



Mt Piper Power Station Ash Placement Project

ENVIRONMENTAL ASSESSMENT

CHAPTER 11 – ASSESSMENT OF OTHER ISSUES

■ August 2010



Contents

11. Assessment of Other Issues	11-1
11.1. General Environmental Risk Analysis	11-1
11.1.1. Overview	11-1
11.1.2. Risk Analysis Methodology	11-2
11.1.3. Environmental Risk Analysis	11-4
11.1.4. Conclusions	11-7
11.2. Socio-Economic	11-7
11.2.1. Methodology	11-7
11.2.2. Community Profile	11-9
11.2.3. Scoping of Issues	11-10
11.2.4. Impacts during construction and operation	11-12
11.2.5. Evaluation of the Significance of Impacts	11-14
11.2.6. Conclusions	11-15
11.3. Traffic and Transport	11-15
11.3.1. Existing Road and Traffic Conditions	11-16
11.3.2. Traffic Impact Assessment	11-17
11.3.3. Conclusions	11-17
11.4. Land Use	11-17
11.4.1. Existing Environment	11-17
11.4.2. Land Use Impacts	11-18
11.4.3. Management and Mitigation Measures	11-18
11.5. European Heritage	11-18
11.5.1. Introduction	11-18
11.5.2. Survey Results	11-19
11.5.3. Discussion	11-19
11.6. Waste Management	11-19
11.6.1. Introduction	11-19
11.6.2. Statutory Framework for Waste Management	11-20
11.6.3. Waste Avoidance and Resource Recovery Act, 2001	11-20
11.6.4. Protection of the Environment Operations Act, 1997	11-21
11.6.5. NSW Waste Reduction and Purchasing Policy (WRAPP)	11-21
11.6.6. Lithgow Solid Waste Management Plan	11-22
11.6.7. Potential Wastes Generated from Proposal	11-22
11.6.8. Waste Management	11-23
11.6.9. Mitigation Measures	11-24
11.6.10. Conclusions	11-25

11. Assessment of Other Issues

The Director-General's requirements state that:

Notwithstanding the key assessment requirements, the Environmental Assessment must include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of the additional key environmental impact(s) must be included in the Environmental Assessment.

11.1. General Environmental Risk Analysis

11.1.1. Overview

The Director-General of Planning requires Delta Electricity to prepare an environmental risk analysis to identify potential environmental issues associated with the construction and operation of the project.

The risk analysis process began at the Project Application and Preliminary Environmental Assessment phase, and was further developed in the Environmental Assessment phase. The risk analysis process was used to scope the environmental investigations and guide project design.

Risk analysis enabled the Environmental Assessment to:

- Target those issues identified as key issues in the Preliminary Environmental Assessment. This took into account the significance of the potential environmental impacts and the effectiveness of the proposed management measures in minimising degradation or deterioration of the biophysical or social environment;
- Identify those potential impacts that are not key issues, including those that would be expected to respond well to appropriate mitigation measures and management;
- Identify residual impacts likely to remain after the application of the mitigation measures. Where significant residual impacts remain, this may require greater commitment to management strategies to mitigate the effect or, in some instances, a re-scope of the design at that location.

Identification of Key Issues

The Preliminary Environmental Assessment identified the issues considered to be the key issues pertaining to the proposed Mt Piper Power Station Ash Placement Project, and these were used as the basis for the key issues in the Director-General's requirements (DGRs) for the project.

The DGRs identified the following key issues for consideration and assessment:

- Air quality impacts;
- Noise impacts;
- Water management;
- Ecological impacts;
- Indigenous heritage;
- Visual amenity.

These key issues have been the focus of the Environmental Assessment for the project.

11.1.2. Risk Analysis Methodology

The environmental risk analysis was undertaken in accordance with the principles of the Australian and New Zealand standard AS/NZS ISO 31000:2009 – Risk Management. It involved:

- Ranking the risk of each identified potential impact by identifying the consequences of the impact and the likelihood of each impact occurring; and
- Considering the probable effectiveness of the proposed mitigation measures to determine the likely residual risk of each impact.

The first step involved an identification of the consequence levels, should an impact occur. The levels are defined in **Table 11-1**.

■ **Table 11-1 Risk analysis consequence definitions**

Consequence Level	Definition
Catastrophic	Would result in a major prosecution under relevant environmental legislation. Would cause long-term and irreversible impacts.
Major	Would result in a fine or equivalent under relevant environmental legislation. Would cause medium-term, potentially irreversible impacts.
Moderate	Would result in medium-term, reversible impacts.
Minor	Would result in short-term, reversible impacts.
Insignificant	Would result in minor, negligible impacts.

The next step involved a definition of the risk rating categories. This was done by considering the frequency of activities that may cause the impact and the probability (or likelihood) of the impact occurring during that activity. The level of likelihood was classed as:

- Very likely – the event is almost certain to occur in the course of normal or abnormal operating circumstances;
- Likely – the event is likely to occur in the course of normal operations;
- Unlikely – the event could occur in the course of normal or abnormal operating circumstances; and
- Very unlikely – the event may occur in exceptional circumstance only.

