

Mt Piper Power Station Extension



Project Description and Preliminary Environmental Assessment

June 2009



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PROJECT DESCRIPTION AND PRELIMINARY ENVIRONMENTAL ASSESSMENT

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Acronyms and Glossary¹

Term	Meaning
ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ACC	Air Cooled Condenser
AHIMS	Aboriginal Heritage Information Management System
Baseload generation	Power plants that are optimised economically and in an engineering sense to a relatively constant, steady and reliable stream of energy.
Baseload generator	Generating plant that is normally operated to produce electricity for most hours of the year.
CCGT	Combined Cycle Gas Turbine – a power plant in which a gas turbine generator generates electricity and the waste heat from the gas turbine is used to make steam to generate additional electricity via the steam turbine.
CH ₄	Methane
CO ₂	Carbon dioxide
DECC	NSW Department of Environment and Climate Change
Delta	Delta Electricity
DoP	NSW Department of Planning
E	Endangered under the EPBC Act or TSC Act
EA	Environmental Assessment
Electricity demand	The electricity requirement to be met by generating units at a point in time, measured in megawatts. Includes: electrical power consumed by consumers; distribution and transmission losses; and power station transformer losses and auxiliary loads.
EP&A Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
HRSG	Heat Recovery Steam Generator
GW	Gigawatt – 1×10^9 watts, i.e. one thousand million (or one billion) watts. A commonly used term to describe power generation capacity or level of demand.
GWh	Gigawatt hour– 1 gigawatt hour. The amount of energy produced or consumed over one hour in a system operating at a capacity level of one gigawatt. A commonly used term to describe power generation production or consumption.
LEP	Local Environmental Plan
LGA	Local Government Area
N ₂ O	Nitrous oxide
NEM	National Electricity Market – the market to facilitate the wholesale exchange of electricity; operated by NEMMCO.
NEMMCO	National Electricity Market Management Company.
NO _x	Nitrogen oxides
OCGT	Open Cycle Gas Turbine – a power plant in which a gas turbine generator generates electricity and the waste heat from the gas turbine is exhausted to the

¹ For consistency, this Glossary uses the same meanings as the Owen Inquiry, where applicable.

Term	Meaning
	atmosphere for cooling. Typically used in times of peak power demand.
PA	Project Application
PEA	Preliminary Environmental Assessment
PV	Photovoltaic
REP	Regional Environmental Plans
SEPP	State Environmental Planning Policies
SKM	Sinclair Knight Merz
SO _x	Sulphur oxides
TSC Act	Threatened Species Conservation Act 1995
USC	Ultra-supercritical coal. USC technology is the most efficient coal technology commercially available at present. There is an arbitrary transition from supercritical coal technology, but generally steam conditions above 26 MPa pressure and 580-600°C are termed ultra-supercritical.
V	Vulnerable under the EPBC Act or TSC Act
VOCs	Volatile organic compounds
Watt	Basic unit of electrical power.
Watt-hour	Wh – basic measure of electrical energy (energy = power x time)

Executive Summary

This report provides a Preliminary Environmental Assessment (PEA) to support Delta Electricity's Concept Plan application for the Mt Piper Power Station Extension Project. Delta Electricity is the Proponent for the project. The report identifies key environmental issues associated with the project and supports an application to the Minister for Planning under Section 75M of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for Concept Plan approval. The project would be a Major Project and a Critical Infrastructure project under Section 75B and 75C of the EP&A Act respectively. This PEA is intended to assist the Director-General of the Department of Planning (DoP) with the issuing of Environmental Assessment (EA) requirements under Section 75F of the EP&A Act.

Delta Electricity operates the existing Mt Piper Power Station, located near Lithgow in central western NSW. The existing Mt Piper Power Station has a generating capacity of approximately 1,400 MW. The proposed Mt Piper Power Station Extension project would comprise the installation and operation of up to 2,000 MW of new generating capacity. This new capacity would be either additional coal-fired steam turbine generators or new combined cycle gas turbines.

The Report from the NSW Government's recent *Inquiry to Electricity Supply in NSW* (also known as the Owen Report) states that NSW needs to be in a position where new baseload generation can be operational by 2013/14, in order to avoid potential short falls. Reduced demand forecasts means that these dates have extended, but there still exists the need for planning and construction of new baseload power generation in NSW as early as possible. This proposal is a response to this need for additional baseload power generation in a cost-effective manner.

The preliminary investigations undertaken for the proposal indicate that the key environmental issues for the Mt Piper Power Station Extension project include:

- Greenhouse Gas Emissions
- Air Quality
- Noise and Vibration
- Water Management
- Socio-economic

Other important issues which will be addressed by undertaking detailed studies include:

- Hazard, Risk and Incident Management
- Visual Landscape
- Flora and Fauna
- Cultural Heritage
- Stakeholder Consultation

This PEA provides discussion of the key environmental issues to demonstrate the Proponent's existing understanding of the issues and the need for further environmental assessment of these key issues. The potential impacts and management of other issues such as land use, geology, soils and groundwater, traffic and transport, socio-economics and waste management, and the reasons they have not been designated as key issues, are also discussed in the report.

The management of both key issues and other issues would be handled through a Statement of Commitments and the Conditions of Approval of the project, which will determine the requirements for environmental management.

1. Introduction

1.1 Purpose of this Report

This Preliminary Environmental Assessment (PEA) has been prepared to support Delta Electricity's concept plan application for the Mt Piper Power Station Extension Project. The report identifies key environmental issues associated with the project and ultimately supports an application to the Minister for Planning under Section 75M of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for Concept Plan approval.

This report is intended to assist the Director-General of the Department of Planning (DoP) with the issuing of Environmental Assessment (EA) requirements under Section 75F of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 The Proponent

Delta Electricity (Delta) was formed in March 1996, when the New South Wales (NSW) Government Authority Pacific Power was separated into three State-owned generation companies. Delta's principal functions are to maintain and operate facilities for the generation and supply of electricity into the National Electricity Market (NEM).

It is recognised that the NSW Government has indicated its intention to include the Mt Piper Power Station Extension Project as a Development Project which could be offered for sale as part of the NSW Energy Reform Strategy. Should this occur, then it is proposed that the project approval being sought would be transferred to the new project owner. In this regard the term Proponent has been used in this document to refer to Delta Electricity currently, or to the future project owner.

1.3 Background

Delta Electricity has four coal-fired power stations in NSW, located in two regions. Vales Point and Munmorah Power Stations are located on the Central Coast, and Mt Piper and Wallerawang Power Stations are located near Lithgow, in central western NSW. These four power stations have a capacity of 4,320 MW and provide about 35% of NSW's electricity supplies.

Delta, in a joint venture with the NSW Sugar Milling Co-operative, has commissioned two 30MW renewable biomass plants in northern NSW. It also has three micro hydro plants in operation, and is constructing 667MW of open cycle gas turbines at its Munmorah site.

