form letters were considered as one submission when preparing a response to the issues raised.

Each of the submissions received were analysed to create a list of specific or unique issues. These issues were then analysed and a response prepared. The list of specific issues raised and Delta Electricity's response are provided in *Section 4.2.*

For submissions received during the post-exhibition consultation phase, the details of the messages recorded on the 1800-line were logged and each of the callers was allocated a consecutive identification number. Where call-back numbers were provided (11 cases), the call was returned and the details of the original message and returned call were recorded. The details of the caller (name and address or suburb) were recorded as were the questions asked, the issues raised and any further action to be taken.

Further action included follow-up phone calls to clarify answers and posting the flyer if it had not been received. Where call-back numbers were not provided (3 cases), the details of the messages were recorded including the name and suburb of the caller (if

provided) and the issue of concern. Delta Electricity was provided with a summary of these calls.

4.1.3 List of issues

A breakdown of the key issues raised by the 20 unique submissions is displayed in *Table 4.1*. Each number represents the number of submissions that raised the key issue at least once.

Table 4.1 Key issue count

Key Issue	Submissions from exhibition of Environmental Assessment[1]	Submissions during post-exhibition consultation
Site location options	6	7
Pipeline route options	3	-
Project definition	3	1
Legal framework and licensing	5	2
Community and stakeholder consultation	4	2
Surface water	6	-
Flora and fauna	4	-
Noise	13	10
Air quality	9	6
Landscape and visual	1	-
Traffic and transport	1	1
Land use and property	9	-
Hazard and risk	8	-
Social and economic	7	-
Cumulative impacts	1	-

A list of the specific issues is provided in *Sections 4.2 and 4.3*, together with Delta Electricity's responses to the issues raised.

4.2 Responses to submissions to the Environmental Assessment

4.2.1 Site location options

Submission numbers: 4a, 5, 6, 9, 10, 14

1. **By choosing a site further north west closer to Colongra Creek Ash Dam, (or to the south west of the ash dam) the noise would be distributed more evenly throughout the surrounding bushland, and still not close enough to be heard by the Lake Munmorah residents.**

2. **Use of old mines rescue sites**

3. **Build it closer to the gas fields where there is no existing population.**

The proposed location of the gas turbine (see Figures 4.1 and 4.4 of the Environmental Assessment) was carefully considered against the criteria listed in Table 3.1 of the Environmental Assessment, with Section 3.2 and Figure 3.1 providing further information on the process.

The relocation of the proposed facility north-west, closer to Colongra Creek Ash Dam, or to an old mine site were not considered viable options from an environmental and commercial perspective. The proposed site location has benefits over other locations within Munmorah Power Station, due to its proximity to existing transmission infrastructure and ease of access. The proposed location also minimises the need for land disturbance and further vegetation clearing.

The relocation of the gas turbine facility closer to Colongra Creek Ash Dam or on a local disused mine site is therefore considered inappropriate and inconsistent with the proposal's objectives.

Delta Electricity is not aware of the location of the gas fields referred to in the submission. Delta Electricity does not own or operate gas fields and would not have access to these lands for consideration as a potential site. In addition, building the proposed facility at such location would require the construction of new transmission infrastructure, which would lead to additional environmental and social impacts.

4. **An alternative gas turbine site exists at Eraring. It should be used in place of Munmorah.**

Eraring Power Station was not considered as a potential site as it is owned and operated by another company, namely Eraring Energy.

5. By building the new plant at one of Delta's other existing facilities, away from urban areas, they [Delta] could choose a site without surrounding neighbours i.e. Mt Piper, or in another area of Delta land at Munmorah/ Mannering Park.

Locating the proposed facility at Delta Electricity's other generation sites, namely Wallerawang and Mt Piper Power Stations, was not considered viable or possible, as there are no suitable natural gas supplies available in this region.

Vales Point Power Station was considered as a potential site location during the concept development phase of the proposal. Sites within the Vales Point Power Station site were considered unsuitable due to the distances to existing site services and transmission infrastructure, and the ability to accommodate the facility and associated infrastructure without significantly disrupting existing operations.

6. By selecting Proposed 'Site A' instead of Proposed 'Site E' the plant would be located slightly further west of our village and perhaps have a slight damping effect as the sound is deflected by the existing power station.

With reference to Section 3.2 and Figure 3.1 of the Environmental Assessment, Site E was selected as it represents the best site from an environmental, operational and safety perspective.

Additional noise modelling was conducted as part of this report to compare and assess the potential operational noise impacts associated with the proposed gas turbine facility located at Site A versus Site E. The noise modelling found that while the impacts may vary at individual locations, the overall difference in terms of noise impact potential was marginal, with Site E having a lesser overall impact than Site A. The results from this assessment are discussed further in *Section 5.2* and a copy of the noise modelling report is provided in *Appendix D*.

Operational and safety criteria also favoured Site E, locating the gas turbine facility well away from the coal-fired power station to minimise interference with existing plant access and underground and/or above ground services.

As the proposal would operate independently from existing coal-fired power generation activities at Munmorah Power Station, Delta Electricity proposes to lodge an application to sub-divide the land for the gas turbine facility and obtain a separate Environmental Protection Licence for the facility. The provision of a clearly defined site boundary will be an important factor in setting specific environmental performance indicators for the facility. Locating the proposed facility at Site E instead of Site A would facilitate the delineation of a clear site boundary.

4.2.2 Pipeline route options

Submission numbers: 3, 16, 17

7. Insufficient pipeline route options were considered.

8. The criteria considered in the route selection process appear to be focused on the impact of the proposal in the Delta Electricity easement and maximising the use of Delta Electricity land, and do not include any assessment of the impact of the pipeline location on adjoining land owners

The pipeline route options reviewed during the concept design phase (see Figure 3.2 of the Environmental Assessment) were selected and assessed against the criteria listed in Table 3.1 of the Environmental Assessment, with Section 3.3 providing further information on the process.

Although a number of additional route options were considered during the concept design phase of the proposal, the assessment concluded that the preferred pipeline route option (Option A) provided the best outcome in terms of meeting the assessment criteria.

From an engineering perspective, the preferred route option (Option A) provides the most direct route (with fewest bends) between the gas turbine facility and the Sydney-Newcastle pipeline. Placing the pipeline along an existing electricity transmission easement was also considered an advantage, as any current and potential future land use impacts along the route would primarily be contained within the existing 60-metre wide easement.

From an environmental perspective, the vegetation along the easement was generally considered 'disturbed' habitat as TransGrid maintains the easement on a periodic basis due to safety reasons. Although a number of threatened flora species were noted during recent detailed investigations, the potential impacts associated with the construction of the pipeline were considered relatively minor and would not affect any of the threatened ecological communities located within and on the outer boundaries of the easement. Directional drilling techniques would be used where there are environmentally sensitive habitats, such as Spring Creek and wetland/swamp areas, to minimise the impacts of constructing the pipeline along this route.

From a land use safety planning perspective, the preferred route option (Option A) provides the largest separation distance between the pipeline and the nearby residential areas of San Remo, Blue Haven, Doyalson and Bushells Ridge, readily complying with land use safety criteria prescribed in *Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning* (HIPAP 4). By containing the pipeline within an established and monitored easement the likelihood of hazardous incidents occurring due to uncontrolled external activities, such as excavating near or on top of the underground pipeline, would be extremely low and unlikely to occur.

A number of potential future developments along the preferred route were noted during the preparation of the Environmental Assessment, particularly on a significant portion of

the land between Motorway Link Road and Wyee Road. However, telephone discussions with Wyong Council and consultants representing Woodbury Park Estate Pty Ltd (major landowner in this area) indicated that these developments were still in the planning phases and that no formal planning applications to rezone or develop these lands had been lodged with Council and/or other authorities, or were unlikely to be lodged for at least another five years.

The master plan provided by the consultants representing Woodbury Park Estate Pty Ltd showed a development concept plan comprising a mix of residential, commercial and industrial land uses. A portion of the development concept relied on the re-alignment of a portion of the electricity transmission corridor. Parsons Brinckerhoff consulted with TransGrid to ascertain the status of the re-alignment application and were advised that a feasibility study on the potential re-alignment was prepared for Woodbury Park Estate Pty Ltd in 1998 and that no further discussions or an application to realign the transmission line had been lodged by Woodbury Park Estate Pty Ltd.

The route options assessment conducted as part of the Environmental Assessment concluded that the proposal pipeline location along the existing electricity transmission easement would minimise impacts on potential future land use developments adjacent to the proposed pipeline route. This conclusion was based on the information above and an apparent lack of progress and uncertainty in the outcome of the proposed future land development plans for the area north of the preferred route option.

Following recent discussions with Woodbury Park Estate Pty Ltd in relation to current status of development plans in this area, Delta Electricity proposes to modify the preferred pipeline route by considering variations and/or alternatives to this route. For this reason, Delta Electricity proposes to amend the proposal and is seeking approval for a pipeline route corridor instead of a specific pipeline route (as specified in the Environmental Assessment). Refer to *Chapter 6* for further details on the proposed modification to the proposal.

4.2.3 Project definition

Submission number: 4a, 4b, 5, 10

9. The Plant is too big. While some peaking plant may be necessary for NSW, the site should be limited to 300MW of gas turbines at most.

Strategic assessments by the NSW government (Green Paper), National Electricity Market Management Company (NEMMCO), and TransGrid on behalf of Delta Electricity, were all used by Delta Electricity to determine the appropriate capacity and location of the proposed facility. Delta Electricity's decision to construct a 600 megawatt gas turbine facility at Munmorah Power Station has been based on the projected needs and outcomes from these strategic assessments.

10. Maximum generation capacity at this site (coal and gas) must be capped at no more than 50% increase of the capacity of the current two units at Munmorah Power Station (650 MW), up to 1000 MW.

The Environmental Assessment only addresses the gas turbine proposal, which is requesting approval to construct and operate a gas turbine facility with a nominal power output of about 600 megawatts. If there were a need to upgrade or increase the capacity of the existing coal-fired power station in the future, a separate environmental assessment and approval process would be undertaken by Delta Electricity.

11. There is no reason why this plant should or could not be built to have no impact in the environment and surrounding neighbourhood and the people who live within that neighbourhood. We need to insist on 'worlds best practice'.

12. It will be cheaper for Delta to build the plant to Worlds Best Practice NOW, take whatever measures necessary to ensure that it is built with all noise attenuation installed and all emission mitigation built-in than to try to fix the problem later.

The proposed gas turbine facility would be built and operated using very high standards and state-of-the art equipment that has been proven around Australia and internationally.

Detailed studies critically assessed the potential impacts of the proposal's operation on the local and regional air quality and local noise environment as these two aspects were considered to be the most significant. The results of these studies are in Chapters 10 and 11 of the Environmental Assessment with detailed discussion in Technical Papers 3 and 4. Using currently available information on typical plant performance and ambient air quality, the studies concluded that the potential noise and air quality impacts would not have an adverse effect on the local environment.

The Department of Planning will assess, approve and enforce the Statement of Commitments and Concept Plan Approval, while the Department of Environment and Conservation will enforce the Environment Protection Licence for the facility. Delta Electricity is committed to complying with these requirements and would ensure best management practices are implemented during operation of the facility to ensure compliance and minimise impacts.

13. Any move toward Combined Cycle operation for these units is of serious concern due to the extended operation, increased impacts and high fuel consumption. Although a more efficient use of fuel Delta must declare that this is not proposed at this location now or in the future.

Delta Electricity would only consider the conversion of the proposed gas turbine facility from an open-cycle to a combined cycle plant if in the future there is a need in the National Electricity Market to increase NSW's base-load generation capacity using gas-fired instead of coal-fired power generation. Delta Electricity would also need to ensure that from a commercial and environmental perspective, the Munmorah gas turbine facility is the most appropriate site to deliver the additional capacity. If such a need were to arise, Delta Electricity would undertake further detailed environmental assessment and consultation activities and require planning approval from the Department of Planning.

4.2.4 Legal framework and licensing

Submission number: 4a, 4b, 5, 10, 19, 20

14. We don't understand why short cuts are being taken in the environmental assessment process and in planning for mitigation measures.

Delta Electricity refutes this statement. Parsons Brinckerhoff has undertaken a detailed assessment of potential environmental impacts of the proposal. The results of this assessment have been presented in the two volumes that comprise the Environmental Assessment of the proposal. The assessments have been conducted with scientific rigour by environmental professionals and recognised experts in their respective scientific fields.

Delta Electricity is committed to implementing a range of mitigation measures and safeguards during the construction and operation of the proposal to ensure the environmental and community impacts of the proposal are minimised or avoided. See the *Statement of Commitments* provided in *Appendix E* for further details.

15. The environmental controls on this facility should be built into the 'Approval" to protect the environment and the people of the region from the dirtier forms of operation, and ensure the plant always operates at the same clean/quiet levels

16. The Environmental Protection Licence must ensure strict limits on noise and air quality consistent with the Parsons Brinckerhoff Environmental Assessment and require operations to be curtailed where the limits can not be met

The Statement of Commitments, as amended by this Submissions Report, will be used by the Department of Planning and the Minister when determining the conditions of approval, should the proposal be approved. Delta Electricity would endeavour to comply with these conditions.

The Department of Environment and Conservation will be issuing an Environment Protection Licence for the proposal facility prior to commencing operation. The conditions in the licence are likely to be based on the General Terms of Approval provided by the Department of Environment and Conservation in its submission to the environmental assessment process. It is important to note that the General Terms of Approval prescribe limits for noise and air quality which Delta Electricity would endeavour to comply with at all times during the operation of the proposed gas turbine facility.

17. Aboriginal cultural heritage issues have been addressed and the recommendations presented in Technical Paper No 2 are appropriate to be translated into consent conditions.

Noted. These are included in the updated Statement of Commitments.

18. Consent required for any changes to operation in the event that the development is modified either by the applicant prior to the granting of consent or as a result of the conditions proposed to be attached to the consent, it will be necessary to consult with the EPA about the changes before the consent is issued.

Noted.

19. Council agrees that the conversion of the facility to cater for anything other than peak demand periods may have increased environmental impacts and may result in unacceptable nose and air quality impacts on nearby residential areas. As such, it is requested that any consent be conditioned to ensure a separate application us submitted to and approved by the relevant authority for any conversion/increase in electricity output.

Noted. Refer to response to issue 21 below.

20. The mitigation measures outlined in Section 11.3 of the EIS must form part of the conditions of any consent and a copy of the Air Quality component of the OEMP for the operational phase of the facility should be forwarded to Council for consideration prior to the commencement of use of the facility. Results of ongoing monitoring during peak usage and 'black starts' should also be forwarded to Council for consideration and action, if required.

Noted.

21. The DEC recommends inclusion of an approval condition, which ensures that the OCGT facility is operated only as a peak-load facility. As such it is important to ensure that the facility is not permitted to operate as an intermediate or base-load facility while continuing to employ open-cycle technologies. An appropriate condition should be negotiated between the proponent and the Department of Planning, in consultation with the DEC.

Delta Electricity seeks approval for an open-cycle gas turbine that would be operated as a peak-load facility, that is, only during times where peak energy demand reaches a pre-determined threshold. The number of hours quoted in the Environmental Assessment (500 hours per year) was based on a projected estimate of the total number of hours the facility may be required to operate on a given year, based on an analysis of energy demand-supply data obtained from the year 2000 to 2005. The total number of hours the facility would actually operate, however, will depend on the energy supply-demand requirements of that particular year and is likely to change from year to year i.e. the actual number of hours are likely to be greater than or less than 500 hours on any given year.

Delta Electricity is also seeking approval to operate the facility during system emergency event, due to its 'black start' capabilities, when re-energising the electricity network following a major blackout would be critical to the region.