The risk rating categories determined through the analysis are summarised in **Table 11-2**.

■ **Table 11-2 Risk rating categories**

Risk rating score	Risk category	General description
1, 2 or 3	High	Detailed assessment and planning are necessary to develop appropriate measures to mitigate and manage the potential impacts.
4 or 5	Medium	Potential impacts can be mitigated through the application of relatively standard environmental management measures.
6	Low	Potential impacts either require no specific management measures or are mitigated adequately through other working controls (such as detailed design requirements, normal working practice, quality and safety controls).

The risk rating category of each potential impact was then determined by combining the consequence and likelihood according to the matrix in **Table 11-3**.

■ **Table 11-3 Risk matrix**

		Likelihood			
		Very likely	Likely	Unlikely	Very unlikely
Consequence	Catastrophic	1	1	2	3
	Major	1	2	3	4
	Moderate	2	3	4	5
	Minor	3	4	5	6
	Insignificant	4	5	6	6

As shown in **Table 11.3**, impacts were allotted a risk rating score of between one and six. One represents an impact with major to catastrophic consequences and likely to very likely to occur; six represents an impact with minor to insignificant consequences and unlikely to very unlikely to occur.

The potential effectiveness of the mitigation measures proposed was assessed and the degree of effectiveness of the mitigation measures was classed as:

- Very effective – the measure would increase the risk rating score by three points – for example, from three (high) to six (low).
- Effective – the measure would increase the risk rating score by two points – for example, from two (high) to four (medium).
- Partly effective – the measure would increase the risk rating score by one point – for example, from three (high) to four (medium).
- Not effective – the measure would not change the risk rating.

11.1.3. Environmental Risk Analysis

The environmental risk analysis was based on investigations and a review of the issues during the preparation of the Environmental Assessment, and knowledge from other major power generation projects. The analysis also considered the input from various government agencies and other stakeholders during the consultation process. The analysis specifically considered the mitigation and management measures developed and put forward in the assessment chapters (Chapters 5 to 10) of this Environmental Assessment report as well as the principles for ecologically sustainable development. The results of the environmental risk analysis are presented in **Table 11-4**.

■ **Table 11-4 Environmental risk assessment results**

Environmental issues								
Aspects	Potential adverse impacts	Overall consequence	Overall likelihood	Risk rating	Proposed mitigation measures	Effectiveness	Factor	Residual risk rating
Ecology	- Effects on threatened species and EECs. - Effects on conservation areas	Major	Unlikely	3 High	Chap 8	Very effective	4	Medium
Indigenous Heritage	Effects on known or possible PADs / indigenous sites	Major	Very unlikely	4 Medium	Chap 9	Effective	5	Medium
Noise	Effects on sensitive receivers (residential)	Moderate	Likely	3 High	Chap 6	Effective	4	Medium
Water management	- Effects on surface receiving waters - Effects on groundwater - Effects on water sources - Effects on drinking water catchment	Major	Likely	2 High	Chap 7	Very Effective	4	Medium
Air quality	Dust levels exceeding health criteria	Major	Unlikely	3 High	Chap 5	Effective	4	Medium
Visual amenity	Visual impacts on sensitive receivers (residential)	Moderate	Likely	3 High	Chap 10	Effective	4	Medium
Waste management	Discharge of wastes to the environment	Minor	Unlikely	5 Medium	Chap 11	Effective	6	Low
Economic and social issues	- Effects on infrastructure and employment - Social effects on existing community	Moderate	Unlikely	4 Medium	Chap 11	Effective	5	Medium

Environmental issues								
Aspects	Potential adverse impacts	Overall consequence	Overall likelihood	Risk rating	Proposed mitigation measures	Effectiveness	Factor	Residual risk rating
Land use implications	- Change in land use - Effects on neighbourhood or potential development	Minor	Unlikely	5 Medium	Chap 11	Effective	6	Low
Traffic and transport	Effects on road network performance and safety	Minor	Unlikely	5 Medium	Chap 11	Effective	6	Low
European heritage	Effects on known or possible heritage items	Moderate	Very unlikely	4 Medium	Chap 11	Effective	6	Low

11.1.4. Conclusions

The environmental risk assessment has shown that the key issues of ecology, noise, water management, air quality, visual amenity have a high level of risk, but the implementation of mitigation measures would ensure that the residual level of risk is reduced to medium. There is no key issue that, following implementation of mitigation measures, would present a high level of residual risk.

Other issues that would have a medium residual risk include:

- Indigenous heritage; and
- Socio-economic effects.

The level of assessment undertaken for these issues has determined the likely extent of impacts and recommended appropriate mitigation/management required to ensure that the risk is abated.

Finally, the other environmental issues for the project which had a low residual risk were:

- European heritage;
- Waste management; and
- Traffic and transport.

Although these issues can be routinely managed through the implementation of standard management and mitigation measures, further assessment was undertaken. This assessment is described in the following sections.

11.2. Socio-Economic

Lithgow Council requested consideration be given to the economic, employment and social impact on the Lithgow LGA, and impacts on infrastructure, community facilities and services due to the on-going nature of the proposal should be considered. These issues are discussed below.