The existing Mt Piper Power station was commissioned in two stages over 1992 and 1993, and now comprises two 700 MW coal-fired steam turbine generators (Units 1 and 2). Four generators were originally intended to be constructed on the site, but the third and fourth units were not built due to a fall-off in energy and demand growth in the 1980s. The regional location of Mt Piper Power Station is shown on **Figure 1-1**.

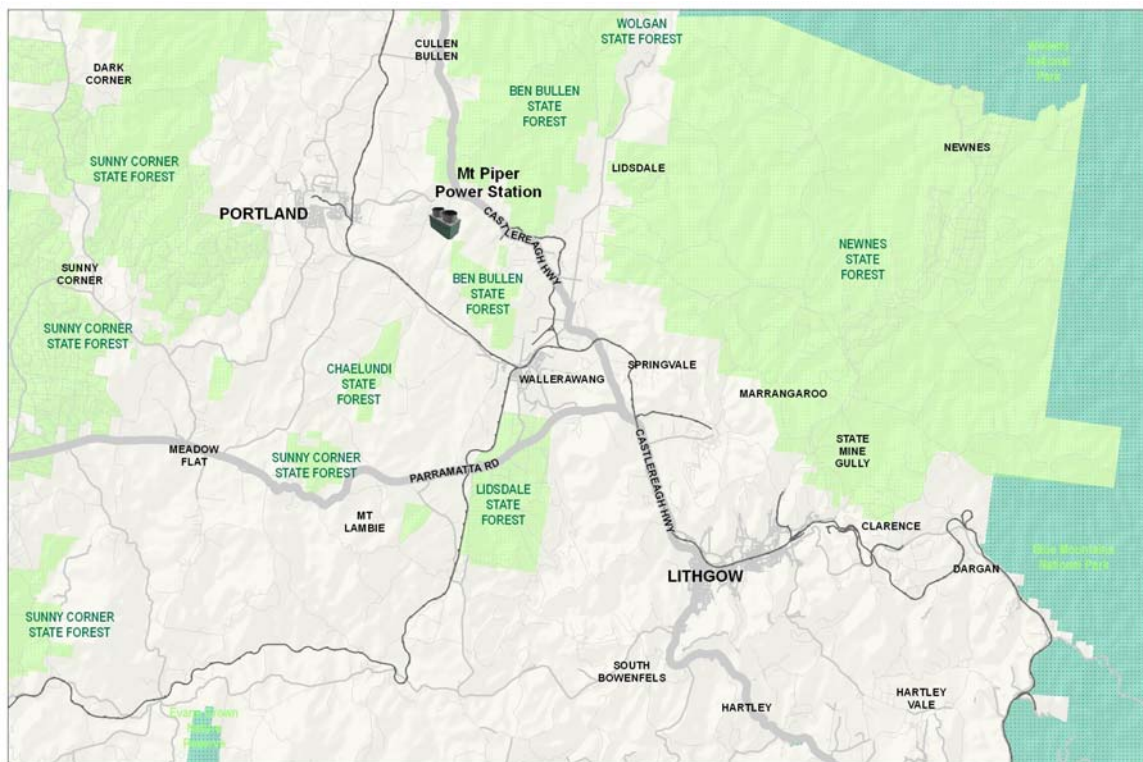
The extension of the plant would have an additional capacity of up to 2,000 MW and would utilise some existing infrastructure including transmission and water supply infrastructure. Use of some infrastructure for the existing power station, such as water management systems, may also occur.

1.4 Project Objectives

The objectives of the project are:

- To provide new baseload generating capacity to help satisfy NSW's future energy requirements;
- To provide this new capacity economically and with the latest technology available to minimise greenhouse gas emission levels; and
- To minimise and manage any environmental or social impacts which may result from the construction and operation of the proposed power station extension.

■ Figure 1-1 Regional Location



2. Project Need and Strategic Justification

2.1 Project Need

The Australian Bureau of Agricultural and Resource Economics (ABARE) indicates that primary energy use, that is consumption of all forms of energy, in Australia grew by an average of 2.0–2.3 per cent per year over the last thirty years (Cuevas-Cubria and Riwoe 2006). This was expected to moderate over the medium term before falling to an average of 1.5 per cent up to 2030, representing an overall increase of 46 per cent.

The NSW Government's *Inquiry to Electricity Supply in NSW* (September 2007), also known as the Owen Inquiry, examined the future of electricity generation in NSW. The Inquiry indicated that electricity demand over the last 20 years has grown more than 4% per year and has doubled over the last two decades. The Inquiry also noted that electrical consumption in NSW has grown by 1,700 GWh per year for the past 30 years. The average growth rate for the next 10 years is expected to be around 1,600 GWh per year, factoring in demand management trends.

The Owen Inquiry concluded that, assuming all generators are consistently running to maximum technical capacity factor limits, NSW generators are capable of delivering about 85,000 GWh of energy per year but that NSW needs to be prepared for new baseload generation from 2013/2014 to meet growing demand and to avoid energy shortfalls. It was forecast in the Owen Inquiry that 88,000 GWh of electrical energy would be needed in NSW by 2013/2014. The National Electricity Market Management Company (NEMMCO) projections for NSW for 2014 within the *2008 Energy and Maximum demand Projection* range from 75,730 GWh for low economic growth scenarios to 81,690 GWh for high economic growth scenarios. These forecasts are lower than those used in the earlier Owen Report suggesting that the need for new baseload generation could go back one to two years, 2014 to 2016. Given the time required to obtain the necessary approvals, and design, procure and construct new baseload generation, especially if project lead times continue to increase, there is a clear need to commence the planning and approvals process.

Currently, during peak periods demand exceeds the State's domestic supply. To meet this peak demand, NSW is required to gain access to electricity from other interconnected regions in the NEM. In 2006-07, interregional supplies from the Snowy Region and Queensland contributed approximately 9,000 GWh to NSW, which is over 10 per cent of NSW needs. Reserve capacity support from the Snowy region and Queensland can provide additional available capacity from 2006/07 until 2009/10. Beyond 2010/11 it is possible that NSW will not be in a position to obtain additional capacity from the Queensland or the Snowy region as Queensland, Victoria and South Australia may be experiencing deficits.

The main factors in determining the need for the proposal are to:

- Supply additional baseload generation capacity to meet future energy demand requirements;
- Provide a long-term energy solution, recognising that the demand is projected to continue to increase over the next 10-20 years at the least;
- Provide electricity supply in a cost effective manner; and
- Consider the community and environmental impacts of increasing power supply.

2.2 Strategic Justification for Baseload Power Station

The Owen Inquiry identified the need to prepare for additional baseload electricity in NSW by 2013/2014. The Owen Report concludes that “the most technologically advanced, commercially viable options currently available for the next tranche of base load generation in NSW are Combined Cycle Gas Turbine (CCGT) and Ultra-supercritical Coal (USC).”²

Delta Electricity’s proposal for additional power generation at Mt Piper Power Station, as part of the solution to providing this additional baseload electricity, will require significantly detailed strategic justification, and while largely based on the findings of the Owen Inquiry, it will also include a detailed consideration of alternative technologies for future baseload electricity.

