Mt Piper Power Station
Ash Placement Project

ENVIRONMENTAL ASSESSMENT

■ August 2010

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Executive Summary

Certification

This Environmental Assessment was prepared by:

Name:	Kenneth Robinson
Qualifications:	BSc (Hons), MEnvStud, PhD, MPIA
In respect of:	Mt Piper Power Station Ash placement Project

I certify that I have prepared the contents of this Environmental Assessment and to the best of my knowledge the information contained in the Assessment is neither false nor misleading.

Signature: 

Name: Kenneth Robinson

Date: 23 August 2010

Mt Piper Power Station
Ash Placement Project

ENVIRONMENTAL ASSESSMENT

EXECUTIVE SUMMARY

August 2010

Executive Summary

The Proponent

Delta Electricity (Delta) is a New South Wales State-Owned Corporation whose purpose is primarily to maintain and operate facilities for the generation and supply of electricity into the National Electricity Market (NEM).

Delta owns and operates Mt Piper Power Station, located approximately 17 km north-west of Lithgow (refer to **Figure 1**). The station currently comprises two coal-fired generating units, each of which is operating at 700 MW.

In 1990 Lithgow City Council granted Delta Electricity consent for ash placement in the former Western Main open cut mine void adjacent to the power station. This area is known as Area 1 and employs dry ash placement. Currently, approximately 780,000 m^3 of ash is placed in Area 1 annually.

Based on the planned operation of the Mt Piper Power Station, the present ash placement area is expected to reach capacity in five to six years – i.e. by around 2015, well before the power station reaches the end of its economic life. Accordingly, there is a need to obtain development consent for ash placement beyond that time.

This Environmental Assessment (EA) report has been prepared to support Delta Electricity's application for relevant approvals for the construction and operation of four sites which represent the Mt Piper Ash Placement. It addresses the requirements for the preparation of an Environmental Assessment for the project, issued by the Director General of Planning.

Strategic Justification

Need for the Project

Ash removal, placement and storage are critical to the long-term ongoing operation of the existing Mt Piper Power Station. Delta Electricity actively pursues reuse of ash from Mt Piper Power Station and has strong commercial, operational and environmental incentives to do so. The current ash storage facility is nearing maximum capacity and alternative sites are necessary for the power station to maintain its role as a low cost, reliable and essential supplier of electricity to NSW consumers.