11.2.1. Methodology

Social impacts are commonly defined as “*events experienced by people as positive and negative changes in:*

- *Their way of life - the way people live, work, play and relate to one another, organise to meet their needs and generally participate as members of society;*
- *Their culture - beliefs, customs and values;*
- *Their community - its cohesion, character, services and facilities” (Armour, 1992).*

The assessment of social impacts is best undertaken in the project development stage where it can help:

- Promote the quality of life of individuals and communities now and in the future;
- Contribute to the efficient and cost effective use of resources in Government project planning and delivery; and
- Contribute to improved management of project planning and decision making processes.

In evaluating social impacts, it is important to recognise the multiplicity of individuals and groups within the affected population and the range of possible effects across these individuals and groups. The social impact assessment is particularly concerned with the equity of impacts, that is, the nature and distribution of potential impacts, especially with regard to the more vulnerable groups in society.

A social impact assessment is typically conducted as a five step assessment process:

- Step 1 – Community profiling, including demographic characteristics of the study area and identification of key stakeholders;
- Step 2 – Scoping of issues;
- Step 3 – Identify the likely social impacts of the project and its alternatives;
- Step 4 – Estimate and evaluate significance of social impacts according to:
 - Extent, significance and timeframe of potential impacts (including uncertainties)
 - Stakeholder group(s) affected
 - Feasibility of successful mitigation measures; and
- Step 5 – Consider identified social impacts and opportunities to mitigate negative impacts.

A range of information sources have been reviewed in the preparation of this social impact assessment to determine potential issues of concern during both the construction and operational stages of the project. These include:

- 2001 and 2006 Australian Bureau of Statistics Census data;
- The Mt Piper Extension EA (SKM, 2009);
- Lithgow Social Plan 2006-2011, Lithgow City Council (2008); and
- Feedback from the community surveys conducted by the Western Research Institute on behalf of Delta Electricity (2002-2007).

11.2.2. Community Profile

The community and business profile has been described with a view to identifying potential community issues and the structure of the community. This demographic and statistical data has been supplemented with qualitative information about community attitudes and social concerns.

Community, Business and Employment Profile

The Mt Piper Power Station is located in the Greater Lithgow local government area (LGA). The population in the Greater Lithgow area in 2006 was 19,399 (ABS, 2006), compared with 19,197 in 2001, 19,248 in 1996 and 20,253 in 1991 (ABS, 2001). Despite the 5.2% reduction in population between 1991 and 2001, the slight growth in 2006 indicates the decline in population may have been arrested.

The population in the area is predominantly Australian-born, with only about 8% of respondents in indicating they were born overseas. Of those born overseas, the main countries of birth were the United Kingdom, New Zealand, Germany and the Netherlands.

The indigenous population comprises about 3% of the Greater Lithgow population. About 92% of the population in the Greater Lithgow area indicated English was the only language spoken at home.

Table 11-5 provides the demographic age profile for the Greater Lithgow LGA.

■ **Table 11-5 Age Profiles**

Age Group	Number of People	Percentage
0-14	4246	22.1
15-24	2341	12.2
25-44	5372	28.0
45-64	4765	24.9
65+	2448	12.8
Total	19172	100

The majority of residents in the area live in privately owned homes, with about 22% of the population in rental accommodation. High levels of home-ownership often indicate a very stable community.

According to the 2006 census data the unemployment rate in the Lithgow area was 8.5%, which was significantly higher than the national average at that time of 5.2%. The main employment industries in the Greater Lithgow LGA are presented in **Table 11-6**. Over time there has been a general decline in employment within the manufacturing industry and the construction industry,

whereas there has been increased employment within the retail trade, health and community services and education.

■ **Table 11-6 Industries of Employment**

Industry	Number of People Employed in the Greater Lithgow LGA	Percentage of People Employed in the Greater Lithgow LGA
Construction	462	7.1
Education	461	7.1
Mining	775	11.9
Health and community services	749	11.5
Manufacturing	621	9.5
Accommodation and food services	650	10
Retail	866	13.3

Source: ABS, 2006

Community Services and Facilities

There are a range of community services within the Lithgow LGA which provide assistance and support to people with disabilities, senior citizens and other groups in the community. There are also numerous schools, churches, libraries, child care centres and other facilities located in the Lithgow LGA.

Public transport services within the Lithgow LGA are provided by a local bus operator which operates between Portland and Lithgow. The Lithgow Community Transport (Translinc) Inc provides a specialist service for frail aged and disabled people of the Lithgow Community who require transport to doctors, hospitals, dentists etc. The Blue Mountains train line connects Lithgow station to the suburban train network.

There are a number of scattered parks, lakes and dams in the Lithgow LGA, which are used for recreational activities such as picnicking, sailing, swimming and fishing. There are also many sporting facilities such as the Lithgow Athletics Club, sports stadium, showground, soccer fields, sporting ovals, tennis courts, bowling clubs, pool and golf course.

11.2.3. Scoping of Issues

Attitudes and Values

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

- Community surveys;
- Community stakeholder forums;
- Consultation with key community stakeholders such as local council;
- Sponsorship of local organisations;
- Interaction with the media to provide information about operational and community activities;
- Publication of reports eg. 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.