2.3 Consideration of Alternative Baseload Electricity Options

The characteristics and availability of generation technologies are summarised in **Table 2-1**. More information on the technologies listed in **Table 2-1** is found in the Owen Inquiry.

Renewable energy for baseload is limited due to either scarcity of viable energy resources in the case of hydro and biomass, or intermittent nature of supply in relation to wind and photovoltaic (PV) solar. Solar hot water is commercial and could potentially offset some baseload demand with greater market penetration.

The potential for geothermal sources is currently limited by the status of technology development and remoteness from load centres of this generation facility.

² Owen Inquiry, page v.

■ **Table 2-1 Summary of Available Supply Options and Energy Resources**

Technology	Commercially Available
Ultra Super Critical Coal (dry cooled)	yes
Gas CCGT	yes
Geothermal Hot Rocks	no
Biomass (crop waste)	Yes
Wind	Yes
Solar – Hot Water Offset	Yes
Hydro – Run of River	Yes
Solar - PV	Yes

CCGT technology is commercially available and well proven. NSW and Queensland have indigenous gas reserves and a large baseload CCGT facility could therefore rely on gas supplies via pipeline from Queensland, South Australia and Victoria, as well as within NSW. This would be able to be sourced from a competitive market.

Coal based technology is a cost-efficient power technology which is commercially available. NSW's large reserves of low cost coal resources will provide a low cost, reliable fuel supply to a proven and mature coal fired generation technology.

Gas and coal are best placed to deliver reliable, low cost, baseload supply over the long term when compared with other technologies. The provision of either a CCGT or coal fired plant at the existing Mt Piper Power Station Extension site are considered to be viable options to help meet longer-term demands as discussed in Section 2.1. This will be discussed in detail in the EA.

2.4 Consideration of Alternative Sites

Two broad options were considered by Delta for locating a new power station development, ie on a greenfield site or by construction on an existing power station site. The use of an existing power station was favoured, given that existing infrastructure would be utilised and impacts would be consolidated onto one site rather than creating an additional area of impact. Therefore, the existing power stations operated by Delta were considered. These include Vales Point, Munmorah, Mt Piper and Wallerawang Power Stations and Mt Piper Power Station was selected as the preferred option.

The Mt Piper Power Station Extension is considered capable of supplying electricity to the NEM at commercially competitive rates to help meet future increased baseload energy needs in NSW. The original designs for the Mt Piper Power Station and ancillary infrastructure allowed for a duplication of the generating capacity. To this end, areas of the site were prepared for future generation capacity.

The Mt Piper Power Station was selected as the preferred option given that:

- There would be no change in land use;
- It would be located adjacent to the existing power station and synergies exist with respect to infrastructure;
- The original design allowed for additional generating capacity to be installed;
- Future land uses in adjacent areas and development densities in populated areas are unlikely to change in the future;
- Proposed use is consistent with other uses in the area given that the major land ownership on the property boundaries are by mining companies; and
- The wider area comprises two power stations and many coal mines and associated infrastructure and both coal and gas can be provided to the site.

2.5 Consideration of Alternative Technologies

Ensuring competitiveness and adherence to environmental regulations at present and in the future have been considerations in the evaluation of technology. The following technological options were assessed:

- The use of CCGT or USC technologies;
- Cooling options;
- Emission control options; and
- Waste disposal options.

Further discussion of the environmental implications of the technology options will be included in the EA.

2.6 Greenhouse Gas Management

Greenhouse gas emissions are considered to be the most significant environmental issue relating to the proposal. It is intended that the most efficient gas or coal technology that can be commercially implemented be employed for this power station. As a result, the Mt Piper Power Station Extension will contribute to the reduction of average carbon intensity of electricity generation in NSW.

It is recognised that carbon capture and geosequestration will not be commercially available by the time the power station is being designed. However, it is intended that the station be made “capture ready” by providing layout space for future retrofit of carbon capture plant, and accommodating future requirements of the capture plant. This commitment to reducing the greenhouse footprint of its operations will be demonstrated in the EA.

3. Description of the Project

3.1 Overview

This section of the PEA provides the context of the project location and a general description of the Proposal. A more detailed description of the proposed Mt Piper Power Station Extension and alternatives to the preferred plant configuration and location will be included in the EA.

3.2 Project Location

The project site is located in the Central West region of NSW, approximately 17 km north-west of Lithgow (refer to **Figure 1-1**). The nearest townships are Portland, located approximately 4 km to the west, Blackmans Flat approximately 3 km to the east and Wallerawang, approximately 6 km to the south-east. Mt Piper Power Station is located at the intersection of Castlereagh Highway, the main transport corridor to the site, and Boulder Road.

The site mainly comprises planted and landscaped areas and remnant woodland / open forest and is surrounded by undulating topography. It is surrounded predominantly by State forests (Ben Bullen State Forest located north east and south east of Mt Piper Power Station), mines (Ivanhoe Colliery located north and west of the site) and power generation facilities (Wallerawang Power Station located approximately 6km to the south-east).

The project site is adjacent to the existing Mt Piper Power Station on land owned by Delta Electricity. The Mt Piper site comprises:

Lot 1 DP325532	Lot 1 DP400022	Lot 15 DP626299
Part Lot 191 DP629212	Lot 2 DP702619	Lots 362 & 366 DP740604
Part Lot 10 & Lots 18, 59, 260 & 261 DP751636	Part Lot 1 DP803655	Lots 1-7 & part Lot 13 DP804929
Lot 1 DP813288	Lot 1 DP 816420	Lots 40, 41, 46-52 DP 827626
Lot 1 DP 829065	Lot 21 DP 832446	Lot 1 DP 920999

The proposed extension would be constructed on part of this land, predominantly on Lots 59 and 260, DP 751636, in the location originally designated in the design and earthworks of Mt Piper Power Station for the installation of generation Units 3 and 4.

3.3 Key Elements of the Project

3.3.1 Layout

The project will comprise the installation of new gas or coal fired power generators (up to 2,000 MW) located adjacent to the existing Mt Piper Power Station. An aerial photograph of the site is shown in **Figure 3-1**. The new plant would be located to the west of the existing plant, generally in the area previously prepared for the extension when Units 1 and 2 were constructed.

3.3.2 Power Generation

The Mt Piper Power Station Extension project will have a total capacity of up to 2,000 MW.