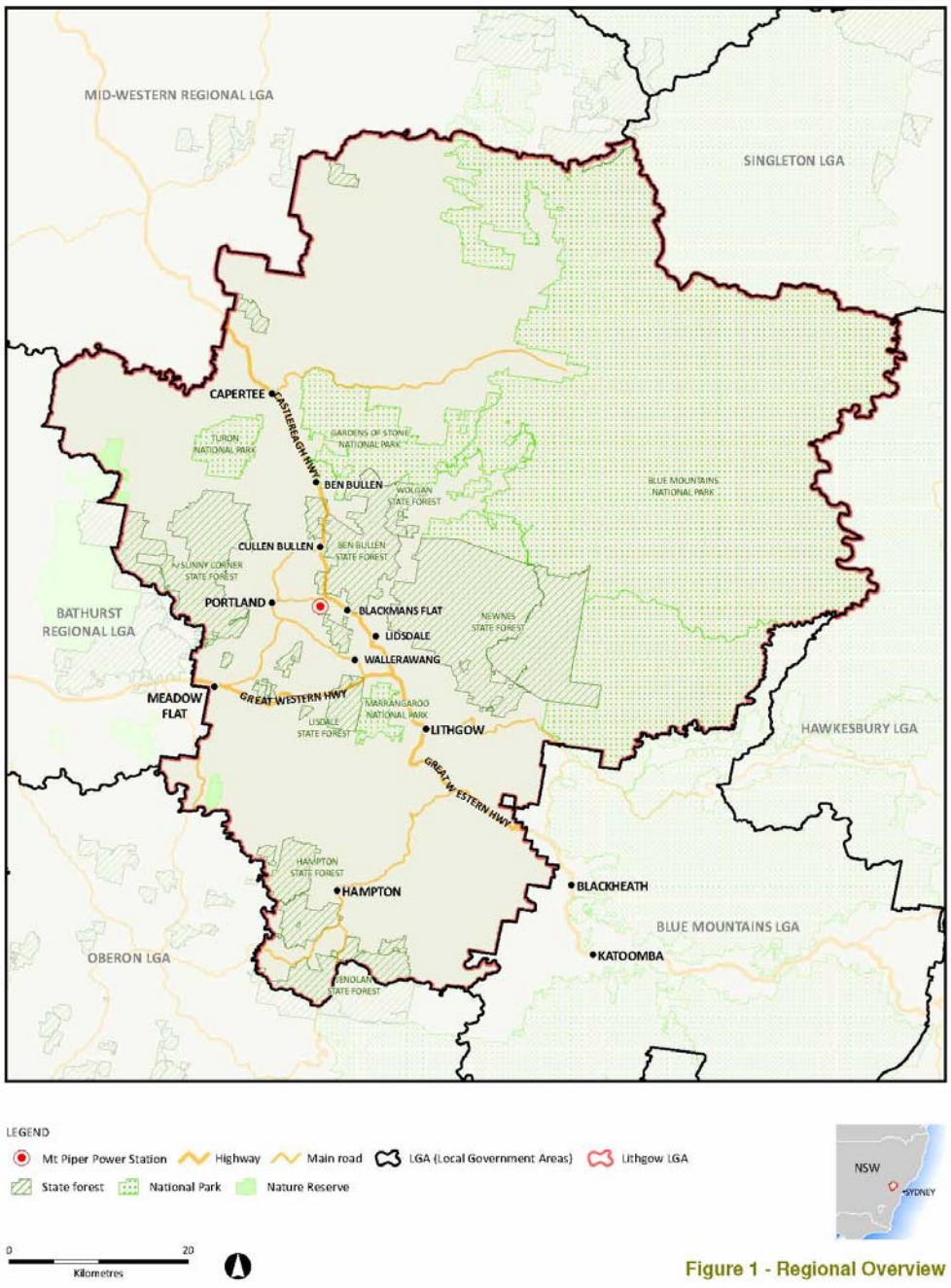


Figure 1 - Regional Overview

By the end of 2009 approximately 10.1 million tonnes of ash from Mt Piper 1 & 2 had been placed in the present ash placement area, Area No. 1. Under planned operations, the approved ash storage area is expected to reach capacity by around 2015, well before the existing power station reaches the end of its economic life. Accordingly, there is a need to undertake planning activities and obtain approvals to enable the continued placement of ash once the existing ash placement area reaches capacity. The selection of additional ash placement areas is required to maintain the operation of the Mt Piper Power Station Units 1 and 2 and to provide for the operation of the proposed Mt Piper Extension should it be constructed as a coal fired plant.

In January 2010 Delta obtained concept approval (Application 09_0119) for the development of 2,000MW of new generating capacity at the Mt Piper site (known as Mt Piper Extension). This new capacity would be either coal fired or gas turbines and if it were to proceed as a coal-fired plant there would be a need for further ash placement areas.

The Mt Piper Extension development site has been made available for sale to the private sector as part of the NSW Government's Energy Reform Strategy. Should the buyer seek project approval to build a coal-fired power station then there would be additional demand for ash storage facilities that is best met by use of the same ash storage sites as those sought for Mt Piper Units 1 and 2. Accordingly, this environmental assessment also provides for ash storage requirements of Mt Piper Extension should it be coal fired.

Alternatives Considered

Delta currently is able to provide about 200,000 tonnes per year from Mt Piper Power Station for reuse in the cement industry. Ash from power generation activities can be beneficially reused for cement making or horticultural purposes, soil stabilisation, engineered fill and road bases, aggregates and polymers and zeolite production, subject to the quality of the ash produced. Delta continues to seek opportunities for reuse of the ash produced.

In 2006 Delta undertook a feasibility and site selection study in which potential ash placement sites were selected to be assessed and evaluated. In total, 25 potential ash placement sites were identified in the surrounding area located up to 13km from the power station. The study also allowed for consideration of potential expansion of the generating capacity of Mt Piper. Ash placement schemes were considered for the current generation capacity of Units 1 and 2 and also the addition of a further 2000 MW of coal fired generation capacity. The volume of storage required and the probable area available at each of the alternatives indicated the need for multiple storage sites.

Throughout the process a number of assumptions and observations were noted including:

- The sites closer to the power station were ranked more highly due to proximity and therefore minimising the need of transporting ash across, or on public roads and the added benefit of a reduction in transportation costs;
- Many of the sites further from the power station site had smaller storage capacities as they were generally on smaller sites;
- Backfilling of underground workings was generally not considered practical due to the limited available space and excessive placement costs, and possible groundwater contamination/ environmental issues;
- It was assumed there would be minimal environmental disturbance at areas with prior disturbance by open cut mining.