Delta Electricity regularly commissions an independent survey to evaluate the community's perception of Delta's operational impact and community relations program. The Western Research Institute conducted the most recent large survey of Delta's Western Region, which encompasses the Mt Piper and Wallerawang Power Stations, in May and June 2005. A total of 310 surveys were completed. The results from this survey are summarised below:

- The majority of respondents (91%) had heard of Delta Electricity, of which 61% felt positively towards Delta Electricity;
- 46% of respondents could identify electricity generation as Delta's main activity and a further 20% identified Delta as being generally involved in electricity. In 2004, only 37% of respondents named electricity generation as Delta's main activity;
- The main sources of information about Delta Electricity are newspapers (21%) and direct contact with the company (15%). In 2004, direct contact with the company was the most common response (22%), followed closely by newspapers (20%);
- Recall of Delta's community support has risen from 59% in 2004 to 64% in 2005. The most commonly recalled sponsorships were for sporting teams and events;
- 47% of respondents expressed concern about waterway issues relating to drought, low water levels, water pollution etc. 5% were specifically concerned about the closure of Lake Lyell Dam.
- 82% of respondents indicated they have no concerns about Delta's operations in the area (a decrease from 89% in 2004). Of those who expressed concern, stack emissions, water usage and water pollution were the most frequently expressed concerns;
- 61% of respondents indicated they were either very or moderately concerned about environmental issues in the local area. The most frequently expressed concerns were air pollution (37%) and water pollution (27%);

- River health, waste processing programs and the rehabilitation and maintenance of creeks and dams were rated as being the top three environmental issues that Delta should be involved with.

The key issues arising from these surveys that were identified by the Western Research Institute (2005) were:

- 1) Attitude towards Delta Electricity – general recognition of Delta Electricity remained similar to the previous years;
- 2) Drought – the community's concern about water related issues such as water usage, water pollution and river health was evident in responses and Delta's attitude to water efficiency and river health is important;
- 3) Migration – residents who have lived in Lithgow for less than five years tend to have a lower level of recognition and feel less favourably towards Delta Electricity;
- 4) Youth – 18-24 year olds feel the least favourably towards Delta Electricity.

A community focus group assessment was conducted by Western Research Institute (2007). This assessment was similar to that discussed above, but on a smaller scale. The findings of the focus group assessment were:

- There is significant support within the region due to Delta's economic importance and support of the local community;
- There are concerns about Delta's operational impacts on the community and environment, with little community awareness of any significant initiatives being undertaken to reduce these impacts;
- There is some concern about Delta's future employment status in the community;
- There is a lack of community consultation regarding large operational decisions and scepticism about Delta's motivations. These are having a detrimental effect on public opinion, especially amongst residents of the immediate neighbourhood.

11.2.4. Impacts during construction and operation

Employment

A minor social and economic benefit of the construction stage of the proposal is employment generation. Construction is expected to provide up to 20 jobs over the period of site preparation for ash receipt, mainly in 2011 and 2012. No new jobs would be created during the operation of the ash placement sites as it would be carrying on from existing operations.

Where practicable, construction materials would be sourced from the local area, thereby providing economic benefits to local businesses. These would include accommodation providers, food and

general supplies, service stations, engagement of local contractors and purchase of supplies from local outlets.

Community

It is anticipated that a number of people in the local area would be employed during the construction of the proposal, but the numbers would not be such as to attract workforce from outside of the area. The limited extra local employment would have some minor economic benefit but would not put any extra demand on infrastructure or community resources.

Access and Movement

Any deliveries of equipment and materials to the site would occur throughout the standard construction hours. As a worst-case up to 3-4 vehicles per day may occur and would be spread throughout the day.

The movement of construction staff would be concentrated around 6-7am and 2-3pm weekdays. Traffic associated with the average number of construction staff would have no impact on operation of the road network. The Construction Environmental Management Plan (CEMP) and any traffic management components would ensure that all construction traffic utilise existing arterial roads and all construction and employee vehicles park on the site. There would be no change to traffic operations during the operational phases of the project.

Lifestyle and Character

Construction and operational activities can potentially affect the character and amenity of an area. Residents who live adjacent to the site on or near the Castlereagh Highway may be affected by site activities such as vehicle movements and ash placement, although these impacts are not expected to be significant. Due to the topography and vegetation surrounding the Mt Piper Power Station site and the distance to sensitive receptors, the visual (see Chapter 10), dust (see Chapter 5) and noise (see Chapter 6) impacts are not expected to be significant.

Health and Psychological Effect

Construction and operational activities would be undertaken within designated daytime hours, and as a result, sleep disturbance is not likely to occur. Providing dust control measures are implemented during construction works and ash placement, no significant affects on health from are expected.

Increased activity on the site, disturbance to current lifestyle and perceived risks associated with the construction stage, have the potential to cause stress or anxiety to some individuals. In order to minimise these potential impacts Delta would utilise its existing community relations program to keep the community informed about the project.