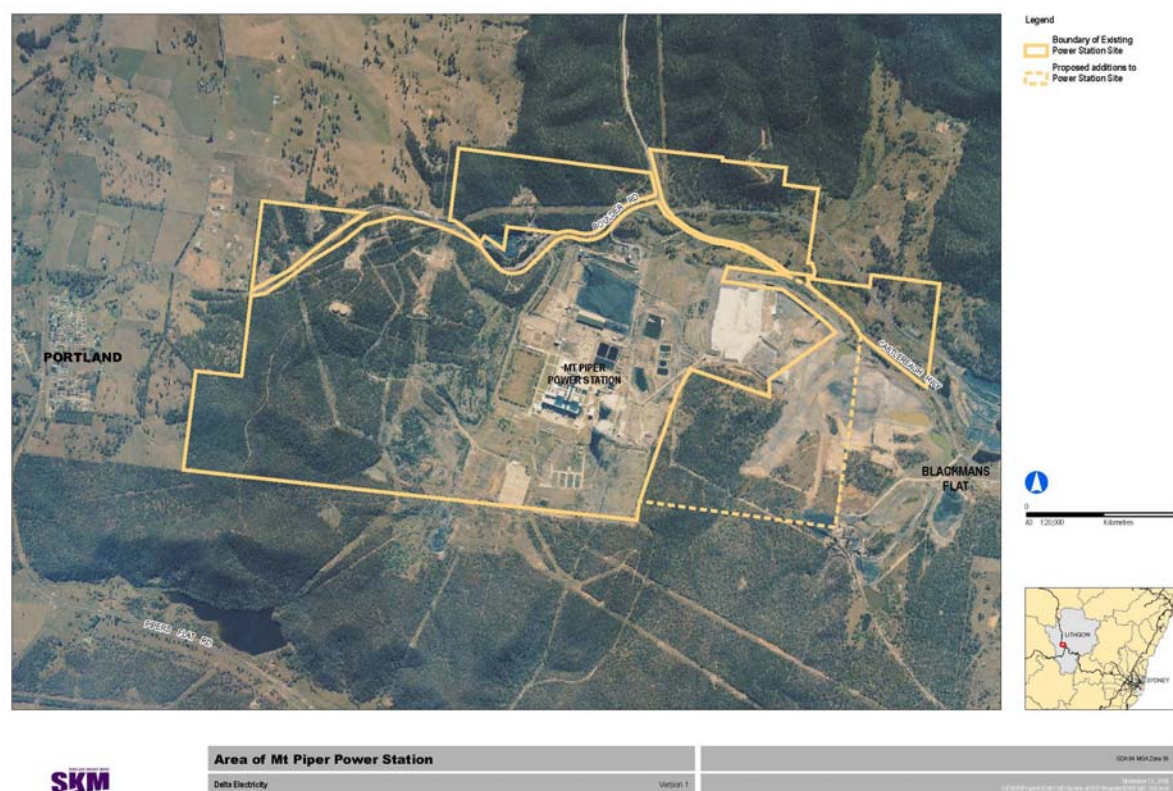
For a coal plant the coal would be pulverised and used to fire two new boilers. Ash would typically be collected and transported by conveyor and/or truck to the ash storage areas. Flue gas would be emitted to the atmosphere, probably via a single stack, approximately 250m in height.

The steam generated by the boilers would be routed to the high pressure turbines where some of the heat energy will be converted to mechanical energy. The steam would then return to the boiler for reheating before it flows through the intermediate pressure turbines and then to the low pressure turbine to convert more of the heat energy into mechanical energy. Steam discharged from the low pressure turbines would pass to direct dry air cooled condensers (ACCs) to be condensed to water before it is returned to the boiler by way of feed heaters, which use steam extracted from the turbines). Heat would be dissipated to the atmosphere via fan-forced air flow.

Combined cycle plants utilise a gas turbine and a steam turbine to drive an electrical generator. The gas is fired in an open cycle gas turbine and hot exhaust gases generated from the gas turbine feed into a heat recovery steam generator (HRSG) which produces steam to drive a conventional steam turbine. In a single shaft design, the steam turbine is coupled to the same shaft as the gas turbine and provides approximately one third of the power output. Together they drive a single generator. In a multi-shaft design, the gas turbine(s) drive their own smaller generator(s) while the steam turbine drives its own smaller generator. The CCGT will exhaust combustion products at a low temperature via a stack or stacks with a nominal height of about 60-80 metres above ground level.

The open cycle phase of the gas fired power station would utilise a closed cycle cooling system. This may include an evaporative cooling system using water to cool the air stream before it enters the combustion chamber of the gas turbine. The CCGT also requires additional cooling for the steam cycle and steam discharged would pass to direct dry air cooled condensers (ACCs) to be condensed to water before being returned to the boiler.

■ **Figure 3-1 Mt Piper Power Station Site**



3.3.3 Transmission

The electrical power output of the power station would be delivered, via step up transformers, to a new 500 kV switchyard adjacent to the existing switchyard. High voltage transmission lines would typically connect the generating units' transformers to the new switchyard. The new switchyard is being built by TransGrid and is not part of this environmental approval process.

3.3.4 Water Management

The Mt Piper Power Station Extension would not involve taking additional water from the existing Coxs River Water Supply Scheme or the Fish River Scheme. The relatively small quantity of water required for power station operations can be obtained from other sources. Access to additional water supply has been obtained from nearby mine workings (i.e. Springvale Colliery). The use of dry cooling minimises water use to a few percent of that required by wet

cooling systems which are currently used at Wallerawang Power Station and on Units 1 and 2 at Mt Piper Power Station.

Water and waste management systems on site could use existing infrastructure. This could include the demineralising plant, brine concentrator, settling ponds, brine concentration ponds clean water ponds and waste treatment system. A water drainage, treatment and discharge arrangement for the project would be designed similar to that used for the existing Mt Piper Power Station. The existing operations treat and reuse all potentially contaminated water on site and excess clean, uncontaminated rainwater water is discharged from the site to Neubecks Creek via a holding pond with an underflow weir. The use of existing and additional infrastructure would be addressed in the EA.

The proposed extension would generate similar water discharge quality and quantity to the existing power station. The new units would not affect the zero discharge status of the process waste flow of the power station.

3.3.5 Fuel Supplies and Infrastructure

For a CCGT gas would likely be delivered to the site via a lateral pipeline system from the existing Moombah to Sydney Pipeline. The lateral would “off-take” near Young and follow the existing gas supply pipeline alignment between Young and Lithgow. Approval for this infrastructure is not being sought in this project application.

For a coal fired plant the coal would be sourced from a competitive market including both local mines and suppliers from a wider region. It is anticipated that, with the expected decline of local resources over time, an increasing proportion of coal would be delivered via rail to Mt Piper Power Station from outside the local area. Such rail transport of coal could utilise existing rail infrastructure and the proposed rail unloader at Pipers Flat. The rail unloader has been assessed independently of the proposed extension and has Project Approval provided. In such a case, coal would be transferred by conveyor from the rail unloader, most probably to the existing coal handling plant at Mt Piper Power Station.

3.4 Workforce and Hours of Operation

It is anticipated that during the construction period for the Mt Piper Power Station Extension up to 950 workers will be required on site, the number depending on whether gas or coal fired plant is built and the timing between units.