Based on the recommendations of that feasibility study, Delta selected four sites (as shown in **Figure 2**) within the defined investigation areas, these being Lamberts North, Lamberts South, Neubecks Creek and Ivanhoe No. 4, for further consideration. The feasibility and site selection study found that, compared with the other options, the four preferred sites would:

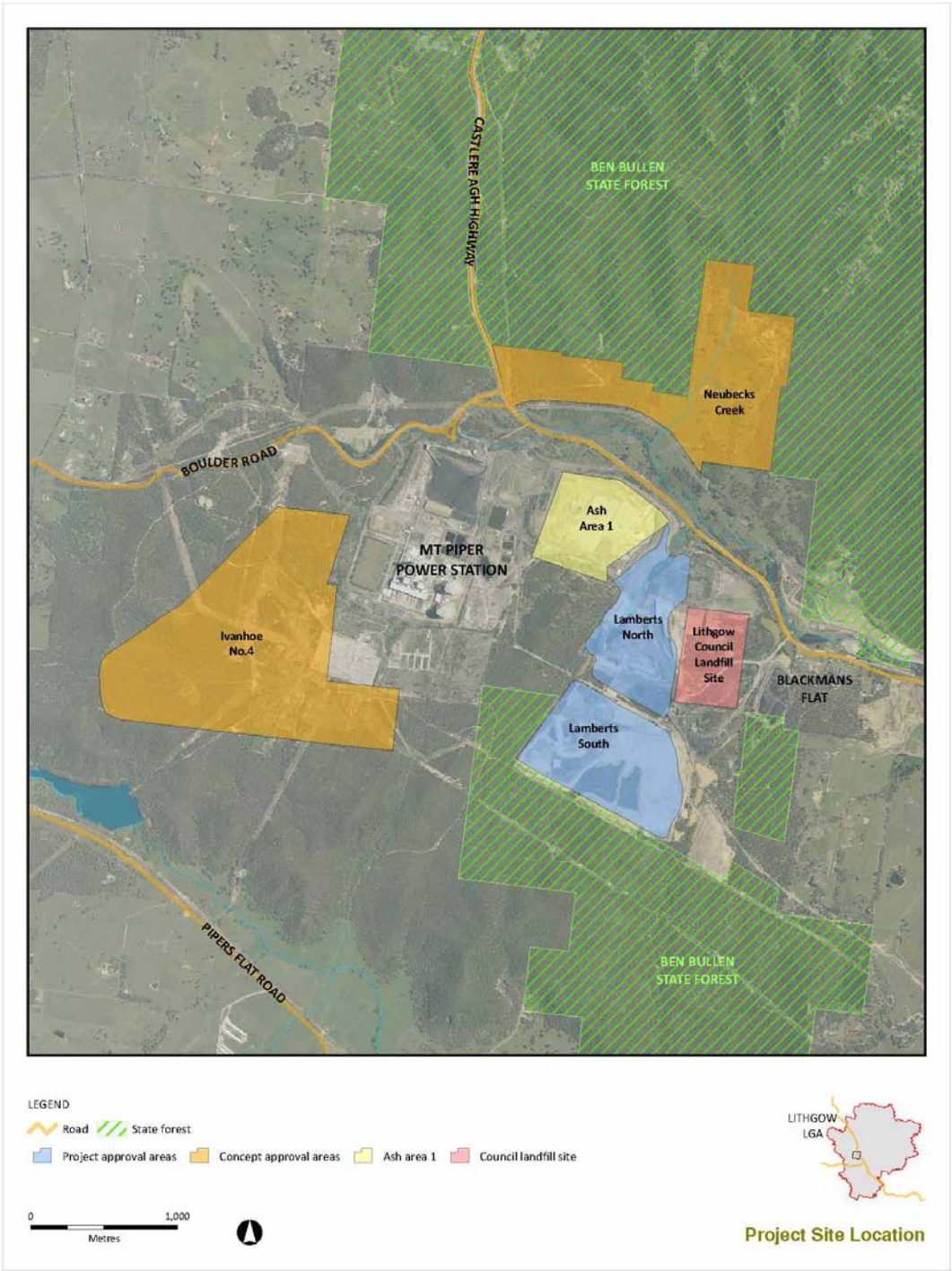
- Optimise the economic costs and benefits;
- Enable the placement of ash within land owned by Delta Electricity or Centennial Coal;
- Enable the ash to be placed in areas that are either currently subject to open cut mining or intended for coal extraction;
- Enable the ash to be transported via conveyor or private haul roads and minimise the requirement to utilise public roads; and
- Minimise undesirable environmental and social impacts in already developed areas.