Delta Electricity requests that any conditions aimed at ensuring the proposed gas turbine facility is operated as a peak-load facility be provided to Delta Electricity for review and comment before finalising. See *Section 6.2* for further comments.

22. Council supports directional drilling under creeks so as to limit potential impacts on amphibians. A condition should be placed on any consent to ensure this occurs.

Noted and agreed. The Statement of Commitments has been updated to note this request.

23. Mitigation measures to form conditions of consent and a copy of the final Management Plan should be forwarded to Council prior to commencement of use of facility.

Delta Electricity may consider this request by providing a copy of the final management plan to Council for comment only.

24. Council recommends the following measures form part of conditions of consent for the pipeline:

- **All amelioration measures outlined in Section 5.3 of the Flora and Fauna Assessment should be adopted and adhered to**
- **Rehabilitation works along the pipeline route and any other disturbed areas should include plantings and seeds collected from the area prior to construction**
- **A Flora and Fauna management plan should be prepared in consultation with Council as part of the Contractor Environmental Management Plan**
- **The Flora and Fauna Management Plan should include a protocol for clearing in Squirrel Glider Habitat.**

Noted and agreed. The Statement of Commitments has been updated to note this request.

25. The Environmental Protection Act 1993 includes noise under the definition of "Pollution". "This means that a person producing excessive noise could be in breach of the general environment duty under s.25. This could result in the issue of an Environmental Protection Order or civil enforcement proceedings against the person responsible for the noise emissions.

26. Noise pollution may cause environmental harm in which case the criminal offence provisions could be applicable. There are two Environmental Protection Policies that provide more detail as to the types and levels of noise that are acceptable under the Act these are the *Environmental Protection (Industrial Noise) Policy 1994* and the *Environmental Protection (Machine Noise) Policy 1994*.

The *Environmental Protection Act 1993* seems to refer to South Australian legislation and is not relevant legislation in New South Wales.

Delta Electricity would operate and comply with the environmental protection requirements of NSW legislation, namely the *Protection of the Environment Operations Act 1997* and associated Regulations.

4.2.5 Community and stakeholder consultation

Submission numbers: 3, 4a, 16, 17

27. No discussions were held with our client's authorised officers [major owner of land adjacent to the pipeline proposed in option A] at any stage with respect to any issues of concerns regarding the proposal. Additionally there were no discussions held with the Proponent in respect to our client's proposal to develop its properties in accordance with the master plan identified.

The 'authorised officers' referred to in the submission are assumed to be from Andrews Neil Pty Ltd. The major landowner referred to in the submission is assumed to be Woodbury Park Estate Pty Ltd.

A number of telephone discussions were held between officers of Andrews Neil and Parsons Brinckerhoff during the preparation of the Environmental Assessment. Andrews Neil provided Parsons Brinckerhoff with correspondence containing details of a master plan concept design being proposed by Woodbury Park Estate Pty Ltd to develop lands located north of the proposed pipeline route.

Although no formal consultation process or face-to-face discussions were held with representatives of Andrews Neil or Woodbury Park Estate, the information obtained during the telephone discussions held and correspondence provided was considered sufficient to ascertain and assess the potential impacts of the proposed pipeline route on potential future land uses adjacent to the route.

As discussed in *Section 4.2.2*, further advice was sought from Wyong Shire Council and TransGrid regarding the status of the above mentioned master plan concept proposal. The advice obtained indicated that no further contact with TransGrid had been made since 1998 regarding the re-alignment of a portion of the electricity transmission corridor and there were no detailed plans, rezoning and/or development applications lodged with Council that could provide certainty to the claims that the master plan concept information provided by Andrews Neil was likely to go ahead in its current form. Based on the information provided at the time, the pipeline route assessment process considered these factors and concluded that the proposed pipeline route would not pose significant land-use impacts on current and future land uses.

28. We insist that discussions take place between the Proponent and our client in order to address the issue of how our client's proposed redevelopment can satisfactorily co-exist with the proposed pipeline. Accordingly we insist that the Proponent enter into discussion with our client and TransGrid to discuss the possible relocation and subsequent use of the existing easement to the satisfaction of all parties.

Discussions were held with representatives from Woodbury Park Estate Pty Ltd and Andrews Neil on 19 April 2006. A meeting with TransGrid and representatives of Woodbury Park Estate was also held on Wednesday 10 May 2006 to discuss pipeline route options. Delta Electricity has considered the issues raised during these discussions and proposes to modify the pipeline route. Refer to *Section 6.1* for further details.

29. I went into Wyong Shire Council Chambers and read my way through the 2 volume edition – over a period of many hours. I was not allowed to purchase a copy, to purchase any photocopies and was only able to take pages of notes. These documents are thousands of pages long and of course, technical in nature and I am sure that the majority of the general population would not have been able to understand the problems which are buried within the document,

Section 3.2 of the Environmental Assessment indicates that copies of the document were made available at a number of venues. Following this submission, an additional copy was provided to the respondent, which was noted by the same respondent in a subsequent submission.

Further consultation has been held in response to issues raised in a number of the submissions received, both in general terms and in response to specific requests. Refer to *Section 3.3* for further details.

4.2.6 Surface water

Submission numbers: 4b, 5, 8, 10, 15, 20

30. Wastewater from the facility will discharge via the existing route Lake Munmorah. No detail is given in the EIS regarding the potential impact this additional discharge may have. Council requests that an assessment of these impacts be carried out and the results considered as part of assessment of the proposal prior to determination.

Page 4-18 of the Environmental Assessment indicates that approximately 12,000 litres of wastewater would be generated during the compressor washing cycle and other maintenance activities during a given year. This small amount of wastewater would be passed through an on-site oil/water separator prior to discharge into the dirty water treatment system currently used by Munmorah Power Station to treat all of its wastewater requirements.

The processes of water injection (when the gas turbine is firing on distillate fuel) and evaporative cooling will not generate wastewater, as all the demineralised water used would either be exhausted through the turbine stack or evaporated into the air.

Based on this information and the range of environmental safeguard and pollution control measures currently in place at Munmorah Power Station, no further assessment was considered necessary.

31. The thermal impact of additional cooling waters on Lake Munmorah would be unsustainable.

32. Nowhere in the proposal does it discuss the effects of the releasing of the hot water used for cooling the plant ... This effect should be completely investigated and detailed. Not just on a 500 hour operation – but on the eventual 24/7/365 operation this Approval is seeking. What effect will it have on the sea grasses and fish within the lake systems?

33. What effects will it [increased water temperature] have on the sea grasses, fish and ecosystems within the lake systems?

The proposed gas turbine facility will not generate or release hot water into Lake Munmorah or Lake Budgewoi. The proposed gas turbine facility will be based on open-cycle gas turbine technology, which does not generate steam condensate (or hot water), as it does not generate steam for electricity production.

4.2.7 Flora and fauna

Submission number: 8, 9, 12, 19, 20

34. I am particularly concerned about the adverse impact that the increased noise and pollution from the facility will have on bird and wildlife in the area. The neighbourhood has many kookaburras, parrots and rosellas, and the impact of a larger, noisier facility can only be detrimental to the surrounding environment.

A detailed ecological assessment of the impact of the proposed facility during its construction and operation was conducted during the preparation of the Environmental Assessment. The key findings of this assessment are presented in Chapter 9 and Technical Paper 1 of the Environmental Assessment.

Adverse impacts on local flora and fauna were considered by using previous studies and site-specific surveys to identify the habitats and ecological communities in the area, with particular focus on threatened and vulnerable species.

For threatened and vulnerable species or communities, more detailed consideration was given to determine if there would be a significant impact on these species due to the construction and/or operation of the proposal. Impact assessments, as required under the *Threatened Species Conservation Act 1995* and *Environment Protection and Biodiversity Conservation Act 1999* are provided in Appendix G and Appendix F of Technical Paper 1 of the Environmental Assessment.

Impacts from construction noise are expected to be minor and of temporary nature, while impacts from operational noise would also be of short-term nature, due to the inherent peak-load operational profile of the facility, and of negligible impact as determined by noise model predictions.

35. I am also concerned about the loss of vegetation that will occur to build the facility. There are a lot of mature Angophora trees as well as other native vegetation which are home to birds and native animals. This vegetation has served as a buffer between my property and the existing power station and I am concerned that much will be lost to build the new facility

36. It [the Gas Turbine] would surely affect the bird and native animal life in the high gums.

Figure 4.5 of the Environmental Assessment shows that the proposed gas turbine facility would be located on a predominantly cleared section of Munmorah Power Station that is currently used for the storage of plant spares. Vegetation clearing would be limited to the footprint of the facility and associated gas delivery infrastructure without affecting the existing vegetated buffer zone that surrounds Munmorah Power Station.

37. The existing transmission easement is up to 60 metres wide in sections and consideration would be given to the extent to which cleared areas need to be maintained. A reduction in the width of cleared areas maintained and rehabilitation of some native vegetation, particularly in areas where Angophora inopina is present, would be preferable. This could also reduce barriers to fauna movement.

TransGrid currently undertakes vegetation management activities along the existing transmission easement in accordance with relevant safety standards and regulatory approvals. It is envisaged that TransGrid would continue to undertake these activities in the future.

Delta Electricity will endeavour to minimise vegetation clearing during the construction of the proposed pipeline.

38. Council raises the following concerns regarding methodology and Threatened Species which they request be given further consideration prior to any approval being granted:

- **It was noted that the fauna surveys carried out on the eastern side of the Pacific Highway, Charmhaven were far less than those carried out on the western side. Only Anabat detection and a small amount of Elliott trapping was carried out in the eastern section of the study area.**

- **The surveys for the Wallum Froglet (Crinia tinnula) were undertaken at a time when the species would be unlikely to be detected, even if present (i.e. there had not been any rain for a number of days). In the Wyong Shire, Wallum Froglets are generally only heard calling after heavy rain, say 30 mm to 50 mm in 24 hours.**

The assessment process is detailed in Technical Paper 1 of the Environmental Assessment. Impact assessments, as required by the *Threatened Species Conservation Act 1995* and *Environment Protection and Biodiversity Conservation Act 1999* are provided in Appendix G and Appendix F of Technical Paper 1 of the Environmental Assessment.

Targeted fauna surveys were focussed on areas of suitable habitat and were reduced east of the Pacific Highway for the following reasons:

- much of the land was subject to an earlier flora and fauna assessment (Payne 2002) and the work for the assessment built upon the findings of this assessment
- with a high degree of public access immediately north of Charmhaven, it was not considered safe to leave traps in place at this site
- habitats in the area north of Charmhaven were disturbed from past clearing practices, fires and access tracks and were not considered to be generally good quality fauna habitat
- the potential for threatened biodiversity to occur in this area was fully assessed as part of the habitat assessment.

Parson Brinckerhoff notes that the timing of the surveys was not ideal for detecting the Wallum Froglet. Given the extended period of drought over the survey period, however, Wallum Froglet habitat was identified during the site surveys and the application of the *precautionary principle* led to an impact significance assessment being conducted. This is provided in Appendix G of Technical Paper 1 of the Environmental Assessment. Applying the criteria from the *Threatened Species Conservation Act* concluded that the proposal would have no significant effect on the recovery of the Wallum Froglet.

39. The study area represents a known habitat for the Squirrel Glider (Petaurus norfolcensis). Habitat clearing and fragmentation Is the greatest single threat to Squirrel Gliders in Wyong Shire. Possible impacts of the proposal on this species should be reduced if few hollow bearing trees are cleared and the width of the cleared areas along the transmission easement is not increased.

Mitigation measures provided in correspondence from Wyong Shire Council and the Department of Environment and Conservation have been included in the amended Statement of Commitments included as part of this report. Refer to *Appendix E* for details.

40. Significant wetland areas surround the current power station which have a fragile environmental status. Of the identified sites Site E has the highest potential to compromise this protected area. Has a full environmental impact been undertaken of the possible negative consequences of the proposed development and a comparison between all of the identified potential sites, A to E?

Delta Electricity acknowledges that the proposed location for the gas turbine facility (Site E) is closest to the SEPP 14 wetlands east of the power station, near the shores of Lake Munmorah. As discussed in *Section 4.2.6*, the proposal would not have an impact on the ecology of Lake Munmorah and Lake Budgewoi as it would not discharge any wastewater or heated water into these systems. In terms of potential construction impacts, construction activities would occur more that 1,000 metres from the edge of these wetlands. Based on the above aspects, the proposal would not have an impact on these wetlands and therefore no further detailed assessment was considered necessary.

4.2.8 Noise

Submission numbers: 2, 4a, 4b, 5, 6, 7, 8, 8, 9, 11, 13, 14, 19, 20

41. The report gave no comparisons of other noise levels, including the noise generated by the normal coal fired facilities, or other noisy things. What are the dBA's for the existing plant when operational. Nowhere in the proposal submission does it list the operational noise levels of their coal fired facilities to give a comparative figure.

The background noise levels measured when preparing the Environmental Assessment were considered representative of existing background noise levels at a number of residential locations in close proximity to Munmorah Power Station. The measured background noise levels included the influence from Munmorah Power Station, which was operating at the time the monitoring was conducted.

42. At no point can I find any details of the PITCH (frequency) of the proposed noise emissions.

The pitch (or frequency distribution) of all noise sources associated with the proposed gas turbine facility was considered in the noise predictions and impact assessment undertaken during the preparation of the Environmental Assessment. The octave-band frequency data for each of the noise sources used by the model to assess potential noise impacts did not demonstrate tonal characteristics.

43. While the noise levels of the 3 sources can't just be added together, it is also not correct to assume that the total noise will only reach the highest noise generated e.g. the 103dBA.

Section 10.2.2 of the Environmental Assessment shows the noise source data obtained for each of the key noise generating components of the proposed gas turbine facility, namely the four air intake fans, four stacks and four gas turbine enclosures. The noise model considered each component as an individual noise source and used established

algorithms to predict what the combined or total noise level would be at the nearest sensitive receptors under a range of meteorological conditions. Refer to Table 10.7 and Figures 10.2 and 10.3 of Environmental Assessment for a list of the predicted noise levels at a number of receiver locations surrounding Munmorah Power Station.

44. Similarly the noise assessment should consider all plant operating at worst case situation at the same time

Section 10.1.6 of the Environmental Assessment indicates that the background noise level data obtained was used to determine project-specific noise level criteria at a number of noise catchment areas surrounding Munmorah Power Station. As discussed in Delta Electricity's response to issue number 41, the background noise monitoring was conducted whilst Munmorah Power Station was in operation. On this basis, the project-specific criteria and subsequent noise modelling assumed that Munmorah Power Station and the proposed gas turbine facility were operating simultaneously.

45. Although the concurrence of night-time operation and adverse weather is likely to be rare, historical meteorological data was used to assess the proportion of time the criteria may be exceeded. When allowing for only occasional use of the facility, the exceedance would occur less than two percent of the time. On this basis, negligible impacts would be expected". NB page 5 of the Summary, (at the beginning of their proposal), has the same paragraph but quotes "5 per cent of the time ". Who knows what the true estimate is?

Noted. Page 10-15 of the Environmental Assessment indicates that the percentage of time an exceedance above the adopted night-time criterion might occur, under worst-case adverse meteorological conditions, is estimated to be less than two per cent in winter, and even less during summer.

46. The noise collection was also undertaken in August when there are the most winds. We normally have strong southerlies and south westers blowing – which would increase the ambient sound reading. The greatest disturbance from noisy industries is noticed on quiet, still nights when the sound generated appears to scream constantly.

Background noise data was analysed using metrological data obtained from Munmorah Power Station. Inclement meteorological conditions (wind speeds greater than or equal to five metres per second and / or precipitation) were excluded from the analysis of background noise levels. The analysis of meteorological information indicated that there were few 15-minute periods that were potentially affected by high wind and there was no rain during the monitoring period.