Equity Issues

The ash placement areas are necessary to allow Mt Piper Power Station to continue to generate electricity. Electricity generated by the Mt Piper Power Station would be distributed across New South Wales via TransGrid's network of high voltage transmission lines and no particular sector of the community would either benefit or be disadvantaged.

The residential areas adjacent to the site have indicated their concerns at on-going development in the area – power generation, coal mining, land fill development. The use of new areas for ash placement will be at the same rate as at the existing area, although it will be closer to residential areas. By maintaining strict control of dust and noise emissions, there will be no change in the perception of impacts resulting from the works and no reason for residences to regard themselves as being treated inequitably as a result of the proposal.

Cumulative Impacts

There is a perception within the local community that the development of the new areas for ash placement will provide a further social burden on locals, adding to the perceived impacts associated with the on-going coal and power generation activities, plus the new Council land fill and the possible Mt Piper Extension.

Cumulative impacts associated with dust and noise have been addressed (in Chapters 5 and 6), and visual impacts have been considered (in Chapter 10), but it is not possible to quantify this possible cumulative social concern. It is clear that it is felt by some members of the community, as evident in the consultation for this project and in the focus group meetings undertaken by Delta.

Some mitigation of this impact would be achieved by further and on-going consultation with the affected community.

11.2.5. Evaluation of the Significance of Impacts

During construction and operation, the potential for adverse social impacts would primarily be associated with 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 and Operational Environmental Management Plans and by on-going consultation with the community. Due to the careful management of these physical impacts and the distance between the ash placement site and sensitive receptors, the potential impacts are not considered to be significant.

The potential adverse impacts associated with the proposal are considered to be outweighed by the benefits associated with the ability of the power station to continue operation and the overall associated benefit for the wider community. The project is regarded as of State and regional significance.

11.2.6. Conclusions

The safeguards and mitigation measures identified in this EA would ensure that many of the potentially adverse social impacts are minimised as far as practicable. The community would also be kept informed about the project to ensure they are aware of any upcoming works and the potential impacts which may occur.

Mitigation measures would include:

- Construction
 - Implementation of recommended air quality controls;
 - Implementation of recommended noise controls; and
 - Liaison with the community to keep them informed about the construction works and schedule through the existing community relations program.
- Operation
 - Implementation of recommended air quality controls;
 - Implementation of recommended noise controls;
 - Liaison with the community to keep them informed about the site operation through the existing community relations program; and
 - Rehabilitation to improve visual perception.

11.3. Traffic and Transport

As outlined in the project description, the development of Lamberts North and Lamberts South will occur on land owned by Delta Electricity and/or Centennial Coal. Movement of ash would occur on-site and would not require separate access to the public road network. Equipment needed for construction and access to the site by employees would represent the only access to the road network required.

Should development of Neubecks Creek or Ivanhoe No 4 be intended in the future, it would be necessary to avoid use of the public road system to transport ash from the power station to these sites. With Neubecks Creek it may be possible to use the existing private road (used for coal transport) and this would need to be investigated. It may also be possible to use a conveyor system which would need to cross over the road or roads. These options would be investigated in any subsequent approval required for the development of Neubecks Creek ash placement area.

Should Ivanhoe No 4 proceed, it is likely that all access to the site would be via the power station site.

This assessment assumes that all transport of ash does not require access to the public road network and the only potential impacts are from the travel to and from the power station by workers or construction equipment.

11.3.1. Existing Road and Traffic Conditions

The Mt Piper Power Station is located at the intersection of the Castlereagh Highway and Boulder Road, approximately 17 km north-west of Lithgow. The Castlereagh Highway is a rural highway linking the Great Western Highway north-west of Lithgow with Mudgee and Central Western NSW. It is primarily a two lane undivided road with a 100 km/hour speed limit. Overtaking lanes are provided on many up-hill sections.

Adjacent to Mt Piper Power Station, the Castlereagh Highway is a two lane undivided road, with gravel shoulders and a speed limit of 100 km/hour. North of Boulder Road, the average annual daily traffic (AADT) is around 3,000 axle pairs (2002 RTA data), while north of the Newnes Road intersection (south of Boulder Road) the AADT is around 3,500 axle pairs. Traffic counts undertaken for the Mt Piper Extension study confirm the validity of this figure and indicate that it is equivalent to around 3,000 vehicles per day comprising 13% heavy vehicles.

Boulder Road runs east-west and links Portland with the Castlereagh Highway. Immediately west of the Castlereagh Highway and adjacent to the Mt Piper Power Station, it has two eastbound lanes and one westbound lane, and a 60 km/hour speed limit. West of the power station, it has two lanes, no shoulders and an 80 km/hour speed limit. The most recent RTA volume data for Boulder Road was collected in 1988, when the AADT was around 1,000 axle pairs. Traffic counts collected for this study indicate that the daily volume is around 890 axle pairs or 650 vehicles, comprising 21% heavy vehicles.

The primary measure of performance for rural roads such as the Castlereagh Highway and Boulder Road is the peak hour volume / capacity ratio. Austroads (1998) specifies theoretical two-way capacities for rural roads, taking into account terrain, shoulder width and traffic composition.