Overview of the Proposal

A full description of the proposal is provided in detail in Chapter 3– Project Description.

In brief, Delta is seeking Concept Approval and Project Approval for two of the proposed placement sites Lamberts North and Lamberts South and Concept Approval for the future development of Neubecks Creek and Ivanhoe No.4. Lamberts North and Lamberts South are currently being mined for coal and Project Approval is being sought for these sites to allow for their development for ash placement from around 2015.

The ash storage available at Lamberts North and Lamberts South is sufficient to provide for the existing Mt Piper Power Station Units 1 and 2 until about 2042-2045, which is the effective life of the plant.



- **Figure 2 – Site Location**

A proposal to extend the generation capacity at the power station site by the construction of an additional 2000MW of gas or coal fired generation capacity was considered by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Concept approval under Section 75O of the EP&A Act was issued for the new power station, called Mt Piper Extension, on 12 January 2010.

If the Mt Piper Extension project proceeds as a coal-fired plant, there would be a reduction in the life of Lamberts North and Lamberts South sites and they would effectively be filled by about 2026.

Concept approval only is being sought for Neubecks Creek and Ivanhoe No 4 as it is necessary to provide an approval process for ash storage should Mt Piper Extension proceed as a coal fired plant. Should Mt Piper Extension proceed with the coal fired option, project approval for the use of Neubecks Creek and Ivanhoe No 4 as ash storage areas would be required before 2026 to provide sufficient ash placement capacity for both plants.

The objectives of the proposal are therefore:

- To provide suitable ash placement areas to ensure the ongoing operation of the existing power station site beyond 2015, in order to maintain the existing level of power supply in NSW;
- To provide sufficient storage areas for ash from the proposed Mt Piper Extension power station should it be coal fired; and
- To minimise and manage any environmental or social impacts which may result from the construction and operation of the proposed ash placement areas.

Approval Process

The proposal has been declared a Major Project and is subject to assessment under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Under Part 3A of the EP&A Act Delta is seeking Concept Approval and Project Approval for the proposed placement sites at Lamberts North and Lamberts South and Concept Approval for the future development of Neubecks Creek and Ivanhoe No.4. An Environmental Assessment Report and a draft Statement of Commitments has been prepared and submitted to the Department of Planning for public exhibition.

The responses received during the exhibition are addressed by the proponent and the project and the responses are assessed by the Department of Planning. The Minister for Planning is the approval authority for the project.

Environmental Assessment of Key Issues

Air Quality

Computer-based dust dispersion modelling was undertaken for the Lamberts North and South dust placement areas and used to assess the impacts of the proposal, while a qualitative assessment for odour and ash contaminants, and for the proposed Ivanhoe No. 4 and Neubecks Creek sites was undertaken.

Meteorological data from the Mt Piper Power Station site were combined with estimated dust emissions from proposed activities to predict off-site total suspended particulates (TSP), particulate matter less than 10 microns (PM_{10}) and deposited dust levels.

An additional scenario was also developed which took into account ash requiring placement from the proposed Mt Piper Extension Project.

The results from the assessment indicated that the project, even without mitigation, is unlikely to cause exceedances of annual PM_{10}, TSP and dust deposition criteria at nearest sensitive receptor locations. It is possible that the maximum 24-hour average PM_{10} criteria may be exceeded from time to time although it is unlikely that the project will be the cause of such exceedances. It was noted that the probability of the project causing an exceedance of 50 $\mu g/m^3$ increases, with increasing background levels. Since the maximum 24-hour average model results represented the "worst-day" at each location in terms of potential impacts from the project, and that the probability of maximum project impacts occurring at the same time as maximum background levels would be very low.

The assessment was based on a worst case operation, in which no controls have been put in place to reduce onsite dust emissions. It is intended that existing dust control measures used in Area 1, such as application of sprays and molasses to exposed surfaces and water trucks on unpaved haul roads, would also be applied to the proposed expansion areas. Consequently, dust concentrations and deposition levels should be lower than predicted.