Construction activities would be undertaken during standard daytime construction hours. It is recognised that a number of construction and commissioning activities need to be undertaken at times when there are minimal personnel on site for safety reasons. Any construction and

commissioning outside of these normal working hours would require prior approval from relevant Authorities.

The existing power station currently employs approximately 100 personnel. It is expected that the new plant may require up to 50 personnel during operation of the proposed extension, the number again depending on the generation technology adopted. The proposed extension will operate 24 hours per day, 7 days per week.

3.5 Project Construction Phase

The overall construction works for the Mt Piper Power Station Extension is expected to take up to 3 years for a gas fired plant and 5 years for a coal fired plant.

The main construction and commissioning activities include:

- Site establishment and preparation for construction;
- Civil works, steelwork erection and plant installation;
- Progressive energisation of electrical plant;
- Co-ordinated commissioning and testing of major plant;
- Removal of temporary containment facilities and completion of remediation and landscaping works.

The activities basically follow the above sequence. A construction management study is planned to address not only site construction activities but also off-site matters such as accommodation for construction workers and the transport of extremely heavy and/or bulky loads to the site.

4. Planning and Approvals

4.1 Environmental Planning and Assessment Act 1979

Part 3A of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) applies to Major Projects, which are identified in the *State Environmental Planning Policy (Major Projects) 2005* (Major Projects SEPP) or by order of the Minister for Planning. Schedule 1 of the Major Projects SEPP defines development for the purposes of electricity generation using coal or gas with a capital investment of more than \$30 million as a Major Project. As the capital investment for the Mt Piper Power Station Extension Project is greater than \$30 million, the project meets the criteria for classification as a Major Project.

On 26 February, 2008 the Premier of NSW announced that proposals to build new power stations with a capacity of greater than 250 MW would be declared to be critical infrastructure under Section 75C of the EP&A Act.³ As the proposed capacity of the Mt Piper Power Station Extension would have a total capacity of up to 2000 MW, this proposal would be classified as critical infrastructure.

The approval authority for Major Projects is the Minister for Planning.

4.2 Environmental Planning Instruments

Environmental Planning Instruments do not apply to Critical Infrastructure projects unless, in the case of State Environmental Planning Policies (SEPPs), they expressly provide that they apply to the project. Nevertheless, there are a number of State Environmental Planning Policies (SEPPs) and Regional Environmental Plans (REPs) which are relevant to the proposed development and will be considered in the assessment. The SEPPs may include:

- SEPP 11 – Traffic Generating Developments;
- SEPP 33 – Hazardous and Offensive Development;
- SEPP 44 – Koala Habitat Protection; and
- SEPP 55 – Remediation of Land.

The two relevant REPs include:

- Sydney REP 20 – Hawkesbury Nepean River (No. 2 1997); and
- Drinking Water Catchments REP No. 1.

³ Published in the *NSW Government Gazette, Number 24, Wednesday 27 February 2008 – Special Supplement*.

The proposed development would be located within the Lithgow Local Government Area (LGA) and is subject to the provisions of the *Lithgow City Local Environmental Plan 1994* (LEP). Within this LEP, the development site is zoned as Rural (General) 1 (a) and the proposed works would be permissible with consent.

4.3 NSW Environmental Approvals

Table 4-1 summarises the licences and approvals that may be required for the construction and operation of the proposed development.

■ **Table 4-1 Potential Approval Requirements under NSW Legislation**

Approval Requirement	Required Action	Agency
<i>Protection of the Environment Operations Act 1997</i>		
Environment Protection Licence for construction and operation	Existing power station is subject to EPL 766. An amendment to EPL 766 under the Act may be sought by Delta for the proposed power station extension	Department of Environment and Climate Change
<i>Roads Act 1993</i>		
Consent to erect a structure or carry out a work in, on or over a public road	New configuration of Boulder Road access or creation of new access from Boulder Road or Castlereagh Highway, if required, would disturb the existing road surface. An application would be made if necessary	Roads and Traffic Authority or Lithgow City Council

4.4 Commonwealth Legislation

Approval of the Commonwealth Minister for the Environment is required for any actions that may have a significant impact on matters of national environmental significance, as described in the *Environment Protection Biodiversity Conservation Act 1999* (Cth) (EPBC Act). Studies being undertaken for this project indicate that no matters of national environmental significance (in this instance nationally threatened species and migratory species) would be significantly affected.

5. Preliminary Environmental Assessment

5.1 Overview

The preliminary investigations indicate that the key environmental issues for the installation of new generators include:

- Water Management;
- Noise and Vibration;
- Air Quality;
- Energy Usage and Greenhouse Gas Emissions;
- Hazard, Risk and Incident Management;
- Flora and Fauna;
- Visual Landscape;
- Cultural Heritage;
- Socio-economic; and
- Stakeholder Consultation.

A summary of these key environmental issues are provided in **Section 5.2**. The discussion is intended to demonstrate the Proponent's existing understanding of the issues and the need for further environmental assessment of these key issues. The potential impacts and management of other issues such as land use, geology, soils and groundwater, traffic and transport and waste management, and the reasons they have not been designated as key issues, are discussed in **Section 5.2.11**.

5.2 Assessment of Environmental Issues

5.2.1 Energy Use and Greenhouse Gas Emissions

Operation of the Mt Piper Power Station Extension would result in greenhouse gas emissions including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), synthetic halocarbons and other important greenhouse gases. Sources of greenhouse gas emissions associated with the operation would be from transportation to and combustion of fuel at the power station and, in the case of coal fired plant, disposal of ash at or near the power station.

Preliminary studies undertaken for the Mt Piper Power Station Extension considered all the commercially available best applicable power generation technologies. As detailed in **Section 2.6**, the proposed extension as a coal plant would employ USC technology resulting in the lowest carbon intensity of any existing coal-fired generation in NSW due to its advanced technology and cooler ambient temperature location. Similarly, the best available gas turbine technology would

be used for a gas fired plant. Further, there will be particular emphasis on ensuring that the extension using either coal or gas as the fuel is carbon capture ready during concept design.

Energy conservation and management measures for the project would be implemented to ensure that non-renewable resource usage is minimised.

Conclusions and Need for Further Assessment

Greenhouse gas emissions are a key issue and a comprehensive energy use and greenhouse gas emission assessment will be completed for the proposed Mt Piper Power Station Extension. The assessment will outline the issues associated with greenhouses gases, the expected greenhouse gas emission levels during construction and operation of the project and the policy requirements of Government addressing greenhouse gas management. Alternative technologies and the need for greenhouse gas offsets would also be considered. Greenhouse gas management and mitigation options would be recommended in the environmental assessment. Energy conservation and management would be included as part of the Construction and Operational Environmental Management Plans. Proposed Greenhouse gas management measures would be consistent with recommendations set out in the Owen Inquiry.