The Castlereagh Highway has a two-way capacity of just over 1,900 vehicles per hour. Traffic counts undertaken for this study indicate a peak hour volume of 274 vehicles, resulting in a volume / capacity ratio of 0.14, indicating average speeds of greater than 93 km/hour and a Level of Service A. Boulder Road has a capacity of 1,500 vehicles per hour, and a peak hourly volume of just 62, with a volume / capacity ratio of 0.04, also indicative of Level of Service A. Thus both roads could be considered to have substantial spare capacity.

Traffic counts were undertaken at the intersection of Boulder Road and the Castlereagh Highway to coincide with the peak staff arrival and departure times. The results of intersection analysis show

that acceptable operation is achieved during both peaks, and that there is significant spare capacity at the intersection.

11.3.2. Traffic Impact Assessment

Construction Traffic

It is estimated that a peak workforce of about 20 people would be required. Any deliveries of equipment and materials to the site would occur throughout the construction period time, but such activity would be very minor. These movements themselves would have an insignificant impact on traffic in the area, and if combined with any activity associated with the construction of the Mt Piper Extension (should it proceed) there would be no change in level of impact beyond that identified for the Mt Piper Extension project (SKM, 2009).

Operational Traffic

It has been assumed there would be no increase in the numbers of staff associated with the operation of the ash placement area, hence there will be no change in traffic to or from the site.

Cumulative Effects

As the vehicle numbers using the public road system would be very small, cumulative traffic impacts would be negligible, even if the Mt Piper extension project proceeds.

11.3.3. Conclusions

The road network surrounding the Mt Piper Power Station has significant spare capacity. The potential traffic impacts of the proposal relate to the movement of staff and construction equipment to and from the site and these impacts would be negligible. No mitigation measures for traffic impacts would be required.

11.4. Land Use

11.4.1. Existing Environment

The proposed ash placement sites are owned by either Delta Electricity or Centennial Coal. The Delta Electricity site is occupied by the existing Mt Piper Power Station, including the existing ash placement area.

The proposed ash placement areas at Lamberts North and Lamberts South are currently either predominantly cleared land, have been subject to previous mining activities or are currently being mined.

The possible future ash placement sites at Neubecks Creek and Ivanhoe No 4 have previously been mined in some form but have had vegetation regrowth since. These areas would not be considered

for ash placement unless the areas were further cleared by mining. At the Neubecks Creek site, the site is moderately covered by vegetation although this would be removed by the mining activities. Castlereagh Road is located directly to the west and south of this site. Ben Bullen State Forest is located directly to the north of this ash placement area.

The Ivanhoe No. 4 site is directly south-west of the existing Mt Piper Power Station. The site is covered by moderate to dense vegetation which would be removed for mining activities. Boulder Road is located to the north, and Pipers Flat Road to the south. Ben Bullen State Forest is located approximately 700m to the east.

The township of Blackmans Flat is located approximately 1km east of the proposed Lamberts North placement area. Portland and Wallerawang townships are located approximately 4 km west and 6 km south-east of the power station, respectively. All of the sites are located within land zoned as Rural (general) purposes.

11.4.2. Land Use Impacts

Land use for all sites would be regarded as changing from coal mining purposes to ash placement / storage. Both of these activities are permissible with consent and are consistent with the intent of the zoning. Effectively there would be no change in land use at the sites and the land use proposed is consistent with the general land uses within the area – power generation, coal extraction. Residential development exists close to the proposed ash site at Lamberts North and the proposed development would not have any further effect on that existing land use.

11.4.3. Management and Mitigation Measures

No mitigation measures are required.

11.5. European Heritage

11.5.1. Introduction

European heritage was addressed in the heritage report presented as Appendix F.

The area of Neubecks and Pipers Creeks saw the early establishment of agricultural industries with land grants occurring in the early 1830s. At Blackmans Flat, settlement is said to have begun during the 1850s in an area about one km south of the current Study Area. Alois Neubeck took up land in what is now known as the Neubecks Creek area in the 1880s and built a cottage of wattle and daub in 1888. Heritage assessment of Neubecks Creek in 2005 (Benton 2005) reported the remains of some European buildings and it is possible that these may represent some of those from this period.

Coal mining began in Wallerawang around 1873 with a number of mines being opened on the Lithgow seam at Mount Piper, mid-way between Wallerawang and Lidsdale. The primary mines at Wallerawang included: The Irondale Colliery; Cullen Bullen Colliery; The Ivanhoe Colliery; The Commonwealth Colliery; The Great Western Mine and The Invincible Colliery. Blackmans Flat Colliery had been established by 1875 and was undertaking underground mining operations, as was the Irondale Colliery at Pipers Flat by 1883. Black Diamond Colliery (later known as Huon Mine) was established within the Boulder section in 1902.

The coal and lime industries have prospered in the Blackmans Flat / Portland areas from the mid to late nineteenth century, utilising the rich geological resources of the Illawarra Coal Measures. Between 1870 and 1905 collieries were established at Pipers Mount, Blackmans Flat, Lidsdale, Wallerawang and Angus Place, generally following the railway line.