47. The "ambient" noise levels readings were taken when the existing plant was operating. The local population generally considered this to be objectionable and it only happened rarely.

As discussed in Delta Electricity's response to issue 41, the ambient or background noise levels were undertaken whilst Munmorah Power Station was in operation. Although Munmorah Power Station has not operated in a continuous manner in the past, the

station has been in continuous operation for the past 12 months and is likely to continue operating on this basis from now on.

48. When you look at the data, Area B has no ambient noise levels recorded. Only Noise catchment areas A, C, D & E were reported. Additionally, the missing data from collection site B should be supplied.

49. These predictions are also made for areas where they did not in fact bother to collect any ambient data, as neither Collection Sites B or C are the closest suburban points to the facility, and will no doubt be the most adversely effected. Our park, which is approximately 900 metres from the preferred site, was not assessed where as other locations further away were referred too.

Section 10.1 and Figure 10.1 of the Environmental Assessment indicates that the areas surrounding Munmorah Power Station and proposed pipeline route were divided into potential noise catchment areas. Background noise monitoring locations were selected on the basis of being able to provide the representative background noise levels at each noise catchment area. For those noise catchment areas where measurements were not undertaken, the background noise levels measured at the nearest noise catchment area (if considered to have similar noise catchment characteristics) were adopted.

The background noise levels measured for noise catchment area C were assumed to apply to noise catchment area B, as both catchments were considered to have similar noise characteristics. The background noise monitoring methodology used for this study complies with the Industrial Noise Policy.

50. Request further studies I believe that this study is flawed and that DE should be required to supply the missing data for the missing areas, and conduct a similar study at the rear of our village –we are closer and lie almost directly to the east of the proposed plant. DE needs to remeasure the sound effect at our village and recalculate their assessments.

In response to concerns raised in the submission, further background noise monitoring was undertaken at the Bevington Shores Manufactured Home Village to verify the assumptions made in the noise impact assessment (Chapter 10 of the Environmental Assessment). The results of this monitoring are discussed in *Section 5.1*.

51. At no point in the discussions on noise emissions has the likelihood of vibrations been discussed. What efforts will be made to ensure that this is not an added impact of the new plant?

The proposed gas turbine facility will not produce detectable ground vibration at the nearest sensitive receiver, as there would be no underground operations and the gas turbines would be secured and installed on a concrete slab. Potential vibration impacts were therefore not considered further in the Environmental Assessment.

52. In addition only preferred site E was referred to in the development report and no comparisons were given on other possible sites, A to D.

53. In addition we request that Site A be correctly assessed as we believe that this will have less impact not only for our residents but for substantial additional residents in Bevington Shores Manufactured Home Park and surrounding streets of Halekulani.

54. Under the selection criteria the distance to 'sensitive receptors' was the apparently considered when deciding between Vales Point or Lake Munmorah Power Station Sites. The distance from Mannering Park is a similar distance to Halekulani or Budgewoi. At Vales Point there is only one population area as compared to 4 surrounding Munmorah, however, they obviously thought that Halekulani /Budgewoi is somehow considered 'less sensitive' to noise for some reason.

As discussed in *Section 4.2.1* of this report and Section 3.2 of the Environmental Assessment, Site E was selected as the preferred site for a number of reasons.

In response to concerns raised in the submissions, additional noise modelling was undertaken to assess the potential noise impacts of the proposed gas turbine facility if it were located at Site A instead of Site E. The results of the additional noise modelling are discussed in *Section 5.2*.

55. All the sound studies look at noise that comes and goes during the day and night and averages the sound. This is a lot less intrusive than constant relentless noise.

The noise impact assessment considers 15-minute statistical averages, being the minimum standard measure prescribed in the NSW Industrial Noise Policy. Consideration is also given to loud events, by providing criteria for events such as L_{A1} (sound level that is reached for 1% of the measured period) compared to L_{A90} (sound level that is reached for 90% of the measured period and is generally considered the background noise level). Additional confirmation is also obtained through attended monitoring, where a person monitors the noise and notes specific sources and corresponding noise levels at a location. All of the above items were considered during the assessment of potential noise impacts from the proposal.

56. Council notes that the predicted noise level exceedance in sound catchment B has been rationalised against the predicted operational hours of 500 hrs/year. The intention of the proposal is to imply a reduced impact by assuming that the nuisance will be negligible because it is not continuous. Council considers this assumption to be flawed.

The noise impact assessment concluded that under neutral or typical meteorological conditions, the proposal would meet the project-specific night-time criteria at all residential receptors. Under adverse or noise-enhancing meteorological conditions, however, there is a chance the proposal would exceed the self imposed criteria by 1

decibel in noise catchment area B during night-time operation. The statistical analysis of the frequency of adverse conditions locally determined the probability of such an event occurring (i.e. the probability of a adverse weather at the same time the proposal would operate).

Delta Electricity's response to issue 56 indicates that the proposed gas turbine facility would operate as a peak-load facility only, which means that the facility would be off-line or on stand-by for most of the year (likely to be more than 95 per cent of the time in a given year). As discussed in Chapter 2 of the Environmental Assessment, the peak energy demand periods when the proposed facility would be required to operate are most likely during very hot summer days, with less use likely during cold winter nights and/or mornings.

The analysis concluded that the intermittent operation of the facility meant the likelihood of noise levels exceeding the self-imposed night-time noise criteria would be less than two per cent during winter. This was considered reasonably low and within the provisions of the Industrial Noise Policy. Noise level predictions never exceeded the recommended (40 dBA) and maximum (45 dBA) noise criteria prescribed by the Industrial Noise Policy for the type of local noise environment.

57. How could the effects on their closest neighbour, Bevington Shores Manufactured Home village with over 250 permanent residents not be analysed as part of their studies? We have an over 50's permanent population with a high proportion of special health issues that needed to be considered carefully.

Potential noise impacts at noise catchment area B, which includes the Bevington Shore Manufactured Home Village, were assessed using noise model predictions and background noise levels assumed to be the same as for noise catchment area C. In response to concerns raised by this submission, additional background noise monitoring has been conducted at the Bevington Shores Manufactured Home Village to verify the assumptions made in the noise impact assessment. The results from this monitoring are discussed in *Section 5.1*.

58. The underlying presumption of this whole proposal is based on the false premise of short term operation (500hrs), with the DE submission asking for approval for up to 24hr operation of the plant for up to 365 days of the year. Once this approval is granted, this level of operation will be permitted without any further approvals.

Delta Electricity seeks approval for a peak-load facility only, which may be required to start at any time during a given year, but particularly during a peak demand period or system emergency. Otherwise the gas turbine facility would be shutdown and on stand-by.

Delta Electricity does not seek approval for an intermediate or base-load facility 'continuous' operation, as it would also be inconsistent with the proposal objectives stated in Section 1.1.5 of the Environmental Assessment.

They state that they will operate during hot summers days and during the nights as a 24 hour operation as required. Of course, this means that they will operate mostly in "adverse meteorological conditions" – when they will exceed the guidelines.

59. It should be noted that surrounding residents are more likely to have windows open during adverse weather conditions in summer and this could worsen the impact of noise from the facility, particularly at night when background noise levels are low and occupants are trying to sleep.

The term 'adverse' meteorological conditions is a technical term that refers to meteorological conditions likely to enhance the distance noise travels i.e. the noise will appear louder than normal to nearby residents, or be heard by residents some distance away from the noise source that would otherwise not hear the noise.

These conditions are generally related to how fast the wind is blowing (wind speed from source to receiver up to 3 metres per second) and the existence of a temperature inversion layer. Both of these conditions need to occur to be considered 'adverse' in terms of noise impacts and generally occur during calm, cold winter mornings.

The submissions seem to relate adverse conditions to the weather conditions that are likely to exist at the time the gas turbine facility will operate, such as during a very hot summer's day. Whilst these periods of peak demand may be physically uncomfortable and could be described as 'adverse', they are not adverse in terms of enhancing noise impacts.

60. The proponent has advised that the construction of the proposal will be over a 12-month period and has adopted the Construction Noise guidelines from Chapter 171 of the former EPA's Environmental Noise Control Manual (ENCM). While the proponent has used background +5dB(A) criterion for construction of the Gas Turbine Facility on the Munmorah Power Station site, the proponent has used background + 20 dB(A) for the natural gas pipeline construction because it is expected that construction activities will not affect individual receivers for more than four weeks. DEC considers that the project will take 12 months to complete, background + 5dB(A) should have been used.

Construction noise limits were assessed against criteria derived from the Department of Environment and Conservation's *Environmental Noise Control Manual* (ENCM). Construction activities were classified into two separate items:

- construction within Delta Electricity's Munmorah site, consisting of the inlet facility and turbine construction; and
- construction of the pipeline, to occur at various times along a pre-defined route.

Construction within Munmorah Power Station would take over 26 weeks (eight to nine months, with two to three months of commissioning). Therefore the background plus 5 dB(A) was identified as an appropriate objective.

Construction of the pipeline would occur over a period greater than 26 weeks (more than nine months). At the time of writing, however, it was envisaged that the pipeline construction activities would be divided into separate sections, with each section taking approximately four weeks to complete, after which the construction work crew would move to the next section. For this reason, the background plus 20 dB(A) criterion was used to determine the relevant noise level objective.

Section 10.3.1 of the Environmental Assessment indicates that the proposed mitigation measures include the development of a noise management sub-plan, to be part of the construction environmental management plan. The noise management plan will be based on the final construction schedule and would be developed prior to the commencement of construction activities. A review of the construction noise level objectives will be undertaken at this time based on the final pipeline construction schedule.

61. Council considers that noise generated by the proposed turbine facility has the potential to have the biggest impact on surrounding residential areas and requires that all noise levels comply with all relevant guidelines, even during adverse weather conditions.

Refer to Delta Electricity's response to issue 65.

62. What recourse is there should the estimated noise levels be found too high

Delta Electricity has committed to the implementation of a range of mitigation measures during the detailed design and construction phase of the project to confirm the noise level predictions in the Environmental Assessment. These commitments are clearly stated in the Statement of Commitments that are included in *Appendix E* of this report.

An Environment Protection Licence would be issued by the Department of Environment and Conservation for the proposal prior to commencing operations. The licence would impose noise limits at residential locations surrounding the facility. Delta Electricity will undertake regular noise monitoring to ensure compliance with the licence's noise limits.

63. I am concerned that the proposal will have adverse effects on my ability to sleep

The noise impact assessment focussed on assessing potential night-time impacts. Due to the inherently intermittent operation of the facility, the intrusiveness criterion was considered most relevant and was used in determining project-specific noise level criteria. Compliance with intrusiveness criteria will minimise the possibility of sleep disturbance by maintaining noise levels at 5 dBA above the lowest background noise level.

The noise impact assessment concluded that the proposed gas turbine facility would comply with the self-imposed intrusiveness criteria at all residential receptors. As daytime noise levels tend to be higher, due to higher background levels, the potential noise impact of operating the facility during the day are likely to be less significant and were therefore not discussed in the Environmental Assessment.

64. Their data collection is flawed and incomplete and their outcomes exceed EPA guidelines without any plans to comply. Any approval should be granted with this in mind as DE is submitting this proposal and justifying its lack of compliance on the limited operating hours it initially estimates - saying that this will therefore cause limited inconvenience to the local community.

The proposal complies with the relevant noise impact assessment guidelines, namely the Industrial Noise Policy. The exceedances mentioned in the Environmental Assessment refer to self-imposed limits, which are stricter than the recommended limits set by the Industrial Noise Policy. The Environmental Assessment concluded that these potential exceedances were minor, with a low probability of occurring.

The Department of Environment and Conservation reviewed the noise impact assessment and considered that the predicted noise levels were reasonable and demonstrated that the proposal would have minimal impact on the local community, in relation to noise.

65. I believe that DE should be forced to sound insulate their equipment to ensure that it does not cause undue stress to the surrounding suburbs.

66. Dig-in the plant and install sound absorbent screens around the plant

67. Install large noise barriers to provide additional screening effect such as that already provided by the existing plant

68. Installation of acoustic tiles on the plant

69. Planting of vegetation screens for longer term noise attenuation

Delta Electricity does not consider the above mitigation measures are appropriate or necessary based on the conclusions from the noise impact assessment provided in Chapter 10 of the Environmental Assessment and further noise impact assessment provided in *Chapter 5* of this report.

Delta Electricity considers that the mitigation measures proposed in the Statement of Commitments (*Appendix E*) should be sufficient to mitigate any potential impacts.

70. DEC advises that the noise limits are not usually specified for construction noise and that the proponent would be required to prepare a Construction Noise Management Protocol so that all related activities are managed to achieve an acceptable environmental outcome.

Noted. The inclusion of noise design objectives during the construction phase aimed to demonstrate the level of compliance with the Environmental Noise Control Manual. Developing a construction noise management plan prior to the commencement of construction activities is included in the Statement of Commitments. See *Appendix E*.

71. Results of ongoing monitoring during peak usage should also be forwarded to Council for consideration and action if required.

Noted.

72. The mitigation measures outlined in Section 10.3 of the EIS should form part of the conditions of any consent and a copy of the final Noise Management Plan and Operational Environment Management Plan for the operational phase of the facility should be forwarded to Council for consideration prior to commencement of use of the facility.

Noted.

4.2.9 Air quality

Submission numbers: 2, 4a, 4b, 5, 6, 7, 8, 9, 10, 11, 12, 14

73. I would like to ask Delta how quickly super heated air at 500°C takes to takes to cool down on a 40°C day?

74. Will large quantities of hot air will shear off the plume of super heated air and be blown across the surrounding neighbourhoods? It is hard to accept that heat generation will be dispersed without detriment to the residents of Halekulani and Budgewoi, and with it air pollution.

75. What effect will this heat emission have on the ambient air temperature of the neighbourhood when the hot westerly wind blows it over us within 1-2 minutes of discharging?

76. How many degrees will the 4 exhaust stacks increase the ambient air temp in the surrounding area?

77. It would seem to me that more effort should be made to cool this air and/or taller stacks would be needed to move this air into higher levels above the surrounding districts. I can not find any data supplied in their proposal.

The high temperature plume leaving the four stacks from the proposed gas turbine facility will not affect the ambient ground level temperature at the nearest residential receptors located about 900 metres to the west of the stacks.

The height of the stacks (about 30 metres above ground level), and the high temperature and vertical velocity of the plume leaving each stack (more than 500 degrees Celsius and 40 metres per second respectively) will ensure the hot plume leaving each stack is extremely buoyant and rise vertically high above the facility in a matter of seconds. Under these conditions, the estimated plume rise (based on a 40 degree ambient temperature) would be more than 130 metres above ground level (including the stack height), which is almost equivalent to the height of the existing coal-fired power station stack. The time it would take the plume to reach this height would be

less than 2 seconds. During this short time period, there is expected to be little to no transfer of heat between the hot plume and the ambient air at ground level.

Note that under cooler conditions, such as 10 degrees Celsius, the plume rise would be even greater, as the temperature difference between the hot plume and the ambient air would significantly increase the buoyancy of the hot plume, thus increasing the height of the plume rise before significant dispersion occurs.

The high velocity at the stack tip would also ensure any potential effects from a strong and hot crosswind which may occur during operation of the proposed facility would not affect the vertical rise of the hot air leaving the stack.

The stack parameters of the proposed gas turbine facility (Table 11.5 of Environmental Assessment) ensure the plume dispersion characteristics of the stack are very effective at dispersing contaminants high in the atmosphere without affecting the ground-level concentration of those same contaminants. The same would apply to the temperature or heat in the plume i.e. the hot plume would not reach ground level nor have a notable ground-level temperature effect on residences located downwind from the plume.