Assessment of the Ivanhoe No. 4 and Neubecks Creek found that ash placement at these sites could have the potential to generate dust and may require further detailed assessment in accordance with the DECC *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in* NSW, should these areas be required for ash storage.

Noise

A noise assessment was undertaken using methods prescribed by NSW Government requirements. Under neutral weather conditions, the operation of the ash placement areas for Lamberts North and South both indicate that compliance with the established noise goals would generally be expected. Without mitigation a marginal exceedance of the project specific noise goals may occur at one

location when operations reach the Lamberts South placement area in 2023. This is likely to occur in the early stages of the operations in this area due to the topography of the site and the proximity to the receiver at this location near the eastern edge of the placement area.

At Lamberts North, the predicted noise levels under adverse meteorological conditions indicate general compliance during the daytime for assessed locations, with a marginal exceedance possible during the latter stages at one site. Without mitigation the same result may be expected at that site for the evening period, and an exceedance of up to about 3 dB(A) is possible at another site during this time.

At Lamberts South, the results generally indicate exceedances for receiver locations without mitigation measures, The exception during this phase of works is the location at Blackmans Flat for the daytime period, which is expected to comply even under adverse weather conditions. The exceedances during the evening period are predicted to be up to 4 dB(A) at the other assessed location. These are expected, however, to reduce to approximately 1-2 dB(A) at both locations during the final stage of works.

The nature of the operations for the ash placement makes mitigation feasible by utilising the benched ash mound as a noise barrier. Testing various barrier options has indicated that where the top of the barrier is 4 m higher than the ground level of the equipment, a 5-6 dB(A) reduction in the noise level at the receiver location is possible.

There are limitations to this method due to the mobile nature of the noise sources and the movement of trucks to and from the dump location, since the barriers effectiveness would be decreased as the noise source moves further from it. While the use of the ash placement as a barrier has been identified as a potential solution, the construction of the ash mound and its progression through the site will require more detailed planning and may be subject to safety and process constraints.

Placement of fly ash and furnace ash at the proposed Ivanhoe No. 4 and Neubecks Creek sites could have potential noise impacts on nearby sensitive receivers and would require further detailed assessment.

Modelling predictions for construction noise indicate that the noise levels from construction activities would be below the project noise goals at the receiver locations. No construction noise mitigation measures would be required.

Water Management

The project investigation areas are only very small portions of the Upper Coxs River Catchment and would have negligible impact on the catchment in terms of water availability.

The proposed ash placement facilities would not require water allocations or licences to operate, as the facilities would be supplied by the water harvested from the disturbed areas of the sites. The water would be used for rehabilitation and dust suppression to supply to the operation. The water sourced from the disturbed areas of the proposed ash placement facility would be achieved by the development of the site water management system developed for each site to manage surface runoff from the sites.

Existing surface water and groundwater data were reviewed. There exists sufficient data from the on-going water monitoring and groundwater modelling studies undertaken to show that the main contribution to elevated water quality parameters in Neubecks Creek is due to past, underground coal mining activities rather than the existing ash placement works at Area 1 or the operation of Mt Piper Power Station.

The management of works at the existing Area 1 is appropriate to minimise the risk of a discharge from the construction and operation of the active ash placement areas. A continuation of these practices in the Lamberts North and Lamberts South areas, as well as similar practices at the Neubecks Creek and Ivanhoe No 4 sites, would be enough to ensure that ash placement has limited if any effects on the water quality of Neubecks Creek.

To reduce potential water quality impacts of the site during construction, general measures to control erosion of soil and sedimentation would be implemented prior to construction works.

Flora and Fauna

The proposed ash placement area (approximately 108 ha in the Lamberts North and Lamberts South areas) comprises mostly disturbed lands, currently part of an active mine and areas rehabilitated following mining activities. Native vegetation within this proposal area is limited to three patches of vegetation at the southern end of the Lamberts South area, totalling about 9 ha. There will also be impacts to regenerating vegetation within rehabilitation areas at the northern and southern end of the two areas.

Habitat for fauna within the proposed ash placement areas is limited to the remnant vegetation patches in the southern-most area proposed for ash placement. The remnant vegetation is of generally good habitat value, supporting an abundance and diversity of foraging, refuge and breeding opportunities for fauna. Although there is vegetation adjacent to the ash storage areas, the loss of habitat (particularly the hollows, trees with decorticating bark and wetland) constitutes a net loss for the locality with consequences for local fauna, including reduced breeding and refuge habitat opportunities and disturbance to remaining habitats. However, impacts on local populations would not lead to an increased risk of extinction, and hence the loss of habitat is considered not significant. Remaining areas of the ash storage area are cleared and modified lands and there are no areas of conservation value for fauna.