11.5.2. Survey Results

No non-Indigenous items of heritage have ever been recorded over Lamberts North or South as far as research undertaken can determine.

There are remains of European heritage over the Neubecks Creek site (Benton 2005) and as assessment of the Ivanhoe No. 4 area has not been completed, it is unknown as to whether European heritage is present on this site.

11.5.3. Discussion

Given the high levels of disturbance of the Lamberts North and Lamberts South study areas, it was expected that no items of non-Indigenous items of heritage would remain. The lack of non-Indigenous heritage items at this location is consistent with the fact that while Europeans have settled the general region for nearly 200 years, the area has since been extensively mined. No mitigation measures would be required.

As European heritage evidence is present at Neubecks Creek and possibly at Ivanhoe No. 4, further assessment of these areas to determine the presence of European heritage would be required prior to any use of these areas for ash placement.

11.6. Waste Management

11.6.1. Introduction

The proposal has the potential to generate small quantities of liquid and non-liquid wastes. The key waste streams identified include:

- Excavated material;

- Cleared vegetation;
- Construction waste (packaging material, scrap metal, formwork, pallets, plastic wrapping and cardboard).

The products of electricity generation such as flyash and furnace ash and brine waste are addressed differently within the EA and are not discussed here.

Detail on each of these waste streams is provided below.

11.6.2. Statutory Framework for Waste Management

The main legislation and guidelines that govern the management of waste for the proposal are:

- *Avoidance and Resource Recovery Act, 2001*;
- *Protection of the Environment Operations Act, 1997*;
- *Protection of the Environment Operations (Waste) Regulation, 1996*;
- *NSW Waste Reduction and Purchasing Policy (WRAPP) (EPA, 1999)*;
- *Lithgow Solid Waste Management Plan*;
- *Environmental Guidelines: Assessment, Classification and Management of Non-Liquid and Liquid Waste (EPA, 1999)*; and
- *Contaminated Land Management Act, 1997*.

The principles of waste avoidance, waste reduction, waste re-use or waste recycling would be adopted during the construction and operation phases of the project in accordance with the following legislation and policies that provide the statutory framework for waste management in NSW.

11.6.3. Waste Avoidance and Resource Recovery Act, 2001

The objectives of the *Waste Avoidance and Resource Recovery Act, 2001* (WARR Act) are to encourage the most efficient use of resources, to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of Ecologically Sustainable Development (ESD). To meet the objectives of the Act, waste management options are considered against a hierarchy, comprising:

- Avoiding unnecessary resource consumption;
- Recovering resources through the re-use and recycling of waste; and
- Disposal (as a last resort).

The Act sets the framework for waste management and planning, based on the following objectives:

- To provide for the continual reduction in waste generation;
- To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the re-use and recycling of waste;
- To ensure that industry shares with the community the responsibilities for reducing and dealing with waste;
- To ensure the efficient funding of waste and resource management, planning and programs and service delivery; and
- To achieve integrated waste and resource management, planning and programs and service delivery on a State-wide basis to assist in the achievement of the objectives of the *Protection of the Environment Operations Act, 1997*.

11.6.4. Protection of the Environment Operations Act, 1997

The *Protection of the Environment Operations Act, 1997* (POEO Act) incorporates the major regulatory and enforcement provisions of the former *Waste Minimisation and Management Act, 1995* (WMM Act). In effect, the POEO Act merges pollution control approvals and pollution control licences into a single process, or one Environment Protection Licence (EPL). EPLs are required for development or activities listed in Schedule 1 of the POEO Act and would incorporate provisions relating to water pollution, noise pollution, air pollution and waste management.

The need for an EPL under the POEO Act was considered with regard to waste, either as waste activity or the site as a waste facility. The following conclusions were reached:

- Waste activities - The proposed development will not generate or store hazardous waste, industrial waste or Group A waste as defined in the POEO Act and is therefore not considered a waste activity; and
- Waste facilities - The term ‘waste facility’ is defined in the dictionary of the POEO Act to mean “...any premises used for the storage, treatment, reprocessing, sorting or disposal of waste (except as provided by the regulations)”. The proposed development is not characterised as a class of waste facility listed in Schedule 1 of the POEO Act.

On the basis of this, a licence would not be required for general waste generated at site under Schedule 1 of the POEO Act.

11.6.5. NSW Waste Reduction and Purchasing Policy (WRAPP)

In 1999, the NSW EPA adopted the *NSW Waste Reduction and Purchasing Policy* (WRAPP). The aim of WRAPP is to ensure that all NSW Government agencies contribute to the achievement of the State’s aim to reduce waste to landfill. WRAPP requires that all state government agencies and

state owned corporations develop and implement Waste Reduction and Purchasing Plans aimed at reducing waste in the following four areas:

- Paper products (general office paper, magazines, newspaper, cardboard, packaging);
- Office equipment (toner cartridges and printer ribbons);
- Vegetation material (tree clippings, leaves and prunings); and
- Construction and demolition material (concrete, excavated rocks and earth and drainage materials).

Waste Reduction and Purchasing Plans must also give priority to purchasing materials with recycled content. As part of WRAPP, Delta Electricity is required to report to DECCW every two years on the progress of their Waste Reduction and Purchasing Plan.