It is important to note that the air turbulence that is likely to be generated by the heat in these plumes will be considered a potential aviation hazard and would be subjected to further review by the Civil Aviation Safety Authority during the detailed design phase. Munmorah Power Station has long been established as a no-fly zone due to the height and heat generated by the existing boiler stack, so the inclusion of the four additional stacks from the proposed gas turbine facility in the existing no-fly zone should be relatively straightforward.

78. What environmental controls will be in place to ensure my residents are not adversely affected by this rise in temperature?

Refer to Delta Electricity's response to issues 74 to 77.

79. Can the air emissions be added to the taller existing stacks to reduce the velocity, temperature and noise of the vent stack emissions, as well as increasing the height of the emission source. DE needs to look at the 35m stack height and calculate the datum levels of the plant compared to the 22 m level of Bevington Shores Village.

The potential use of the existing flue stack was investigated during the functional design phase. The results from these investigations found that the existing stack would not be suitable as it would not be able to withstand the high temperature of the exhaust gases generated by the gas turbines.

80. Because gas is considered a clean form of energy the plant will not have pollution controls built in

The proposed gas turbine facility will be fitted with state-of-the-art burner equipment (dry, low NO_x burners and a sophisticated process control system) and an in-stack monitoring system, which will monitor and control pollutant emissions during operation.

Demineralised water would also be injected into the combustion chamber to minimise NO_x emissions during distillate firing.

81. When the start-up uses distillate or even worse ... diesel unacceptable emission levels will be released into the atmosphere using the excuse that it is ok because it will only be for a short period of time.

Refer to Delta Electricity's response to issues 87-89.

82. The 75 hours of firing on diesel is also of concern at this location in respect of emissions and also in terms of fuel delivery and storage. My concern is that the emissions are much higher if they switch to the alternate distillate fuel.

83. What controls will be in place to limit the use of distillate and stop them swapping permanently without any further notification or controls?

84. DE's proposal actually states that is expected that they will use distillate for 75 hours out of the 500 hours of proposed operation. This equates to around 15% of the operating time. What limits will be imposed on the use of distillate.

The 75 hours quoted in the Environmental Assessment was based on an arbitrary estimate on the number of hours the gas turbines may be required to use distillate due to the unavailability of the natural gas supply. The actual number of hours, however, is likely to be significantly less than 75 hours and probably 0 hours during a normal year, as the natural gas supply system being proposed is considered very reliable.

Delta Electricity confirms that natural gas will be the primary fuel source and will be used by the gas turbines when available. Distillate will be used as a back-up fuel when the natural gas supply is unavailable and the facility is required to run.

85. What guarantees are in place that distillate will only be used on very rare occasions when there is a disruption to the natural gas supply. If natural gas is not resumed within a certain period of time the use of distillate should cease and the plant be shut down.

Distillate fuel is a more refined version of diesel and is therefore not the same as that used in vehicles. It is required to be of a very high quality to be suitable for use in gas turbines, and would only be used when natural gas is unavailable and the gas turbine facility is required to generate power.

In the event that distillate is used, the proposed facility would operate as long as is required to meet the peak demand or system emergency requirements, after which the facility would be shutdown until required to operate.

86. The air emissions at start up are extremely high and as this is peaking plant, two start-ups per day would be quite likely thus affecting air quality. This will cause unacceptable levels of air pollution on the adjacent residential areas.

87. The start up levels cannot be ignored as the start-ups will be so frequent. There could conceivably be 50-100 start ups for the anticipated 500 hours of operation. Each start-up represents many times the increase of gas emission releases. How could this be allowed?

88. How could the provisions of the Protection of the Environment Operations (Clean Air) Regulations of 2002 not apply to start-ups?

The air emissions from the proposed gas turbine facility will comply with the *Protection of the Environment Operations (Clean Air) Regulations of 2002* set by the Department of Environment and Conservation. The concentration limits prescribed in the Regulations are only applicable when the facility is under normal or steady-state operation, as this condition has the potential to have the most significant 'long-term' impact on local air quality.

In order to consider the inherent variations in the operating profile of a peak-load power station and the large number of starts, four different operating scenarios were modelled to assess the potential air quality impacts of the proposed gas turbine facility.

The modelled scenarios can be described as follows:

1. Gas turbine using gas during start-up
2. Gas turbine using gas during normal operation
3. Gas turbine using distillate during start-up
4. Gas turbine using distillate during normal operation

The modelling was conducted on the basis that the proposed gas turbine would be operating continuously during the modelled year for each of the above scenarios. The assessment determined which were the worst days based on the predicted maximum 1-hour and 24-hour average concentrations for a range of pollutants.

The results presented in Table 11.7 of the Environmental Assessment demonstrate that the greatest air quality impacts would occur when the gas turbine facility uses distillate during a start-up. Please note that such an event is considered infrequent and unlikely.

Section 11.2.2 and Table 11.7 of the Environmental Assessment demonstrates that the predicted air pollutant concentrations at the nearest sensitive receptors during the worst-case scenario (i.e. operating the facility using distillate for a whole year whilst emitting pollutant concentrations that are equivalent to start-up conditions) would comply with the ambient air quality goals prescribed by the Department of Environment and Conservation.

89. The proposal does not explain this term [black start]. My industry sources say that a Black Start is using diesel fuel. Is this correct? Is distillate a less emotive name for diesel?

Sections 2.4, 2.5 and 4.3.8 of the Environmental Assessment refer to a 'black start' as the ability of start the gas turbines during a major power blackout or shutdown of the local or State electricity network. In such an event, the gas turbines will be started using one or two diesel generators to provide the electrical power necessary to start the gas turbines.

The gas turbines will normally use natural gas to start-up during a black start. In the event that the gas supply is not available at the time of the blackout, distillate (which is a refined version of diesel) would be used instead.

90. What odours would be emitted?

The natural gas contains an odorant for safety reasons. The natural gas supply system would be sealed and should not emit any fugitive odours. Emissions from the four stacks will primarily comprise carbon dioxide and water, which are both odourless substances. Therefore no odours will be emitted during the operation of the proposed gas turbine facility.

91. During an emergency the report talks about "gas venting" to release dangerous pressure levels. Assuming that this occurs on an "adverse weather condition day" say a 40-53 degree day with scorching westerly winds blowing - how much gas would be released over our village

92. In the event of a natural gas emergency vent procedure, how will this affect the local population? How will people be notified? Will they be notified? Bevington Shores has over 250 residents, many of them with breathing difficulties.

Gas venting would be an unlikely event and would only occur in an extreme emergency situation when the pressure in the pipeline exceeds a pre-determined set point. At this point, in built safety devices such as pressure relief valves or bursting discs would open to reduce the pressure in the pipeline to acceptable limits, after which the valve will close. Note that the gas turbines and all other associated equipment will immediately cease to operate in any such event. The design and location of the vent points would be subject to a rigorous and detailed risk assessment process.

Being lighter than air, any natural gas released during such an event would readily disperse into the atmosphere without affecting ground level receptors downwind from the release point.

93. The approval is for both "clean" gas fired operations and distillate operations, with no limitations on the hours of operation on distillate. In both cases many of the guideline emissions are expected to be exceeded

As indicated in Delta Electricity's response to issues 88 to 90, the proposed gas turbine facility will not exceed the air quality guidelines that have been prescribed by the Department of Environment and Conservation.

94. Some of the figures given by DE in their planning estimates show that emissions are expected to exceed guideline in continuous operations. Why would a plant be approved which is planning to exceed guidelines?

It is assumed that the exceedances referred to in the submissions relate to the potential exceedances shown in Table 11.7 of the Environmental Assessment. The reported exceedances are related to the 1-hour maximum concentrations for NO_2 and 24-hour average concentrations for fine particulates (PM_{10}).

Page 11-14 of the Environmental Assessment indicates that the exceedances reported in Table 11.7 were based on the assumption that all of the NO_x has been converted to NO_2. This is a conservative assumption that is generally used in most air quality assessments as a first stage in the assessment of the potential air quality impacts of a proposal.

Based on the potential exceedances noted in Table 11.7, the Ozone Limiting Method was used to more accurately estimate potential NO_2 emissions. The results of using this method were presented in Table 11.8 and concluded that the NO_2 emissions due to the proposed gas turbine facility plus the maximum measured 1-hour average ground level concentration would be 173 micrograms per cubic metre, which is well below the Department of Environment and Conservation's goal of 246 micrograms per cubic metre.

In terms of the potential exceedance of the 24-hour average concentration for PM_{10}, a review of the information shown in the Table 11.7 clearly demonstrates that the proposed gas turbine facility would contribute less than one percent of the total PM_{10} concentration under all operating scenarios. The reported exceedance was due to the high background level adopted in the assessment and was likely to be the result of bushfires occurring at the time the monitoring was undertaken.

95. Ambient air quality data was inadequate for the assessment with only two sites, Wyee and Munmorah around the station. Additional stations closer to the station should have been available. In their absence detailed modelling of all power station sources should have been used with the analysis of interaction of the plumes.

The two ambient monitoring sites used to determine existing ambient conditions are currently used by Delta Electricity to source ambient air quality data for the purposes of meeting the monitoring requirements stipulated in the Environment Protection Licence for each power station site. The data is reported in the Annual Report which is lodged to the Department of Environment and Conservation on annual basis, as per the reporting requirements of each licence.

96. The air quality assessment needs to address the cumulative impacts of gas turbines operating at the same time as the coal fired power station.

97. The Air quality assessment seems to model gas turbine emissions but does not simulate coal fired power stations at the same time. The modelling needs to be re-run with multiple sources under maximum emissions for each source and under various wind directions to fully assess the worst case impacts on the surrounding residential areas.

98. What are the cumulative levels of all these pollutant gases when added to the fallout we are currently receiving from Delta's Vales Point Plant?

Page 11-9 of the Environmental Assessment indicates that the existing ambient air quality conditions of the region surrounding the proposed turbine facility were conservatively quantified by selecting the maximum 1-hour background concentrations measured by the Munmorah and Wyee air monitoring stations between June 2002 and December 2004. These maximum concentrations were used to establish worst-case background concentrations when assessing the potential cumulative impacts associated with the proposed gas turbines operating under the four modelled scenarios.

The ambient air quality measurements were considered representative of the region, and included the influence of the major industrial activities in the local area, namely Vales Point and Munmorah Power Stations and mining activities, as well as the other major sources such as motor vehicle emissions.

The modelling assumed that the gas turbine facility would be operating continuously over the modelled year, which for the purpose of this assessment was selected to be 2003. The measured maximum 1-hour background ambient ground level concentrations were then added to the modelled maximum 1-hour ground level concentrations to determine the potential cumulative effect of the proposal on the air quality in the assessment area.

The addition of maximum measured ground level concentrations to maximum predicted ground level concentrations provides a conservative worse-case prediction of potential impact. On this basis, it was considered that there was no need to model worst-case conditions from the existing power stations, as actual ambient air quality data was available to determine existing ambient conditions. This approach was discussed and endorsed by the Department of Environment and Conservation before the Environmental Assessment was lodged for public exhibition.

4.2.10 Landscape and visual

Submission number: 10

99. The proposed site is unsuitable due to the considerable growth in residential properties in the areas surrounding the Munmorah Power Station. New developments are occurring now that will have clear views of the development.

It is unlikely that future developments will be visually affected by the proposal due to the existence of an extensive vegetated buffer zone between the proposed gas turbine facility and potential future residential developments.

The visual assessment described in Chapter 12 of the Environmental Assessment indicated that the existing power station structures, in particular the two exhaust stacks and boiler house, would continue to be the dominant features of the predominantly industrial landscape, as the structures associated with the proposed gas turbine facility would not be as large or tall and therefore far less visible.

100. Visual impact of existing coal-fired facility

101. The 2 redundant coal fired units at Munmorah should be dismantled and removed from the site together with the unused chimney stack. This site improvement would offset the additional visual impact of the Gas Turbine Power station and gives confidence to neighbours that impacts will not progressively creep up

102. Additionally Delta Electricity should complete the removal of redundant plant at its Vales Point Power Station instead of leaving it as a rusty eyesore

103. Coal handling areas at the coal fired power stations should be downsized and the unused sections rehabilitated

The future use and/or fate of the existing coal-fired power generation activities at Munmorah Power Station was not considered, as it is outside the scope of the proposal presented in the Environmental Assessment.

4.2.11 Traffic and transport

Submission number: 20

104. A condition should be placed on any consent requiring a public road dilapidation report prior to commencement of construction of the facility.

105. Cost of damage to road from proposal to be borne by Delta The condition should also state that the cost of any damage caused to the public road system during construction or ongoing operation of the facility is to be borne by Delta Electricity.

Section 14.3.2 of the Environmental Assessment indicates that a dilapidation report will be prepared to assess the current state of local and State roads that would be used during construction prior to the commencement of construction activities. The report would be produced as part of the construction environmental management plan. It is envisaged that consultation with local and State road authorities would be undertaken during the development of such a plan.

4.2.12 Land use and property impacts

Submission numbers: 2, 3, 4a, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20.

106. The Residents' property values will not just drop - but it may not be possible to sell them at all to other retirees

107. Detrimental effects on my property values as all impacts could affect the property values of the homes in the village and surrounding areas.

108. I have had 16 residents list their homes for sale - many citing that they need to sell now before there is no market at all for their homes.

Delta Electricity does not agree that the future residential property market will be affected by the proposed gas turbine facility

The proposed gas turbine facility would be located within the grounds of Munmorah Power Station, which has been in operation for more than 40 years and will continue to operate as a coal-fired power station in the foreseeable future. The proposal will also utilise existing electricity transmission infrastructure and would not affect the extensive vegetated buffer zone which currently surrounds Munmorah Power Station.

With reference to Chapters 10 and 11 of the Environmental Assessment and Delta Electricity's responses to community concerns related to potential noise and air quality impacts from the proposal, the proposed gas turbine facility would not have an adverse effect on the noise and air quality that currently exist in the local area surrounding Munmorah Power Station and there would be no degradation of the current living conditions and standards as a result of the proposal.

Based on the above comments, it is reasonable to assume that the proposed location of a gas turbine facility at Munmorah Power Station would not adversely affect the current and future local residential property market.

109. We have a proposed pipeline route that all but disregards our client's proposal and indeed seriously jeopardises its feasibility.

110. The buffer zone recommended for the pipeline cannot be accommodated within the existing electricity easement. Preliminary discussions with TransGrid regarding the relocation of the electricity easement were held and will be continued as the development consent is finalised. Given that the EIS makes it clear that the relocation of the electricity easement has been raised previously, the existing easement should not be relied upon to provide a path for the pipeline. Relocation of the easement remains an integral part of the land owner's future development plans.

111. Restrictions on future land use; the preferred pipeline location (Option A) has a negative impact on adjoining landowners and places significant restrictions on the future development of the [subject] land; The presence of this buffer on [landowner] will have a significant negative impact on the future development options for landowners to the south of the electricity easement.

112. The existing easement is noted as being 60.96 metres wide, it would appear that the proposed buffer area to the south of the pipeline, given its proposed location within the location within the easement, will encroach upon our client's land. This is unacceptable to our client as once again, the pipeline will further restrict the redevelopment of our client's property as identified in its Master plan. The easement traverse a parcel of land which Council is in the process of acquiring from TransGrid, and Precincts 4 and 15, which are identified for future employment generating and residential land uses.

Refer to *Sections 4.2.2* and *Section 6.2* of this report for Delta Electricity's response to these issues.

113. The preferred route also has the potential to constrain the development of a future Wyong Coal Project within Precinct 15. Specifically, the pipeline may impact on the provision of large scale infrastructure such as coal washeries and rail loops.