5.2.2 Water Management

The existing Mt Piper Power Station is located in the upper catchment of Neubecks Creek, which flows to Coxs River. Coxs River flows south through Lake Wallace and Lake Lyell into the Hawkesbury-Nepean River system. Pipers Flat Creek, located south of the Mt Piper site, also flows eastward and joins the Coxs River.

There is currently one licensed discharge from Mt Piper Station to the receiving waters. The existing Environmental Protection Licence (EPL 766) lists the discharge, volume and effluent quality monitoring required at this site. Mt Piper Power Station is configured for zero discharge of process water to surface receiving waters. Other elements of operational water management are described in **Section 3.3.4**. During construction, the main impacts to water quality would include the risk of sediment and other pollutants to local waterways due to soil erosion.

Conclusions and Need for Further Assessment

Water management at the site is a key issue and a detailed assessment of operational site water management will be undertaken as part of the EA.

To reduce water quality impacts of the project during construction, general measures to control erosion of soil and sedimentation would be implemented prior to construction works. Furthermore, a Soil and Water Management Plan (SWMP) would be prepared as part of the Construction Environmental Management Plan (CEMP), in accordance with principles and practices in Soils and Construction (Landcom, 2004).

5.2.3 Noise and Vibration

Background noise levels at the project site are mainly influenced by the operation of the existing power station. The project is not located in proximity to any large townships, the closest being Portland and Wallerawang, approximately 4 km to the west and 6 km to the south-east respectively. However, residential receivers at Blackmans Flat have been identified within 3 km of the project site, therefore there is a potential for noise impacts to occur during construction and operation of the project.

It is expected that noise emissions associated with the operation of the project will mainly be from the generation plant, exhaust stacks and air cooled condensers. During construction, noise would be generated from major earthworks and excavations, construction traffic associated with material deliveries and plant commissioning.

Construction and operational noise impacts will generally be mitigated through appropriate management and design measures. Standard noise controls would be implemented during the construction phase, such as generally limiting significant noise generating activities to DECC daylight hours and maintaining ongoing consultation with nearby residential receivers.

Conclusions and Need for Further Assessment

Noise impacts are regarded as a key issue and a noise assessment would need to be undertaken to assess the operational impacts of the project. This would include monitoring of existing noise levels and the modelling of the potential impacts in accordance with industry recognised standards and protocols. The criteria used to assess the noise impacts would be developed in accordance with the NSW Industrial Noise Policy. Noise impacts would also be assessed under a range of meteorological conditions. The assessment would include construction noise from work sites, particularly an assessment of traffic noise during operation and construction.

5.2.4 Air Quality

The existing air quality around the project area is largely influenced by the existing Mt Piper Power Station, the nearby Wallerawang Power Station and the existing coal mining operations. Particulate emissions are currently controlled at Mt Piper Power Station by highly efficient fabric filter baghouses. Delta's current air emission limits are identified by EPL 766.

The combustion of black coal or natural gas results in combustion products being released into the atmosphere during electricity production. The emission gases vary in quantity and type depending on the coal or gas combustion technology used and can contain nitrogen oxides (NO_x), sulphur oxides (SO_x), particulate matter (dust) and volatile organic compounds (VOCs) as well as greenhouse gases (e.g. CO₂).

Operation of the Mt Piper Power Station Extension using gas or coal will result in further air pollution emissions as identified above.

Construction of the Mt Piper Power Extension will require bulk earthworks and may result in nuisance dust emissions on occasions. Appropriate dust management measures will be implemented throughout the duration of construction activities including watering of exposed soils when necessary, stabilising working areas and minimising areas of surface disturbance. These standard measures will ensure that impacts from dust generation are minimised and are minor.

Conclusions and Need for Further Assessment

Operational air quality is a key issue for the project and a comprehensive air quality assessment will be undertaken to assess the operational impacts of the project. This will include modelling of the emissions from the existing and proposed operations in accordance with DECC criteria, a regional transport study and identification of appropriate mitigation measures.

Construction activities associated with the Mt Piper Power Extension may result in nuisance dust emissions. The impacts of these emissions on air quality will be localised and temporary, provided that standard mitigation measures identified above are implemented prior to construction works.

5.2.5 Hazard, Risk and Incident Management

Mt Piper Power Station currently stores and handles a number of Dangerous Goods that are listed in the Australian Dangerous Goods Code, used mainly for water treatment and conditioning in the water/steam circuit. SEPP 33 lists threshold levels that must be exceeded before the policy applies. Dangerous Goods that could exceed those threshold levels that are currently stored at Mt Piper Power Station and required for the proposed extensions are listed in **Table 5-1**.

There are also a number of potential hazards associated with the piping of gas for a gas fired power station and an assessment of hazards and risks associated with this will be needed.

Conclusions and Need for Further Assessment

The proposed extension of the Mt Piper Power Station may result in hazards associated with the storage of dangerous goods and the operation of gas fired plant. Although not regarded as key issues, a preliminary hazard assessment (PHA) will be undertaken as part of the EA. The PHA would outline the hazard associated with the operation of the Mt Piper Power Station Extension, identify and assess risk impacts to surrounding land uses, and would outline measures to reduce the risks, where required. An emergency response and incident management plan would also be required for the proposed extension and would be addressed in the EA.

■ **Table 5-1 Dangerous Goods exceeding SEPP 33 Threshold Levels**

Name	Class	Packaging Group	Total Quantity Stored	SEPP33 Threshold
Existing Storage Facilities				
Corrosive Substances (acid/alkali)	8	II	256m ³	25m ³
Corrosive Substances (acid/alkali)	8	III	73m ³	50m ³
Anhydrous Ammonia	2.3	-	30 tonnes	5 tonnes
Chlorine	2.3	-	10 tonnes	5 tonnes
Proposed Storage Facilities				
Corrosive Substances (acid/alkali)	8	II	36.4m ³	25m ³

5.2.6 Flora and Fauna

The proposed site has been predominantly cleared and the existing vegetation mainly comprises maintained grassland (planted and landscaped areas) and remnant woodland / open forest.

Vegetation communities in the area are typical of those in the wider region and are primarily linked to the local geology. Previous ecological surveys have been undertaken in the perimeter lands of the Mt Piper Power Station and the nearby Thompsons Creek Dam (Ecotone Ecological Consultants 1996). The mapped vegetation communities of the perimeter lands are listed below in **Table 5-2**.

■ **Table 5-2 Vegetation Communities of Perimeter Lands**

Geology	Vegetation communities of the perimeter lands
Triassic Sandstone	Silvertop Ash Open Forest
	Sydney Peppermint Open Forest
	Brown Stringybark Open Forest
	Scribbly Gum Open Woodland/Forest
	Thin-leaved Stringybark Open Forest
Permian Sediment (Illawarra Coal Measures)	Brittle Gum/ Red Stringybark / Scribbly Gum Open Woodland
	Snow Gum Grassy Open Woodland
	Ribbon Gum/ Apple Box/ Snow Gum Open Woodland

None of the vegetation communities of the Mt Piper perimeter lands listed above is listed under the schedules of the Commonwealth EPBC Act or *Threatened Species Conservation Act 1995* (NSW) (TSC Act).