11.6.6. Lithgow Solid Waste Management Plan

In response to calls from the NSW Government to achieve significant reductions in solid waste sent to landfill, local Councils are obliged to establish a plan for waste minimisation. The main objective of the plans was to allow individual Councils to achieve waste reductions through their regulatory functions of development consent and building approvals.

Lithgow Council has produced a Solid Waste Management Plan (SWMP) which provides Waste Management Guidelines adopting the waste management hierarchy of minimisation, recycling, resource recovery and disposal. The aim of the strategy is to review the current solid waste management practices and explore the possibilities in technology associated with waste management that may be adaptable to the current and future waste management strategy.

The recommendations of the SWMP that are particularly relevant to this proposal include:

- Council purchase land at Blackmans Flat for a central waste facility that will implement best management strategy for the separation and disposal of the residual waste;
- Council encourage existing industries to minimise their waste generation and to practise waste recycling wherever possible.

11.6.7. Potential Wastes Generated from Proposal

The construction and operational phases of the proposal would generate different amounts and types of wastes according to the activity undertaken. A summary of the expected waste streams generated is outlined below. The majority of waste generated from the proposal would be in the form of non-liquid waste ie. excavated material and general waste products during construction. Waste quantities provided are estimates based on industry practice and existing guidelines.

Construction Excavated Material

One of the first stages in the construction process would be to level the site. Small quantities of soil would be excavated to enable the foundations for the new structures to be laid. The walkover survey conducted as part of the geology, soils and groundwater survey did not identify any visible signs of contamination and as such, it is expected that all excavated material would be suitable for re-use. Hence, wherever possible, the excavated material would be re-used on site.

Construction Green Waste

It is anticipated that small amounts of green waste would be generated by clearing. Typically, this vegetation would comprise of exotic grasses and weeds, as well as native species.

Construction

It is anticipated that small amounts of general building waste such as packaging materials and plastics would be generated during the construction period. In addition, a small quantity of waste (sewage and domestic rubbish) would be generated if a construction compound is used. Where possible, waste products would be reused or recycled.

Operational Waste

Waste generated from the operation of the ash placement activities would include:

- Used oils, tyres, rags, packaging, oil drums and discarded components associated with on-site vehicle maintenance;
- Paper and associated stationery waste associated with office activity.

11.6.8. Waste Management

Strategies and management measures that would be implemented to achieve minimal waste generation and responsible disposal for the construction and operational phases of the proposal would be developed within Waste Management Sub-plans or similar reports prepared as part of the Environmental Management Plans prepared for the project. The measures within the relevant plans would ensure the incorporation of the principles of avoid, re-use, recycle embodied in the WARR Act.

A Waste Management Sub-plan would be developed for the construction phase of the proposal for incorporation in the Construction Environmental Management Plan (CEMP). The plan would be prepared in accordance with the legislation and guidelines outlined above. The sub-plan would detail any procedures for the management of construction wastes from the site. In addition, the plan would contain an inventory of all waste types anticipated and the preferred options for re-use, recycling or disposal, and would seek to ensure that all waste generation and its fate is recorded such that waste minimisation can be achieved.

Waste management would be a component of the Operational EMP for the operational phase of the facility. It would ensure that initiatives for the sustainable management of waste are given consideration.

11.6.9. Mitigation Measures

Mitigation measures for wastes generated by the proposal are discussed below.

Construction Materials

- Ensure the correct quantities are ordered and delivered to the site;
- Investigate the use of recycled materials;
- Reuse clean excavated material on-site where suitable.

Contaminated Soils and Hazardous Materials

- Identify unsuitable / contaminated material (if found) and dispose of it in accordance relevant NSW legislation; and
- Collect empty oil and fuel drums in suitably designated areas and arrange for a licensed waste contractor to remove them.

Green Wastes

- Chip native vegetation cleared during construction and reuse as mulched material for revegetation;
- Remove all noxious weeds and exotic plant species and, if practicable, dispose of at a licensed landfill facility; and
- Transfer green waste not reused on-site to a green waste facility.

Paper / Cardboard / Packaging

- Develop strategies to encourage reduction and recycling for plastics, paper and packaging products.

Sewage and Water

- Provide portable toilet facilities during construction phase, which would be regularly maintained and ensure wastes are disposed of by a licensed waste contractor in accordance with Council and DECCW requirements or provide access to the existing sewerage system installed for Mt Piper power station.

Domestic Solid Wastes

- Provide recycling facilities to encourage the separation and recycling of all paper, aluminium, glass, and plastic products used during construction and operation; and
- Collect and dispose of all domestic waste at a licensed facility.

11.6.10. Conclusions

Waste management arrangements would be put in place during the construction phase of the ash placement works to maximise the reduction, recycling, and reuse of waste materials. This would be achieved through the implementation of a Waste Management Sub-plan (WMP) during construction. The WMP would be developed and implemented in accordance with the requirements of relevant waste management legislation and policies and incorporated into the Construction EMP for the site.

Waste management requirements for the operational phase would be incorporated into the Operational EMP.