The coal project referred to in Council's submission was identified during the landowner consultation phase of the Environmental Assessment. The owner of the four lots located on the western section of the proposed pipeline route and immediately east of the F3 Freeway is a resource company that owns a current mining lease over these lots. It is thought that the resource company is investigating the viability of undertaking underground mining activities underneath these sites.

The Mine Subsidence Board is generally aware of these investigations but was not provided with details on the extent and/or scope of the proposed works at the time of writing the Environmental Assessment. The company advised Parsons Brinckerhoff that the long-term plans for the site may include construction of a new rail loop.

Requests were made by Parsons Brinckerhoff to representatives of the resource company to provide future development plans but these were not provided. In the absence of any details on the extent, scope or layout of the potential future aboveground and/or underground activities on this land, it was not possible to determine whether the location of the proposed inlet facility and pipeline route would have an adverse effect on the future development of these lands.

114. The DE submission relies on the fact that there is low density housing around the proposed facility. Government figures anticipate that by 2025 Wyong Shire will have trebled in population and the density of housing will be approaching Metropolitan density. The majority of this increase will be located in the northern region of the Shire. Which means around this power plant?

Delta Electricity has not relied on the existence of low density housing currently surrounding Munmorah Power Station when assessing the potential environmental impacts of the proposal.

The assessment of potential noise and air quality impacts provided in Chapters 10 and 11 of the Environmental Assessment demonstrates that the potential impacts associated with the operation of the proposal are generally constrained within Delta Electricity site boundaries.

115. Council requests clarification as to the potential impacts of the gas supply pipeline on future urban land uses outside of the existing electricity transmission easement (i.e. will there be further restrictions on development outside of the existing identified easement width?). Additionally, clarification is sought on what activities could occur within the easement (e.g. roads and infrastructure crossings).

The proposed pipeline route would be located along the southern edge of the existing electricity transmission easement. Figure 16.1 and Table 16.1 of the Environmental Assessment indicates that the estimated land use safety buffer zones are as follows:

- residential land use: 32 metres from pipeline centreline
- sensitive land use (schools, hospitals etc): 57 metres from pipeline centreline

Refer to *Figure 4.1* for a representation of potential land use buffer zones.

Road and/or infrastructure crossings are possible but would need to be identified early during the detailed pipeline design phase to ensure adequate provisions for access and safeguards are incorporated into the design and construction at each of the nominated pipeline crossings.

116. The existing terms of easement do not refer to the use of same for the proposed pipeline.

Delta Electricity confirms that any future pipeline easement would be negotiated separately from any current arrangements the land owner may have with TransGrid in relation to the existing electricity transmission easement.

117. TransGrid to as late as 2003 indicated that they may consider the relocation of the easement. This issue does not appear to have been considered to any great extent by the proposal.

Telephone discussions were held with TransGrid's Newcastle office, indicating that no further discussions on this matter had taken place with representative from Woodbury Parks Estate Pty Ltd since 1998.

118. The proponent could seek to acquire an easement for the pipeline prior to the sale or from the new owner after the sale [for lots 1-3 of DP259306]. Further, the proponent has not indicated nor discussed with our client whether the use of the easement within our client's property will necessitate the acquisition of part of our client's land or require the creation of a further easement for the purpose of the pipeline, given its proposed location and the need for a buffer zone to same.

119. This results in 20 metres of pipeline buffer being located on land not under the ownership or control of Delta Electricity or TransGrid. Suggestions of the establishment of a pipeline easement with associated compensation for affected landowners is not considered to have the potential to compensate [landowners] for the loss of residential development potential due to the pipeline presence.

Refer to *Section 4.2.2* and *Section 6.1* for Delta Electricity's response to these issues.

120. At pages 16-6 of the EIA, the Proponent states in Table 16.1 that "Sensitive Land Uses" and Residential" uses should be separated from the pipeline by 900 and 60 metres respectively. However in the first paragraph on page 16-7 of the same document the Proponent classifies residential land as a "sensitive land use". Accordingly, if this is indeed the case, the proposed buffer of 30 metres (which is also unacceptable for the reasons outlined above) on either side of the proposed pipeline may be incorrect, as a buffer of 450 metres may be required instead. If this interpretation of Table 16.1 is correct, then our client's property would in effect, become sterilised for the purpose of redevelopment.

The 600 and 60 metre separation distances noted in the submission refers to the second column in Table 16.1 of the Environmental Assessment. This column provides an estimate of the separation distance between the proposed pipeline centreline and nearest 'existing' land use along the proposed pipeline route. This column is provided to demonstrate compliance with the prescribed land use safety planning criteria stipulated in *Hazardous Industry Planning Advisory Paper No 4*.

121. Further to the contents of Table 16.1, we note that the distance from the pipeline where the risk criteria is reached for residential uses is indicated as 32 metres, yet the proponent only proposes a 30 metre buffer. Consequently, the proposed buffer area may potentially encroach further into our client's property than proposed. This again is unacceptable to our client

Delta Electricity confirms that based on the data used to produce Figure 16.1 of the Environmental Assessment, the $1x10^{-6}$ risk of fatality contour for residential land uses is reached 32 metres from the pipeline centreline.

122. Future land uses (road widening activities) have been acknowledged as a reason why Option B is not preferred. In relation to Option A, the EIS states (section 3.3.2) that the consultation phase of the EIS identified the future adjoining land uses as industrial/commercial. This is at odds with Chapter 18 of the EIS (section 18.2) where it is acknowledged that land adjoining the northern side of the proposed pipeline route has potential development including 'urban redevelopment comprising industrial, commercial, retail and residential development;.

123. The EIS states that 'Option A was also considered an acceptable adjoining land use and would not prevent the development of these lands for such a purpose.' While the urban development intentions of >><< to include residential and mixed use development were sent to Parsons Brinckerhoff, the EIS does not acknowledge or consider the potential for land at Spring Creek to be used for residential, educational or mix use purposes.

Refer to *Section 4.2.2* and *Section 6.1* for Delta Electricity's response to these issues.

124. The EIS states (section 4.3.3) that the electricity easement under the control of TransGrid is 60 metres wide and centred on the centre phase conductor of the transmission line. However, the correspondence from TransGrid included in Appendix C of the EIS indicates that the TransGrid easement is 45 metres wide, centred on the centre phase conductor of the transmission line.

Delta Electricity confirmed with TransGrid that the existing electricity transmission easement is 60 metres wide and not 45 metres as originally quoted by TransGrid.

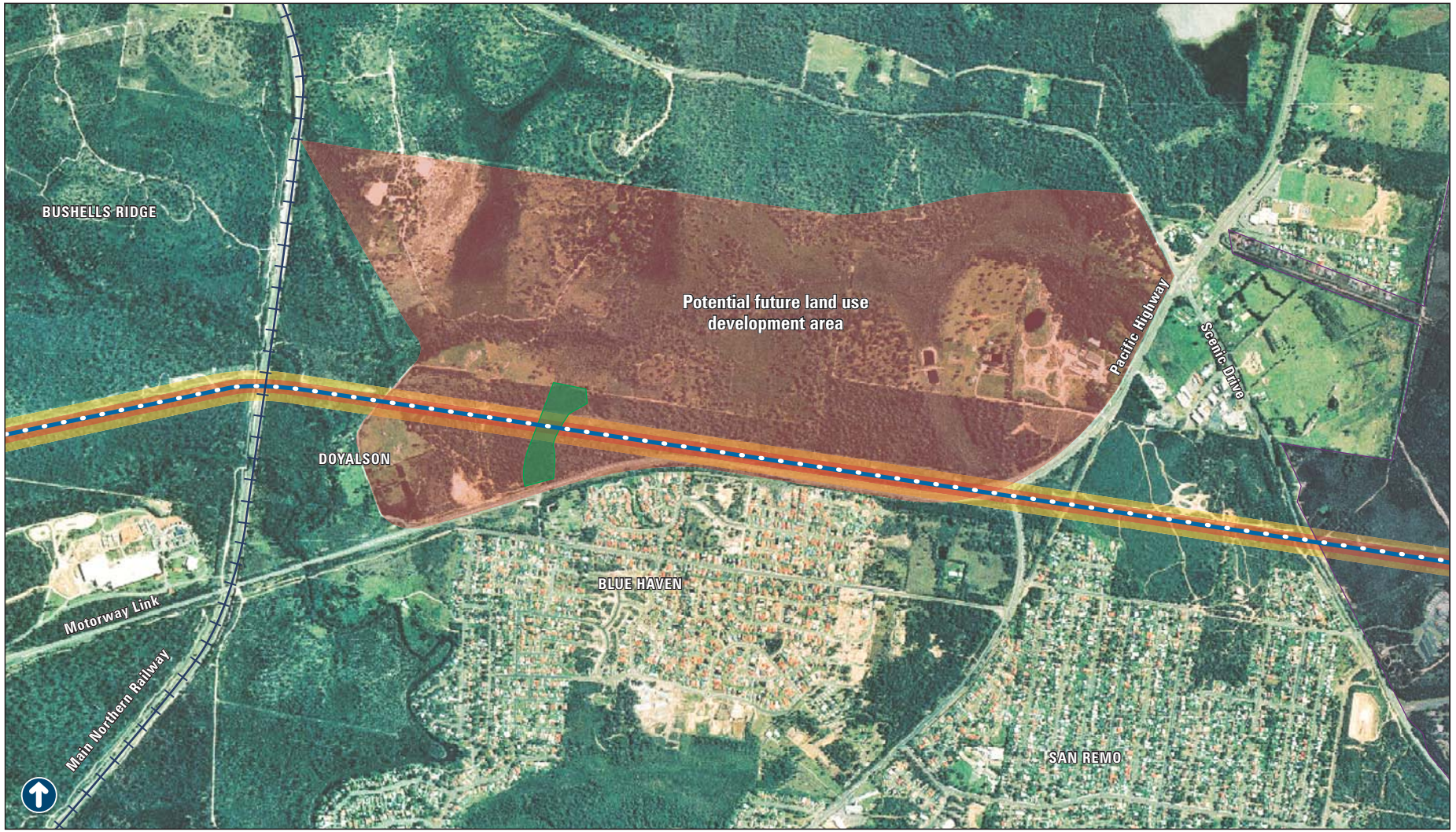

Figure 4.1 Potential future land use affectation zone

Proposed pipeline route

Rail line

Land owned by Delta Electricity

Swamp

Residential land use affectation zone (approx 30m from pipeline centreline)

Sensitive land use buffer zone (approx 60m from pipeline centreline)

4.2.13 Hazards and risks

Submission numbers: 2, 4a, 4b, 5, 6, 7, 9, 12, 18

125. The possibility of gas ignition and explosion in the event of leakage and/or sparking due to the longitudinal induction or pipeline failure in proximity to a 330kV power line should be considered in a thorough hazard assessment. What would be the extent of the explosion and the damage that it might cause to the surroundings including the power line? Can this risk be assessed and quantified.

Section 4.3 of the Environmental Assessment indicates that the pipeline would be designed to comply with relevant Australian Standards, in particular AS2885 and AS4853. During the detailed design phase, as number of detailed risk assessment and surveys will be conducted, including induction studies, to determine the potential risks and necessary engineering controls and safeguards to mitigate these risks.

126. DE has addressed their emergency response plan, however, they have not addressed how the local population may be effected. The SES and NSW Fire Brigade will be provided with information. Why not the people close enough to be most affected?

127. As the plant will run at extremely high temperatures I would like to be reassured about possible explosions, plant fires, bush fires and be advised on the notification and evacuation plans for surrounding suburbs.

Delta Electricity will consider undertaking further consultation activities with the communities in the immediate vicinity of the power station, in addition to the State Emergency Service and NSW Fire Brigades, during the development of the emergency response plan for the facility.

A range of risk assessment studies will be undertaken during the detailed design phase of the project to ensure the risks of a fire and/or explosion at the facility are as low as practically possible. The outcomes from these studies will be incorporated into the final plant design.

These studies include:

- fire safety study
- hazard and operability (HAZOP) study
- construction safety study

The above studies will need to be prepared prior to the commencement of construction activities and will undergo a detailed review and approval process by the Department of Planning and other relevant government authorities. The proposed gas turbine facility will not be permitted to commence operation until these studies have been approved and implemented by the contractor building the plant.

128. Delta Electricity has already had threats made against its' power stations and I believe that there is an increased risk to the surrounding public of plant sabotage

Delta Electricity has not received threats against any specific plant or infrastructure. Delta Electricity acknowledges, however, the community's concern regarding plant security.

The Munmorah Power Station site has a range of security measures and plans in place that have been developed in conjunction with Australian law enforcement and security agencies. It would be inappropriate to describe these measures in detail, for security reasons. The appropriate security measures will be incorporated to ensure the gas turbine facility is secure.

129. What heat do bushfires generate in comparison to these super heated discharges?

Bushfires are known to generate flame temperatures that exceed 1,000 degrees Celsius and a heat radiation intensity of more than 1,200 kW/m^2, depending on fuel density and climatic conditions at the time of the fire. In comparison, the super heated plume at 500 degrees Celsius would generate a heat radiation intensity of approximately 50-100 kW/m^2, which although dangerous to exposed skin if located directly adjacent to this heat source, the altitude and vertical velocity of the plume at the stack tip (30 metres above ground level and more than 40 metres per second respectively) would dissipate most of this heat at more than 130 metres up in the atmosphere.

130. Can this superheated air cause instantaneous combustion of the dry bushland around?

The facility would be located within a cleared section of Munmorah Power Station. The nearest patch of established bushland would be located about 200 metres from the western boundary of the facility. Considering the relatively low heat intensity that would be generated by the hot plume (see above) and the plume dispersion characteristics described in Delta Electricity's response to issues 74 to 77, the possibility of the hot plume causing the instantaneous combustion of surrounding bushland is extremely low.

131. Has a Bush Fire assessment been done as to whether the proposal will increase the likelihood of the close surrounding bush being impacted by the development proposal and a comparison of the impact of different sites A to E? It would appear to us that Site E would be of the highest risk in terms if potential danger to surrounding bush as compared to other alternate sites.

An assessment of potential bushfire risks (either from a fire at the facility on the nearest bushland or from a bushfire on the nearest bushland threatening the safety of the facility) would be undertaken as part of the fire safety study identified in Section 6.1 of the Environmental Assessment, and stated in the Statement of Commitments included in *Appendix E*.

132. Electrical risk to be considered at design;

133. Additional studies to be undertaken to assess risk associated with electrical transmission lines;

134. Delta must accept costs associated with presence of a.c. transmission line

Delta Electricity will consider the comments provided and consult with TransGrid during the pipeline design process to ensure all relevant standards and regulations are complied with. Delta Electricity will also accept any costs associated with the interaction of the gas pipeline with the high voltage transmission line.

135. The Hazards Unit at the Department [of Planning] requests for more information regarding site layout and importantly the spatial relationship between the proposed plant with existing plant elements, residential areas, etc. As I have taken over this project, I am not aware whether this was raised as part of the feedback that we gave you regarding submissions and subsequently is addressed in the submissions report / preferred project report.

Refer to *Figure 4.2* for details of the gas turbine facility in relation to the existing power station elements. Refer to *Figure 5.1* for a scaled figure showing the location of the proposed gas turbine facility in relation to the nearest residential centres located outside the Munmorah Power Station site boundary.