The survey found up to six threatened flora species and twenty-nine threatened fauna species have been recorded in a 10 km radius of the Mt Piper Power Station site listed under the TSC Act (refer to **Table 5-3** and **Table 5-4** respectively).

■ **Table 5-3 Threatened Flora Previously Recorded in the Locality**

Species	Status		Recorded from Mt Piper perimeter lands
	C'wlth	NSW	
<i>Lepidium hyssopifolium</i>	E	E	No
<i>Persoonia marginata</i>	V	E	No
<i>Eucalyptus cannonii</i>	V	V	Yes
<i>Boronia deanei</i>	V	V	No
<i>Persoonia hindii</i>	-	E	No
<i>Derwentia blakelyi</i>	-	V	No

Endangered (E) or Vulnerable (V) under the EPBC Act or TSC Act

Conclusions and Need for Further Assessment

Impact on biodiversity is not regarded as a key issue, but a detailed flora and fauna assessment will be undertaken to assess potential impacts of the project on threatened species, populations or communities. An updated review of relevant literature, legislation and databases would be undertaken to determine any new listings of threatened species, populations or communities. A field investigation would also be undertaken as part of the assessment which would focus on vegetation, fauna habitats and species diversity present within the proposed plant extension area and potentially affected by the proposal.

5.2.7 Visual Landscape

The nearest sensitive receivers to the existing Mt Piper Power Station are residences located at Blackmans Flat and Back Cullen Road, approximately 3km from the power station. Additional sensitive visual receivers include Portland, Lidsdale and Cullen Bullen townships, located approximately 4-6km from the site.

The existing Mt Piper Power Station is surrounded by undulating terrain. Due to the topography and vegetation screening around the power station, it is not a dominant visual feature in the landscape. The majority of the plant is hidden from view, although the top of the exhaust stack and water vapour from cooling vapours are visible from surrounding areas. The plant itself is visible for approximately 1 km of Castlereagh Highway. Views are minimised, however, by vegetation screening.

Conclusions and Need for Further Assessment

If coal fired, the proposed extension to Mt Piper Power Station would be similar in appearance to the existing plant as components would be essentially duplicated. The main difference would be the installation of ACCs rather than existing cooling towers, which is unlikely to be viewed from surrounding areas due to their relatively low height. If gas fired, the plant will have a lower aspect with shorter buildings and stack(s).

■ Table 5-4 Threatened Fauna Previously Recorded in the Locality

Common Name	Species	Status		Recorded from Mt Piper perimeter lands
		C'wlth	NSW	
Brush-tailed Rock Wallaby	<i>Petrogale penicillata</i>	E	E	No
Regent Honeyeater	<i>Xanthomyza Phrygia</i>	E	E	No
Spotted-tailed Quoll	<i>Dasyurus maculates</i>	V	V	Yes
Green and Golden Bell Frog	<i>Litoria aurea</i>	V	E	No
Bathurst Copper Butterfly	<i>Paralucia spinifera</i>	V	E	No
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V	No
Blue Mountains Water Skink	<i>Eulamprus leuraensis</i>	-	E	No
Giant Dragonfly	<i>Petalura gigantean</i>	-	E	No
Stuttering Frog	<i>Mixophyes balbus</i>	-	E	No
Booroolong Frog	<i>Litoria booroolongensis</i>	-	E	No
Koala	<i>Phascolarctos cinereus</i>	-	V	No
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	-	V	Yes
Powerful Owl	<i>Ninox strenua</i>	-	V	Yes
Eastern Bent-wing Bat	<i>Miniopterus schreibersii</i>	-	V	Yes
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	-	V	Yes
Yellow-bellied Glider	<i>Petaurus australis</i>	-	V	No
Brown Treecreeper	<i>Climacteris picumnus</i>	-	V	Yes
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	-	V	No
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	-	V	No
Hooded Robin	<i>Melanodryas cucullata</i>	-	V	No
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	-	V	Yes
Barking Owl	<i>Ninox connivens</i>	-	V	No
Diamond Firetail	<i>Stagonopleura guttata</i>	-	V	No
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	-	V	Yes
Squirrel Glider	<i>Petaurus norfolcensis</i>	-	V	No
Square-tailed Kite	<i>Lophoictinia isura</i>	-	V	No
Speckled Warbler	<i>Pyrrholaemus sagittata</i>	-	V	No
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	-	V	No
Turquoise Parrot	<i>Neophema pulchella</i>	-	V	No

Endangered (E) or Vulnerable (V) under the EPBC Act or TSC Act

Although visual impact is not regarded as a key issue, a visual impact assessment would be undertaken as part of the EA. The assessment would include a desktop analysis of existing photographs, maps and drawings, a field survey of sensitive locations, graphical simulation of the proposed new plant in the context of the existing landscape, assessment of the visual impact, and development of mitigation measures which would minimise the visual impact of the proposed new plant.

5.2.8 Cultural Heritage

The study area is located near the eastern margin of Wiradjuri tribal land, which is one of the largest tribal lands in Australia and encompasses a significant proportion of the central western region of NSW. A search of the DECC Aboriginal Heritage Information Management System (AHIMS) identified a concentration of sites to the south and south-east of Mt Piper Power Station, and also in close proximity to Thompsons Creek and Neubecks Creek.

Several cultural heritage surveys have also been previously undertaken for developments associated with the existing Mt Piper Power Station. In particular, one survey identifies previously unrecorded Aboriginal sites and historic sites south of the study area and Pipers Creek (McIntyre, 1988).

A desktop search of the Lithgow City Council LEP, NSW State Heritage Inventory and the Australian Heritage Database revealed no previously recorded European heritage sites or objects within or in close proximity to the study area.

Conclusions and Need for Further Assessment

Although not regarded as a key issue, detailed cultural heritage survey and assessment would be undertaken as part of the EA. Consultation with representatives of local Aboriginal groups would also be undertaken at this time. The significance of any Aboriginal or European heritage sites that may be potentially affected by the proposal would be assessed. If any indigenous sites or items are considered to be of high significance and would be disturbed or impacted by the proposal, further intensive investigations would be conducted in consultation with relevant Aboriginal groups. Appropriate management measures would be developed prior to constructions works, to ensure significant sites and items are salvaged, if necessary.

It is considered unlikely that construction and operational activities would impact any significant European heritage values given the previous land uses as a series of open cut mine pits, and the existing Mt Piper Power Station.

5.2.9 Socio-economic Issues

The Mt Piper Power Station is located in the Lithgow LGA on the western edge of the Blue Mountains, about 140 kilometres west of the Sydney central business district. The population in the Greater Lithgow area in 2006 was 19,399 (ABS, 2006). The major centres in the vicinity of the Mt Piper Power Station are Lithgow and Bathurst. Smaller villages include Wallerawang, Portland and Cullen Bullen.