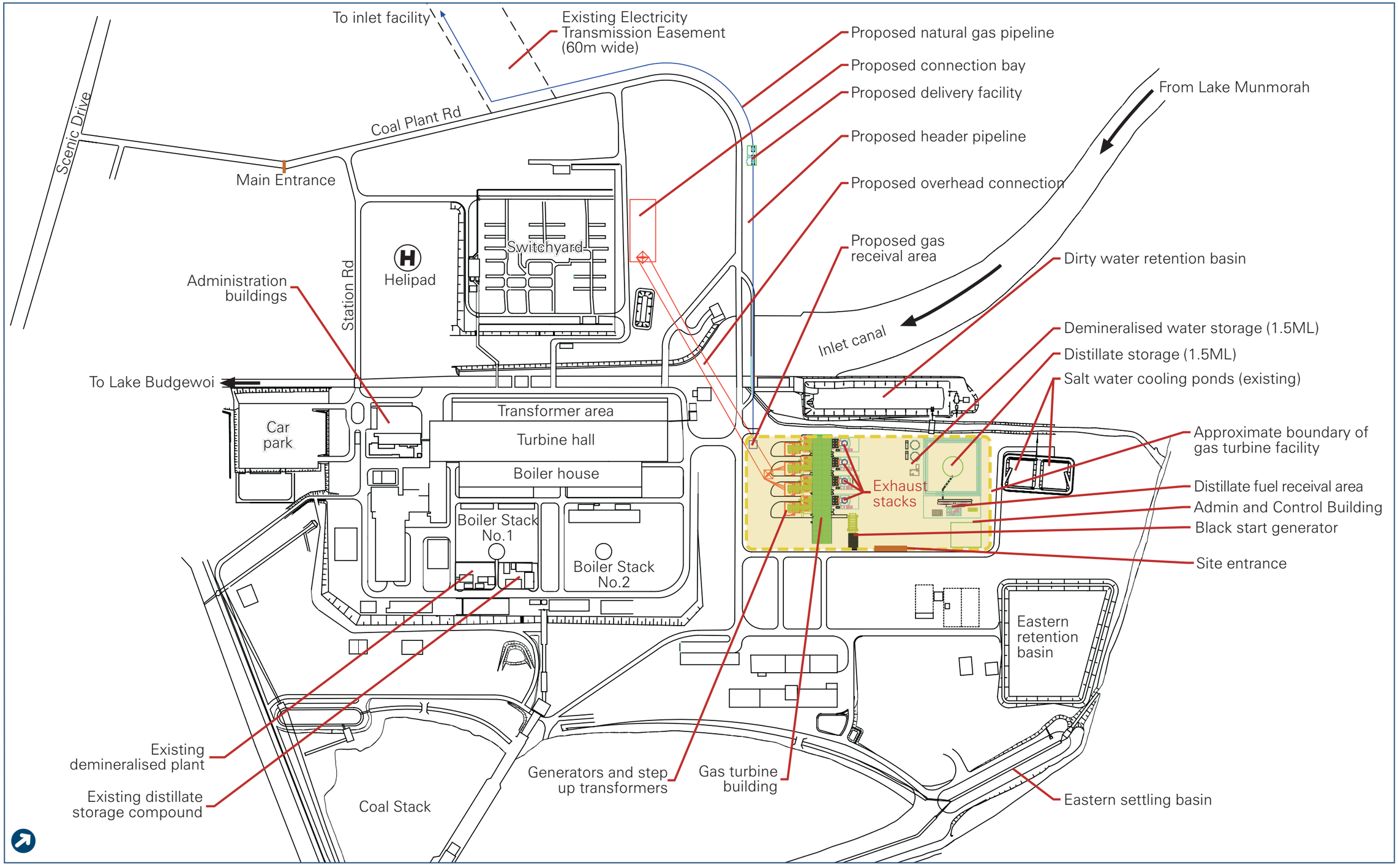

Figure 4.2 Scaled drawing of proposed gas turbine facility in relation to existing facilities within Munmorah Power Station

4.2.14 Social and economic impacts

Submission number: 2, 6, 8, 11, 12, 13, 14

136. There should be consideration given to compensation to be given to the people living in the village.

Refer to Delta Electricity's response to issues 107 to 109 for details.

137. The proposed gas turbine will have an adverse effect on my peace and enjoyment of life.

138. The noise and heat generated from these turbines running for long periods of time in peak load times will have an adverse effect on resident's ability to enjoy outdoor activities.

139. If another power station was built in the same vicinity the quality of life at Budgewoi would be further reduced.

The noise modelling and impact assessment conducted as part of the Environmental Assessment has demonstrated that the proposed gas turbine facility will not have a significant effect on the surrounding community, in relation to potential noise and air quality impacts.

As discussed in *Section 4.2.9*, there will be no heat-related impacts on the community to the east of the proposed facility, as the hot plume would quickly rise and disperse into the upper atmosphere without having any notable effect on ground level temperatures downwind of the plume.

4.2.15 Cumulative impacts

Submission number: 4a

140. We have owned the village for over 8 years and over that time the coal fired Power Station of Lake Munmorah has hardly been used. It has operated as "a Peak load power station supplying electricity at short notice during periods of peak power supply") i.e. a back up station for that time & I read in some of their literature that it was only used 6 times over the past 2 year period. Why is a new plant necessary when the existing coal fired plant sits there unused?

Munmorah Power Station cannot be used as a peak load power station for a number of reasons, including plant efficiency, longer start-up time, and higher running costs. Although Munmorah Power Station has not been in continuous service in the past, the station has been running on consistent basis for the last 12 months and is likely to continue in the foreseeable future.

4.3 Response to post-exhibition submissions

4.3.1 Site location options

Submission numbers: 25, 26, 29, 30, 31, 32, 33

141. We would prefer site A over site E.

Site E was chosen by Delta Electricity as the preferred site as it represents the best site from an environmental, operational and safety perspective.

Both sites were similar in terms of the potential noise, air and visual impacts to the nearest sensitive receptors (i.e. no site was considered significantly better than the other in terms of reduced environmental impacts).

Site E was superior from an operational and safety perspective, as the site will be located well away from the coal-fired power station so interference with the existing operations would be minimal (i.e. effects on access routes, existing underground and aboveground services will be minimal).

An additional study has been conducted using the results of noise modelling studies at site A and site E to compare the two sites. Refer to *Section 5.2* for a discussion on the outcomes from this study.

4.3.2 Project definition

Submission numbers: 23

142. What is the megawatt output capacity of the proposed facility?

The megawatt output capacity of the proposed facility is approximately 600 megawatts.

4.3.3 Legal framework and licensing

Submission numbers: 28, 34

143. What avenues are available to us if the proposal does go ahead and it is excessively noisy?

There are two main avenues available. Firstly, call Delta Electricity and request an explanation/make a complaint. If the problem continues make a complaint to the Department of Environment and Conservation. The Department will request an explanation from Delta Electricity, and if they are not satisfied with the explanation the Department will issue Delta Electricity with a fine and/or a mandate to rectify the problem.

144. When will a decision be made?

The decision will be made once the Department of Planning has received and assessed the submissions received and the Submissions Report (this document).

4.3.4 Community and stakeholder consultation

Submission numbers: 33, 34

145. I would like a copy of the most recent newsletter.

Request noted and arrangements made to post out Newsletter No.3.

4.3.5 Noise

Submission numbers: 21, 22, 24, 25, 26, 27, 29, 30, 31, 33

146. There is already enough noise as it is.

147. What would the cumulative impact be on local noise levels (i.e. what would the noise levels be when the existing power station and the proposed gas turbines were running simultaneously).

148. I am concerned about the potential noise from the proposed facility.

149. I heard a loud noise Friday night and am concerned about the potential noise levels if the proposal goes ahead.

150. Would noise levels increase as a result of the operation of the proposed facility?

The noise assessment was prepared in accordance with the Industrial Noise Policy guidelines. The Department of Environment and Conservation has reviewed the noise assessment that Parsons Brinckerhoff conducted and considers the noise impacts from the gas turbines to be minimal.

The Department of Environment and Conservation will be issuing an Environment Protection Licence for the gas turbine before it commences operation. This licence will impose strict noise limits for a number of locations surrounding the power station that are to be complied with by Delta Electricity. The noise limits will have to be monitored on a regular basis. If these limits are exceeded for some reason, under the terms of the licence, Delta Electricity will be obliged to investigate and rectify the situation to ensure these limits are complied with.

151. I am concerned about the potential noise levels of the proposed facility. I have friends living near a "similar" power station at Alice Springs and they tell me that it is very noisy.

Unlike the above-mentioned power station at Alice Springs the proposed gas turbine facility would not operate all of the time as it will only operate during periods of peak energy demand (such as hot summer days and some cold winter nights). The noise from the proposed facility would normally be below or just above the background noise levels during the night (the quietest time for ambient noise levels). Further tests will be conducted during commissioning of the facility to ensure that it complies with the imposed noise limits. Compliance with the noise limits needs to be assured before the

Department of Environment and Conservation will issue the licence to operate the facility.

152. I heard a loud noise from the existing power station early one Sunday morning in February; will this also occur with the proposed gas turbine facility?

Delta Electricity commented that this event was probably due to a quick-start air ejector, which is a relatively rare occurrence associated with one of the generators coming back into service. The gas turbine facility being proposed does not utilise this kind of technology.

4.3.6 Air quality

Submission numbers: 22, 25, 26, 27, 30, 33

153. What would the impact of the proposal be on air quality?

154. Would the impact on air quality be detrimental to my health, I have asthma and emphysema?

During construction, a number of mitigation measures would be put in place to minimise the generation of dust. These measures would include, but are not limited to: applying water to storage piles, covering vehicles transporting spoil and revegetating exposed areas.

During operation it is predicted that the emissions from the gas turbines would comply with environment protection regulations set by the Department of Environment and Conservation.

155. Would diesel be used very often?

Natural gas is the fuel of choice (due to financial and environmental reasons) and will be used by the gas turbines most of the time (for all start-up and normal operations). Distillate fuel (which is a refined version of diesel used in vehicles, and is suitable for use in gas turbines) will only be used when the following two conditions exist:

- natural gas is unavailable (due to a malfunction in the gas supply system or not enough gas is available to run the turbines); and
- the gas turbines are required to run (the demand is very high and there is not enough electricity to meet the demand or there is an emergency situation where something has happened to one or more of the large power stations affecting the electricity grid and the gas turbines are needed to kick-start the grid)

The chance of both of these conditions occurring at the same time is low.

156. Would dust emissions increase with the operation of the proposed facility?

As it is gas-powered, the proposed facility would not generate a noticeable increase in dust (identified in the Environmental Assessment as fine particulate dust or PM_{10}).

4.3.7 Land use and property impacts

157. I want to make it clear that we are permanent residents (at Bevington Shores), this is not a caravan park.

Noted. Bevington Shores has been regarded as a permanent community throughout the Environmental Assessment process.

5. Additional investigations

Additional investigations were undertaken to address a number of the key issues raised in the submissions received. The investigations were focussed on addressing particular community concerns in relation to the potential noise impacts of the proposal on the community in the immediate vicinity of Munmorah Power Station.

The two studies undertaken to address these concerns were the following:

- **Additional background noise monitoring:** The study was undertaken to address community concerns about the validity of the assumptions made in the Environmental Assessment in relation to the existing background noise levels for Noise Catchment Area B
- **Comparison of Site A versus Site E:** This study was undertaken to address a number of community submissions which requested that the proposal be located on Site A (helipad site) instead of Site E (proposed) due to perceived environmental benefits in relation to reduced noise impacts.

5.1 Additional background noise monitoring

5.1.1 Background

As indicated in Section 10.1.6 of the Environmental Assessment, the project-specific criteria which was developed to assess the potential noise impacts at Noise Catchment Area B, which primarily covers the suburb of Halekulani, was based on an assumed background noise level, as no background noise monitoring had been undertaken in this area. The assumed background noise level was based on the measured background noise level obtained for Noise Catchment Area C, which covers the suburb of Budgewoi.

A number of submissions from residents that live in the Halekulani area, and in particular from the Bevington Shores Manufactured Home Village and Sunny Lake Shores Caravan Park, have expressed concerns about the validity of this assumption and perceive that their respective communities have not been adequately considered in the Environmental Assessment, particularly in relation to potential noise impacts. In response to this concern, Delta Electricity engaged Parsons Brinckerhoff to undertake further background noise monitoring in this area to validate the assumptions made in the assessment and confirm the conclusions of the noise impact assessment presented in the Environmental Assessment.

5.1.2 Scope of assessment

The scope of this study was to determine if the assumed background noise levels used in the Environmental Assessment to assess potential noise impacts in Noise Catchment Area B were valid, based on actual monitoring data.

5.1.3 Noise monitoring methodology

Long-term unattended noise monitoring was carried out with the use of an EL-215 noise logger (serial number 194636) and an EL-315 noise logger (serial number 15-203-510). Attended noise levels were carried out with a RION NA27 (serial number 105522408). The instruments comply with AS 1259 Acoustic – Sound Level Meters.

The instruments were calibrated by a NATA accredited laboratory within 2 years of the measurement period. A copy of the calibration certificates is included as *Appendix C*.

The microphones were positioned at 1.2 metres above ground level and were fitted with a wind sock. Each instrument was calibrated before and after the measurement period to ensure the reliability and accuracy of the results. No significant variances were noted. The instruments were set to A-weighted, fast response, with noise levels monitored over 15-minute statistical intervals. Observations of sources influencing the current ambient noise environment were made while completing the field work.

5.1.4 Noise monitoring locations

The noise monitoring locations with reference to the proposed gas turbine facility are shown in *Figure 5.1* and described in *Table 5.1*.

Table 5.1 Noise monitoring locations

Noise monitoring location	Location description	Comments
A	North-west corner of village (Site # 95)	Nearest potentially affected receiver. Used to determine existing site influences to local ambient noise environs
B	North-east corner of village (Site # 11/32)	Indicative background noise location Used to establish typical baseline levels for the area (minimal influence from existing Delta Electricity operations expected)

Each monitoring location is located within a typical residential landscape. Intermittent traffic noise was observed at each location, with fauna being a key source for each measurement location. Industrial-related noise was barely audible at location B during the daytime period.

Figure 5.1 Additional background noise monitoring locations

5.1.5 Unattended noise monitoring

Unattended noise monitoring was conducted at each location from Thursday 30 March 2006 to Tuesday 11 April 2006. The results from this monitoring are presented in *Table 5.2*.

Table 5.2 Unattended noise monitoring results

Monitoring location and period		L_{A10}		L_{Aeq}		L_{A90} (RBL)	
		Range	Average	Range	Median	Range	Median
A	Daytime (7am – 6pm)	44 – 51	46.5	45 – 63.5	47	31.5 – 41	34.5
	Evening (6pm – 10pm)	39 – 49	44	40.5 – 54.5	45.5	30.5 – 39	35.5
	Night-time (10pm – 7am)	42.5 – 47	44	40.5 – 47	42.5	33.5-40	38
B	Daytime (7am – 6pm)	47 – 53	50	47.5– 54.5	50.5	32 – 40.5	35.5
	Evening (6pm – 10pm)	40.5 – 46	43.5	42 – 48	44.5	33.5 – 38.5	35
	Night-time (10pm – 7am)	38 – 44	41	38 – 46.5	43	32 – 37	34.5

Notes: Values expressed as dB(A) and rounded to nearest 0.5 dB(A)
Range based on analysed daily levels
L_{A10} = Noise level 10% of time
L_{Aeq} = Equivalent noise level (average)
L_{A90} = Noise level 90% of time (background)
RBL = Rating Background Level

Inclement weather conditions (wind speeds greater than or equal to five metres per second and/or precipitation) have been excluded from the analysed levels. Inclement meteorological conditions were obtained from the weather station located at Munmorah Power Station.

A log of noise events over the unattended noise monitoring period was provided by Rowena Hamilton (proprietor of the Bevington Shores Manufactured Home Village). A number of short-term extraneous noise events were recorded including heavy surf, motor bikes, construction activities, lawn mowing and general maintenance works. The inclusion of the logged events did not influence the long-term averages reported in *Table 5.2*.

Compiled daily noise logger graphs have been included in *Appendix C*. Periods excluded from recorded noise levels are shown as shaded on the compiled daily noise logger graphs. The daily noise logger graphs were generally consistent throughout each daily period. Diurnal variations were observed, with an increase in ambient noise levels between 6 am to 6pm, expected to be the results of influences from community noise and local fauna.

5.1.6 Attended noise monitoring

Daytime and night time attended noise monitoring was carried out at each noise monitoring location on Tuesday 11 April 2006. Meteorological conditions during

the attended noise monitoring program were satisfactory for noise monitoring purposes with minimal wind, some cloud cover and a temperature of approximately 28 °C (day time) and 21°C (night time). The results from the attended noise monitoring are presented in *Table 5.3*.

Table 5.3 Attended noise monitoring results

Monitoring location and period		Measured levels			Comments
		L_{A10}	L_{Aeq}	L_{A90}	
A	Daytime (15:50 – 16:05)	45	43	37	Munmorah observed influence 37 – 38, audible up to 40 – 41 Fauna observed ≈ 37 – 42 Distant motor bike observed ≈ 40 – 52 S.S ≈ 40, minimum 37 – 38
	Night-time (23:00 – 23:15)	42.5	41	38.5	Munmorah observed influence 37 – 38 (key noise source) Leaves rustling ≈ 41 – 43 No road traffic noise S.S. ≈ 38 – 39
B	Daytime (16:15 – 16:30)	44	43	40.5	No industry audible Fauna observed ≈ 40 – 44 Surf noise ≈ 40 Leaves rustling 42 – 45 Distant motor bikes audible ≈ 41 S.S. ≈ 40 – 41, min 39
	Night-time (23:25 – 23:40)	35	34	32	Munmorah audible 32 – 34, with observed influence of 33 due to fauna (insects present)

Notes: Values expressed as dB(A) and rounded to nearest 0.5 dB(A)
Range based on analysed daily levels
SS = Observed steady state noise level
L_{A10} = Noise level 10% of time
L_{Aeq} = Equivalent noise level (average)
L_{A90} = Noise level 90% of time (background)
RBL = Rating Background Level

L_{Aeq} noise levels measured at each location were consistent during the daytime. Night time noise levels varied by 5 – 7 dBA between each location. Ambient noise levels at Location A were higher. This is expected due to the influence from operations at Munmorah Power Station.

5.1.7 Review of monitoring results

Unattended monitoring results

Table 10.1 of the Environmental Assessment reported a Rating Background Noise Level (RBL) during the night of 34 dBA and the lowest reported background noise level of 32 dBA for Noise Catchment Area C. The lowest reported background noise level (32 dBA) was assumed to apply for Noise Catchment Area B.

As shown in *Table 5.2*, the night-time RBL for Bevington Shores were measured at 38 dBA, with a lower daily range of 33.5 dBA (Location A) and 32 dBA (Location B).

The results indicate that the measured levels are generally consistent with the assumed ambient noise levels used in the Environmental Assessment to determine the project-specific criteria for Noise Catchment Area B (Table 10.4 of Environmental Assessment). Background noise levels at Location A were slightly higher but this is expected due to the influence of industrial noise at this location.

Attended monitoring results

Table 10.2 of Environmental Assessment reported night-time attended noise measurements within Noise Catchment Area C of 30 dBA (L_{Aeq}) and 29 dBA (L_{A90}). The attended noise monitoring levels measured at Bevington Shores outlined in *Table 5.3* were generally the same during the day but slightly higher during the night.

Review of project-specific operational noise criteria

A review of the project-specific operational noise criteria for Noise Catchment Area B has been undertaken based on the measured background noise monitoring data obtained as part of this study. The outcome of this review should determine whether the noise criteria used in the Environmental Assessment to assess potential noise impacts in Noise Catchment Area B were appropriate.

The Industrial Noise Policy sets out two criteria that are used to assess the potential noise impacts of a proposal on the nearest sensitive receptors. The first criterion aims at controlling intrusive short-term noise impacts on residences (intrusive criterion). The second criterion aims at maintaining the long-term amenity of particular land uses (amenity criterion). The more conservative of the two limits are established as the project-specific operational noise goals.

The relevant intrusive criterion can be summarised as follows:

- L_{Aeq} (15 min) ≤ Rating Background Level + 5 dBA

Table 5.4 Amenity criteria for suburban setting

Type of receptor	Period	Recommended noise level
Residential Day time	7am – 6pm Monday to Sunday 8am – 6pm, Sundays and Public Holidays	55 dB(A)
Residential Evening time	6pm – 10pm	45 dB(A)
Residential Night time	Remaining period	40 dB(A)

Notes: L_{Aeq} = Equivalent noise level (average)
Source Table 2.1 NSW DEC Industrial Noise Policy NP

The amenity criterion is determined based on guidelines presented in the Industrial Noise Policy. The acceptable amenity limits for a suburban setting are listed in *Table 5.4*.

The amenity criterion is established with reference to the L_{Aeq} noise levels for the area and the existing industrial noise influence. The amenity criterion is then corrected with reference to Table 2.2 of the Industrial Noise Policy.

As indicated in *Table 5.3*, an industrial noise influence of 37 – 38 dBA was observed at Location A. The industrial noise influence observed at Location B was 33 dBA. Therefore, the recommended acceptable noise levels set out in *Table 5.4* need to be modified to account for the existing level of stationary industrial noise. Based on the existing noise environs, the amenity limits set out in *Table 5.5* would apply.

Referencing the RBL (L_{A90}) values measured during the unattended noise monitoring program and the formula to assess the intrusive noise criterion, the intrusive noise limits set out in *Table 5.5* would apply:

Table 5.5 Project-specific amenity and intrusive criteria for suburban setting

Period	**Amenity criteria [L_{Aeq}, period]**		**Intrusive criteria [L_{Aeq}, 15 min]**	
Location	A	B	A	B
Day time	55	55	**39**	40
Evening	45	45	**40**	50
Night	**36**	40	43	39

Notes: L_{Aeq} = Equivalent noise level (average)
Source Table 2.1 of Industrial Noise Policy

The daytime / evening intrusive noise goals and night-time amenity noise goals are more stringent and would therefore govern, shown as bold in *Table 5.5*.

5.1.8 Conclusions

The background monitoring results obtained by this study and revised project-specific criteria for Noise Catchment Area B have been compared with the assumed background noise levels and project-specific noise criteria used in the Environmental Assessment to assess potential noise impacts at Noise Catchment Area B. The results of this comparison are summarised in *Table 5.6*.

Table 5.6 Summary of monitoring data – Bevington Shores Manufactured Home Village (Noise Catchment Area B)

Period	Assumed RBL [a] (dBA)	Measured RBL (dBA)	Assumed project-specific criteria [b] $L_{Aeq, 15\ min}$ (dBA)	Revised project-specific criteria $L_{Aeq, 15\ min}$ (dBA)
Location A				
Day	36	35	37	39
Evening	33	35	37	40
Night	32	38	37	36
Location B				
Day	36	36	37	40
Evening	33	35	37	40
Night	32	34	37	37 [c]

Notes: Values expressed as dB(A) and rounded to nearest dB(A)]
RBL = Rating Background Level
a - Sourced from Table 10.1 of Environmental Assessment
b - Sourced from Table 10.4 of Environmental Assessment
c - Conservatively estimated on the lowest reported daily L_{A90} noise level

The measured background noise levels at the Bevington Shores Manufactured Home Village were noted to be slightly higher than the assumed noise levels used in the Environmental Assessment.

The project-specific noise criteria developed using actual background monitoring data were generally consistent with the assumed project-specific criteria used in the Environmental Assessment to assess the potential noise impacts at Noise Catchment Area B.

The noise level predictions presented in Table 10.7 of the Environmental Assessment for Noise Catchment B were in the range of 27 – 29 dBA. The background noise level monitoring provided a median night-time L_{Aeq} noise level of approximately 43 dBA and a median night-time L_{A90} noise level of 38 dBA (Location A) and 34.5 dBA (Location B). With reference to the incremental noise levels reported in the Environmental Assessment, the proposed gas turbine facility is expected to be generally inaudible at the Bevington Shores Manufactured Home Villages and would not result in any incremental noise impacts.

Based on the above results, it can be concluded that the assumptions made in the Environmental Assessment in relation to Noise Catchment Area B were appropriate and do not alter the conclusions of the noise impact assessment in the Environmental Assessment.

5.2 Noise comparison study – Site A versus Site E

5.2.1 Background

A number of submissions from residents that live in the Halekulani area, and in particular in the Bevington Shore Manufactured Home Village and Sunny Lake Shores Caravan Park, have requested that Delta Electricity consider relocating the proposed gas turbine facility to Site A instead of Site E, as it is perceived that Site A would provide environmental benefits, from a noise impact perspective.

5.2.2 Scope of assessment

The scope of this study was to undertake additional noise modelling to predict and determine if locating the proposed gas turbine facility at Site A (helipad) provides environmental benefits (from a noise impact perspective) over the currently proposed site location (Site E).

5.2.3 Methodology and results

The noise modelling exercise used the same software and background information as the original study (see Chapter 10 and Technical Paper 3 of Environmental Assessment), allowing for a direct comparison. The additional modelling is presented as an addendum to Technical Paper 3 and is attached in *Appendix D*. This section summarises the key findings of the updated assessment.

5.2.4 Modelling results

A summary of the model results is provided in *Table 5.7*. Predicted operational noise levels are shown at night, at this is the most sensitive period and where concerns are most likely to arise.

Noise level contours showing predicted $L_{Aeq,\ 15\ min}$ noise levels are provided in *Figure 5.2* (under neutral or typical meteorological conditions) and *Figure 5.3* (under adverse or noise enhancing meteorological conditions).

Table 5.7 Predicted operational noise levels: Site A (helipad) and Site E (proposed) – Neutral conditions

Noise catchment area	Receiver location	Night-time criterion $L_{Aeq,15min}$ (dBA)	Predicted noise levels $L_{Aeq,15min}$ (dBA)	
			Site A	Site E
A	Lakeside Village	40	23	21
	Kamilaroo Drive	40	20	19
B	Sunnylake Shores Caravan Park	37	19	27
	Macleay Street	37	21	35
C	Woolana Road	37	33	34
	Ulana Road	37	35	32
D	Barega Close	38	32	28
E	Baker Street (south)	38	29	18
	Baker Street (north)	38	35	30
F	Denman Street	38	31	24

$L_{Aeq, 15\ min}$ = Equivalent noise level (15-minute average)

Table 5.8 Predicted operational noise levels: Site A (helipad) and Site E (proposed) – Adverse conditions

Noise catchment area	Receiver location	Night-time criterion $L_{Aeq,15min}$ (dBA)	Predicted noise levels $L_{Aeq,15min}$ (dBA)	
			Site A	Site E
A	Lakeside Village	40	26	23
	Kamilaroo Drive	40	23	22
B	Sunnylake Shores Caravan Park	37	21	29
	Macleay Street	37	24	**38**
C	Woolana Road	37	37	37
	Ulana Road	37	39	35
D	Barega Close	38	36	31
E	Baker Street (south)	38	33	21
	Baker Street (north)	38	**41**	32
F	Denman Street	38	34	29

$L_{Aeq, 15\ min}$ = Equivalent noise level (15-minute average)

Figure 5.2 Predicted noise level contours (Site A) - Typical meteorological conditions

- Existing Munmorah Power Station
- Site A (Helipad Site)
- Bevington Shores Manufactured Home Village
- Sunnylake Shores Caravan Park
- LAeq 40dBA
- LAeq 35dBA
- LAeq 30dBA

Figure 5.3 Predicted noise level contours (Site A) - Noise enhancing meteorological conditions

- Existing Munmorah Power Station
- Site A (Helipad Site)
- Bevington Shores Manufactured Home Village
- Sunnylake Shores Caravan Park
- LAeq 40dBA
- LAeq 35dBA
- LAeq 30dBA

5.2.5 Statistical analysis of potential noise impacts due to meteorological effects

More detailed analysis of the worst case adverse meteorological conditions indicate with temperature inversions of 5º per 100m and a wind speed from source to receiver of 3 metres per second, noise levels are 2-3 dBA higher than shown in *Table 5.7* are possible, although infrequent.

Since noise levels under worst-case adverse meteorological conditions are predicted to exceed the night time intrusiveness criteria at four of the residential receiver areas to the south and west in Noise Catchment Areas C, D and E, it is important to quantify the proportion of time that this may occur to better understand the potential noise impacts.

Generally, the likelihood of concurrent wind speed and wind direction leading to noise levels significantly above the criteria is low. However, this higher degree of affectation can result if prevalent wind conditions dominate in certain directions.

Records of wind speed and direction were obtained for the meteorological station at Munmorah Power Station for three years. This data has been processed to determine the likelihood of either wind or temperature inversions affecting the propagation of noise. Taking into account prevalent wind conditions or temperature inversions, statistical modelling was undertaken to determine the proportion of time that exceedances of the relevant criteria could occur in any one season.

A total of 110 separate meteorological condition combinations were considered – wind speeds of 1-3 metres per second in each of eight directions, and zero wind speed (representing both zero wind and wind speeds above 3 metres per second) with associated temperature inversions. Noise levels were calculated under each of these conditions, and the probability of occurrence of each wind condition was taken into account to determine the percent of time that noise levels could exceed the relevant criterion.

The results are separated into seasons and tabulated in *Table 5.9*. The results are provided in percentile bands. The table also shows the proportions of time that meteorological conditions are predicted to give rise to noise levels in excess of the daytime criteria for the modelled scenario.

These proportions assume the proposed gas turbine facility would be operating continuously throughout the night-time. However the total time of operation in a year is estimated at 500 hours, with a significant proportion of this time occurring during the day. The proportion of time of actual use would reduce by a factor of approximately 10, when considering the likely use at night-time during the winter season and much higher factors for the other months.

Table 5.9 Proportion of operating hours resulting in noise level exceedance

Receiver location	Adopted night time criterion ($L_{Aeq,15min}$ dBA)	Proportion of time if continuous operation (%)			
		Summer	Autumn	Winter	Spring
C – Woolana Road	37	4 (5)	5 (8)	11 (15)	6 (10)
C – Ulana Road	37	15 (3)	20 (6)	41 (5)	26 (4)
D – Barega Close	38	1	1	1	1
E – Baker Street (north)	38	31	11	6	21

$L_{Aeq, 15\ min}$ = Equivalent noise level (15-minute average)

Numbers in brackets are from Table 10.8 of Environmental Assessment

On this basis the percentage of time exceedances may occur is generally less than 2 per cent and at worst-case 4 per cent in winter.

5.2.6 Conclusions

A comparison of the noise level predictions indicates noise levels are likely to be higher at more residential receiver locations for Site A versus Site E. Although the predicted noise levels for Noise Catchment Areas B and C are reduced due to the shielding effects of the existing power station buildings, the predicted noise levels for Noise Catchment Areas D and E in particular are increased. As indicated in *Table 5.9*, the proportion of time potential exceedances above the project-specific noise criteria increases for Site A at a number of locations within Noise Catchment Area C.

Although there seems to be changes in noise levels at individual receivers, the overall difference between the two site location options, in terms of potential noise impacts, is considered relatively minor, with Site E resulting in slightly lower potential noise impacts than Site A.

Based on the above results, Site A does not provide environmental benefits over Site E in terms of reducing potential noise impacts. In fact, locating the facility at Site A has the potential to increase potential noise impacts to residents of San Remo and Buff Point.

6. Modifications to the proposal

Subsequent to the consideration of the submissions received, further consultation with relevant stakeholders and additional design information becoming available, Delta Electricity proposes a number of minor modifications to the concept design presented in the Environmental Assessment. The following sections summarise the proposed modifications to the proposal.