The majority of people employed in the Greater Lithgow area work in the retail industry, followed by manufacturing and health and community services.

Conclusions and Need for Further Assessment

It is anticipated that a portion of the workers required for construction would be sourced from the Lithgow / Bathurst area. However, due to the specialist nature of many trades required for the construction, many of the skilled workers will be sourced from outside of the local area. During construction, the potential for adverse impacts would primarily be associated with increased numbers of workers in the area placing an increased demand on services within the area. A well defined plan for the provision of services to the increased population would be required to be in place before construction begins.

There is also the potential for construction traffic and activities which generate noise and/or dust. These impacts would be managed in accordance with the mitigation measures presented in this EA and the Construction Environmental Management Plan.

During operation, the potential adverse impacts predominantly relate to air quality, noise and the visual environment. These impacts would be managed in accordance with the mitigation measures presented in this EA and the Operational Environmental Management Plan.

As social impacts could be regarded as a key issue, an assessment of socio-economic impacts would be undertaken as part of the EA. This would describe the characteristics of the communities in the area affected by the proposed extension and review of the types of issues and concerns expressed by residents and businesses in those areas, as well as the likely impacts and benefits associated with the development.

5.2.10 Stakeholder Consultation

Delta Electricity has developed a community relations program to inform the community of Delta's operational activities and obtain community feedback. The following consultation activities are undertaken to provide a link between Delta and the community:

- Independent community surveys;
- Consultation with key community stakeholders such as local council;
- Quarterly community reference group forum;
- Sponsorship of local organisations;
- Interaction with the media to provide information about operational and community activities;
- Publication of reports e.g. annual reports and state of the environment reports;
- Provision of work experience opportunities;
- Provision of the Energy Expo at Mt Piper Power Station; and
- Provision of daily tours of the power station.

A Community Consultation Plan will be prepared, the content of which would depend on the outcomes of the Planning Focus Meeting and any specific requirements issued by the DoP, but may include:

- Establishment of a database, including all private stakeholders and potentially affected landholders;
- Establishment of an information hotline and project email address.
- Preparation of material for distribution informing stakeholders about the project and newspaper advertisements to advertise the project.

Meetings would be held with stakeholders / concerned landholders as required. The consultation plan would aim to ensure there is effective, ongoing liaison with the community. The feedback from the consultation activities would be evaluated as part of the social impact assessment.

A profile of affected communities would also be prepared. Measures to reduce adverse impacts and promote positive impacts would be identified in the EA and appropriate management plans developed for the proposal (e.g. the Air Quality Management Sub-Plan, Noise and Vibration Management Sub-Plan and Traffic Management Plan).

In addition, agency consultation will be undertaken in accordance with the requirements of the Part 3A assessment and approvals process.

5.2.11 Other Environmental Issues

There are other potential environmental issues associated with the Mt Piper Power Station Extension that are not considered to be key issues. These issues are considered secondary issues given the characteristics of the project and the availability of appropriate safeguards for mitigation. These issues are outlined in **Table 5-5**.

It is proposed that these issues will be addressed in sufficient detail to assess the level of their impacts (if any). It is anticipated that any impacts identified would be able to be managed through appropriate mitigation measures and management plans.

■ **Table 5-5 Other Environmental Issues**

EXISTING ENVIRONMENT	POTENTIAL IMPACTS	MANAGEMENT AND MITIGATION MEASURES
Land Use		
The project site is owned by Delta Electricity and is occupied by the existing Mt Piper Power Station. The site is surrounded by State forests, extractive industries (mining) and power generation facilities. Mt Piper Power Station is surrounded by undulating terrain. Mt Piper Power Station is located on the intersection of Castlereagh Highway and Boulder Road. Portland and Wallerawang townships are located approximately 4 km west and 6 km south-east of the site, respectively. The proposed site would be located within land zoned Rural (general) purposes.	The project site would be located on land acquired and used for the purposes of power generation. The proposed works would result in no changes to site land use.	Overall, the adverse impacts on land use are expected to be minimal.
Geology, Soils and Groundwater		
The project site is located in an area previously used for coal mining. Portions of the open cut mines were backfilled and levelled during the construction of the existing Mt Piper Power Station. Groundwater quality in coal measures rocks are generally poor and have low bore yields.	The project is mainly located on fill material, and a minor amount of settlement in filled areas could occur due to piling, movement of construction plant and water infiltration. Contaminants may also be encountered in the fill material. Groundwater quality may also be influenced from water moving from nearby abandoned mines.	A detailed assessment of potential soil contamination will be undertaken prior to construction. A detailed geological, soil and groundwater investigation will be required prior to undertaking detailed design.
Traffic and Transport		
Mt Piper Power Station is located on the intersection of Castlereagh Highway and Boulder Road. Currently, road traffic is relatively low with most traffic corresponding to movement of staff to and from the existing Mt Piper Power Station. Trucks or conveyers also bring coal from nearby collieries on-site.	During construction, additional traffic movements would be generated by construction movements and material deliveries to and from the project site. This would have a small impact on delays at Castlereagh Highway and Boulder Road. Operation of the Mt Piper Power Station Extension is expected to have insignificant impacts on traffic volumes and intersection delays.	Consultation would be undertaken before construction with the appropriate roads authority regarding the works that may affect roads or traffic. A Traffic Management Plan would be developed as part of the CEMP.

EXISTING ENVIRONMENT	POTENTIAL IMPACTS	MANAGEMENT AND MITIGATION MEASURES
Waste Management		
The project would generate a number of waste streams and utilise a variety of materials during the construction phase.	During construction, excavated material, green waste and demolition products would be generated as waste. Operational waste would be primarily comprised of by-products of coal fired electricity generation.	A Waste Management Plan (WMP) would be developed and incorporated into the CEMP. This would incorporate the principles of avoid, re-use and recycle, to minimise wastes. Waste management requirements for the operational phase would be incorporated into the Operational Environmental Management Plan (OEMP). The management of ash will be the subject of a separate EA.

6. Conclusion

This PEA has described the proposed Mt Piper Power Station Extension Project and established the strategic context of the project. The project is Critical Infrastructure and falls within Schedule 1 of the Major Projects SEPP and will therefore be assessed under Part 3A of the EP&A Act.

Potential environmental impacts associated with the project have been categorised as ‘key’ issues or ‘other’ issues. Based on this preliminary assessment, an indicative scope for the EA has been developed, focussing on the key issues. The other issues can be readily addressed through appropriate mitigation and management measures and do not require detailed assessment. Following consideration of this PEA and consultation with other agencies, the DoP will provide the Director-General’s requirements for the EA.

The EA will be prepared in accordance with the Director-General’s requirements under the provisions of Part 3A of the EP&A Act. A Statement of Commitments will be developed for inclusion in the EA and will address the management of key issues and other issues.

7. References

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