6.1 Pipeline route

Following recent discussions with one of the major private land owners that could be affected by the proposed pipeline route (i.e. Woodbury Park Estate Pty Ltd), Delta Electricity wishes to review the proposed pipeline route with a view of mitigating some of the potential long-term urban development constraints that were raised by Woodbury Park Estate Pty Ltd during these discussions.

Consequently, and in accordance with the Concept Plan Approval process available under Part 3A of the *Environmental Planning and Assessment Act 1979*, Delta Electricity seeks to modify the proposal presented in the Environmental Assessment by proposing a *pipeline route corridor concept* instead of a specific final pipeline route.

The *pipeline route corridor concept* allows Delta Electricity to proceed to the next phase of the project, having obtained Concept Plan Approval for the project, on the basis that a more suitable pipeline route will be selected and assessed to the satisfaction of the Department of Planning and other relevant government authorities prior to lodging an application for full Project Approval.

The proposed *pipeline route corridor* is shown in *Figure 6.1* and is generally bound by an area approximately 250 metres north of Bushells Ridge Road and Wyee Road (northern routes) and the Motorway Link Road and Pacific Highway (southern routes).

A brief description of each of the potential pipeline route options that are likely to be investigated by Delta Electricity is provided below.

Northern route options

- Route 2A – runs north-west along an existing Delta Electricity-owned ash pipeline corridor, then west along the southern edge of Wyee Road and Bushells Ridge Road until it reaches the Sydney-Newcastle pipeline

- Route 2B – runs north-west along an existing Delta Electricity-owned ash pipeline corridor then straight line (west) along undisturbed bushland until it reaches an existing 330 kV corridor then south-west until it reaches the Sydney-Newcastle pipeline

- Route 2C – runs further north-west (to avoid residences north of existing ash pipeline corridor) and then straight line west along Delta Electricity land (south of existing ash dam used by Vales Point Power Station) until it reaches the existing 330 kV corridor, then south-west until it reaches the Sydney-Newcastle pipeline.

Southern route options

- Route 1A - currently preferred route

- Route 1B – same as Route 1A but diverts from electricity transmission easement by following the northern side of Motorway Link Road and then west along Tooheys Road (southern edge) until it reaches the Sydney-Newcastle pipeline

- Route 1C – same as Route 1B but follows northern side of Motorway Link Road until it reaches the F3 off-ramp, and then runs west along the northern edge of off-ramp until it reaches the Sydney to Newcastle pipeline

Delta Electricity is confident that one (or more) of these alternate pipeline routes will result in a practical and cost-effective outcome for Delta Electricity as well as Woodbury Park Estate Pty Ltd whilst still achieving social, economic and environmental outcomes that are acceptable to the local community and relevant government authorities.

Following receipt of the Concept Plan Approval from the Minister for Planning, Delta Electricity proposes to undertake further investigations to identify the preferred and final pipeline route. The additional investigations are likely to include:

- Further consultation with relevant stakeholders (land owners and community groups) and government authorities

- Additional flora and fauna surveys

- Additional aboriginal heritage surveys

- Additional geotechnical surveys

- Further noise impact assessments

- Final hazard analysis (preferred pipeline route)

- Review and assessment of potential land-use constraints (current and proposed)

The outcomes from these investigations and details of the final pipeline route will be lodged with the Department of Planning and other relevant government authorities for review and approval before the commencement of the detailed design phase of the project.

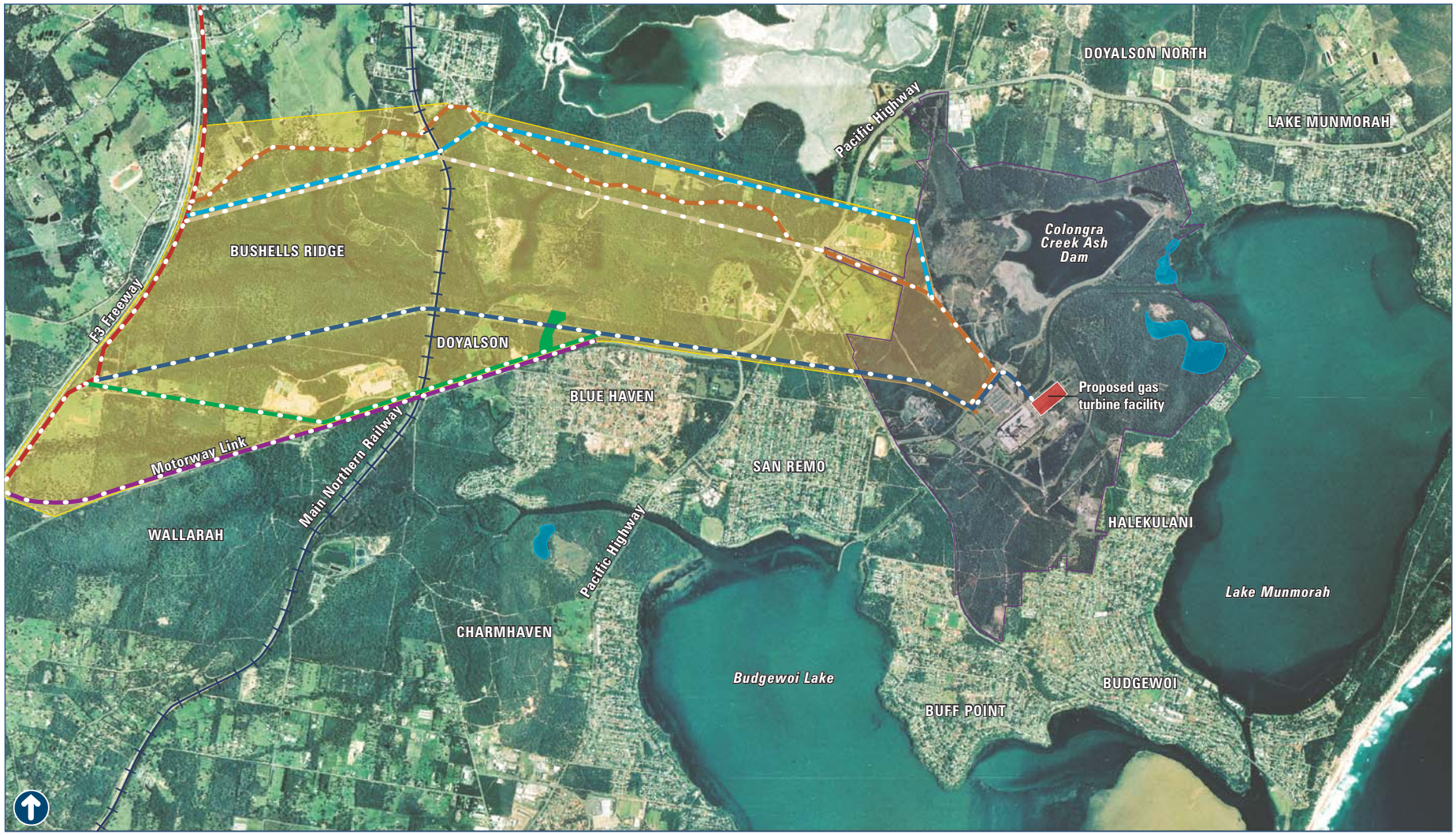

Figure 6.1 Proposed pipeline route corridor

Delta Electricity considers that the potential environmental impacts of the final pipeline route will not be greater than the environmental impacts already anticipated and/or mitigated in the Environmental Assessment. The final pipeline route will, however, minimise the potential future land use constraints identified by Woodbury Park Estate Pty Ltd, which is considered to be an improved environmental outcome.

6.2 Gas turbine facility

Delta Electricity requests that the Department of Planning consider a number of minor modifications to the proposed gas turbine facility, as presented in Chapter 4 of the Environmental Assessment, when determining the proposal on the basis of issuing a Concept Plan Approval for the project. The proposed modifications have arisen due to the recent refinement of the concept design at the time of writing this report.

The proposed modifications allow Delta Electricity to procure the plant and equipment for this project without significantly affecting compliance with the conditions of the Concept Plan Approval.

Delta Electricity considers that the proposed modifications to the gas turbine facility will not result in any adverse environmental impacts not already anticipated and/or mitigated in the Environmental Assessment.

A summary of the proposed modifications being requested is provided in *Table 6.1*.

Table 6.1 Requested amendment to proposed gas turbine facility concept

Component of proposal	Project description as presented in Environmental Assessment	Requested modification to project description
Total power output	*Section 4.3.7* *"The proposal entails the installation of up to four gas turbines, with a total output capacity of about 600 megawatts"*	The 600 MW nominated in Section 4.3.7 of the Environmental Assessment was based on the nominal power output of one of the larger gas turbine manufactures and an assumed natural gas quality. The actual power output of the preferred equipment provider may be higher or lower than the nominal 600 MW figure quoted in the Environmental Assessment. Delta Electricity seeks reasonable flexibility on any Concept Plan Approval condition that may impose or limit the maximum power output of the proposed gas turbine facility. An indicative range would be $\pm$10 % or between 540 – 660 MW and an approval condition that acknowledges this range would be appropriate.

Component of proposal	Project description as presented in Environmental Assessment	Requested modification to project description
Plant capacity factor	*Section 4.5.2* *"Although the proposed gas turbine facility could operate for 24 hours per day and 365 days per year, the gas turbine is likely to operate for about 500 hours per year (5.7 % of the time)."*	The estimated number of operating hours (500 hours per year) and associated plant capacity factor (5.7%) stated in Section 4.5.2 of the Environmental Assessment was based on a preliminary market analysis of supply-demand data from 2000 to 2005. The actual number of hours may vary from year to year as it depends on the energy supply-demand conditions at a particular point in time. However, the proposed facility will be operated as a peak-load facility only. The Environmental Assessment assessed the potential air quality and noise impacts of the proposal on the basis of continuous operation to be consistent with the worst-case approach. The results form these two assessments in particular demonstrated that the proposed facility would comply with the prescribed guidelines and regulations. Delta Electricity seeks reasonable flexibility on any Concept Plan Approval condition that may impose or limit the maximum number of hours the gas turbine facility is permitted to operate using natural gas in a given year. Delta Electricity acknowledges DEC's comment regarding the operation of the proposal as a peak-load station and not an intermediate or base-load station. Delta Electricity wishes to confirm that it has no intention to operate the facility for any other purpose, other than as a peak-load station. Delta Electricity would be happy to meet with the DEC and DoP to discuss this matter before the Concept Plan Approval conditions are finalised and issued.
Black start capability	*Section 4.5.2* *"The facility would also be required to respond to system emergency and security situations, which would be in addition to the nominal operating profile"*	As indicated in Section 4.5.2 and throughout other sections of the Environmental Assessment (e.g. Section 2.4), the black-start capability of the proposed gas turbine facility is likely to play a critical role in restoring power during a major system black-out. Consequently, Delta Electricity requests that a special condition be included in the Concept Plan Approval which permits Delta Electricity to operate the gas turbine facility as long as is required to respond to a system emergency situation, without incurring a penalty or deduction on the 'approved' total number of hours the facility may be permitted to operate using natural gas and/or distillate on a given year. Delta Electricity would be happy to meet with the DEC and DoP to discuss this matter before the Concept Plan Approval conditions are finalised and issued.

6.3 General Terms of Approval

Delta Electricity has reviewed the General Terms of Approval (GTA) provided by the Department of Environment and Conservation in its submission to the Department of Planning and requests that the Department of Environment and Conservation considers Delta Electricity's request to amend the GTA as listed in *Table 6.2*.

Table 6.2 Requested amendment to General Terms of Approval

Relevant clause	Requested amendment
Clause 9 – Air emission limits	Delta Electricity seeks an amendment to this clause such that the limits set in the table apply to 'normal' conditions only and do not apply during start-up conditions, in accordance with clause 45 of the Protection of the Environment (Clean Air) Regulations 2002.
Clause 9 – Air emission limits	Delta Electricity requests that the 100 percentile concentration limit for firing on distillate be increased from 65 mg/m^3 to 90 mg/m^3 (normal conditions), which would comply with the emission limits set in Schedule 3 of the Regulations. Alternatively, Delta Electricity requests that the 65 mg/m^3 limit be specified as a 95 percentile concentration limit. Following recent discussions held with Delta Electricity's engineering consultants, there are concerns that equipment manufactures may not be able to achieve the emission limits prescribed in Table 11.6 of the Environmental Assessment for 100 percent of the time. Delta Electricity proposes to specify stricter emission limits in the tender documentation but requires some flexibility in performance specification in the event that the emission limits cannot be achieved 100 percent of the time using reasonable and practical means. The proposed amendment will be subjected to further environmental assessment and modelling during the detailed design phase to ensure that the conclusions from the air quality impact assessment are unchanged. The results of the additional assessment will be forwarded to the DEC for review and approval prior to finalisation of design.

7. Preferred project report

In accordance with section 75H(6) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the Director-General requires the proponent to submit a Preferred Project Report that outlines proposed changes to the project to minimise its environmental impact.

Subsequent to the exhibition of the Environmental Assessment, a number of minor modifications have been made as a result of the consideration of public submissions, further consultation with land owners and further design information becoming available. *Chapter 6* provides a description of the proposed modifications and a justification for each and constitutes the Preferred Project Report.

The Environmental Assessment concludes that the proposed modifications are unlikely have a greater environmental impact than that outlined in the Environmental Assessment. Nevertheless, further assessment will be undertaken during the detailed design phase of the proposal. Taken together, the proposed modifications would not result in any adverse environmental impacts not already anticipated and/or mitigated in the Environmental Assessment.

Part 3A of the EP&A Act requires the proponent to provide a Statement of Commitments which demonstrates its commitment to the implementation of the proposed mitigation and management measures. A draft Statement of Commitments was provided in *Appendix D* of the Environmental Assessment. A final Statement of Commitments, which has been amended as a result of the submissions received, is provided in *Appendix E* of this report.

8. Conclusion

This Submissions Report has addressed the outcomes of the consultative process conducted during and subsequent to the exhibition of the Environmental Assessment for the proposed Munmorah gas turbine facility.

In addressing both compliance with legislative requirements and the requirements of the consultative process, this Submissions Report demonstrates that:

- All statutory obligations have been met (*Chapters 2* and *3).*
- Delta Electricity has considered all issues arising from the submissions and provided written responses to the issues (*Chapter 4).*
- In responding to a number of the key issues, additional studies and consultation has been undertaken to adequately respond to these issues (*Chapter 5*).
- Modifications to the concept design have been proposed to reduce the identified potential impacts (*Chapter 6).*
- The environmental impacts of the modifications have been assessed and it has been determined that there are no greater impacts as a consequence of these proposed modifications (*Chapters 5 and 6*).

In consideration of the above, it is concluded that the Munmorah gas turbine facility proposed as described in the Environmental Assessment and amended by this Submissions Report should proceed for the approval of the Minister for Planning subject to the adoption of the Preferred Project Report.

9. References

Department of Environment and Conservation (2000) *NSW Industrial Noise Policy.* Environment Protection Authority, Department of Environment and Conservation, Sydney, NSW.

Environment Protection Authority NSW (1994) *Environmental Noise Control Manual.* Department of Environment and Conservation, Sydney, NSW.

National Electricity Market Management Company 2004, *2004 Annual Report*, viewed 4 April 2005.

New South Wales Government 2004, *Energy Directions Green Paper*, viewed 30 March 2005.

Parsons Brinckerhoff Australia Pty Ltd (2005) *Munmorah Gas Turbine Facility Environmental Assessment – Main Volume, Volume 1,* Parsons Brinckerhoff Australia

Parsons Brinckerhoff Australia Pty Ltd (2005) *Munmorah Gas Turbine Facility Environmental Assessment – Technical Papers, Volume 2* Parsons Brinckerhoff Australia.