An assessment of the impacts of this proposal on species, populations and ecological communities listed under TSC Act and the EPBC Act was undertaken. One plant species listed as vulnerable under both the TSC Act and the EPBC Act, Capertee Stringybark (*Eucalyptus cannonii*) was observed in one location. Up to three individuals of the *Eucalyptus cannonii* would be removed to accommodate the proposed ash placement. No other threatened flora species were recorded despite targeted searches within areas of suitable habitat, and it is unlikely that other threatened flora species are present considering the extent and type of habitats present and the degree of survey effort undertaken. Hence, the results of the TSC Act and EPBC Act tests of significance indicate the loss of habitat would not significantly affect the viability of threatened flora species in the area.

No threatened fauna species (TSC Act or EPBC Act) were identified on the site during the field surveys. The site may provide at least foraging and possibly roosting habitat for a suite of microbat species, and could form part of the territory of Spotted-tail Quoll, owl and glider species. However, the results of the TSC Act and EPBC Act tests of significance indicate the loss of habitat would not significantly affect the viability of threatened fauna species in the area.

An area of up to 9 ha of remnant vegetation would be offset to ensure there is no net loss of flora and fauna values in the area. This would provide a habitat offset of 1:1. Although no threatened species or ecological communities would be affected by the loss of the 9 ha of vegetation, the generally good habitat value would suggest that an offset would be appropriate. The remnant vegetation within the offset location should have similar habitat attributes as the remnant vegetation within the proposal area, comprising a relatively mature area of vegetation with an abundance of hollow trees and fallen timber. Although only three specimens of Capertee Stringybark would be lost to the development, the proposed offset area should contain specimens of that species, if possible.

The Neubecks Creek and Ivanhoe No 4 sites, although previously subject to mining activities, have remnant or regrowth areas of vegetation and associated potential ecological values. These would need to be further assessed in the project approval phase before any approvals are given for ash placement.

Indigenous Heritage

Previous cultural heritage surveys of the Lamberts North and Lamberts South areas demonstrate that this area was used in the past by Aboriginal people. However, as a result of the wholesale nature of the subsequent disturbance associated with open cut mining operations and the reshaping of the ground surface soils which has completely modified the entire local landscape, there is now very low / zero potential for intact archaeological deposits over the proposed ash placement study area.

The two previously identified sites, one just west of the Lamberts South and one to the east of Lamberts South, remain intact and are currently protected by a Cultural Heritage Management Plan. For the purpose of this project, these two previously registered sites remain as constraints and would be avoided by project impacts.

Surveys undertaken at both Neubecks Creek and Ivanhoe No. 4 also identify these areas as having been used in the past by indigenous groups with a number of sites known to occur in areas where ash placement could potentially occur. Further assessment and survey of the Ivanhoe No. 4 Concept Area in the project approval phase would be required to ensure all indigenous heritage has been adequately identified and documented.

With regards to the general results over the study area (all sites) the following general management would be implemented:

- Avoidance of impact - If this can be done, then a suitable curtilage around the recorded sites would be determined so as to ensure their protection both during the short term construction phase of development and in the long term use of the area;
- If impact is unavoidable - then an Aboriginal Heritage Impact Permit – (AHIP) may be applied for from the NSW DECCW and approval would depend on many factors including the assessed significance of the recorded sites. Sites of moderate to high significance and/or potential may require either test or salvage excavation, or more detailed recording, as part of the conditions of an AHIP being granted. Sites of low significance may have an AHIP approved with no further archaeological assessment being required, or with an approved monitoring programme. Once granted, the local Aboriginal communities may wish to collect or relocate artefacts, whether temporarily or permanently, if necessary. Consultation with the Indigenous community is required for all AHIP applications.

In reference to Neubecks Creek and Ivanhoe No. 4 areas:

- There is already known evidence of Aboriginal occupation over both the Neubecks Creek and Ivanhoe No. 4 Concept Areas and hence any proposed impacts would need to be assessed against known heritage values of these locations such that appropriate heritage management measures could be devised;
- A significant component of this process would be Aboriginal community consultation in relation to the assessment for sites, the cultural significance of any recorded locations and with regards to mitigation and management measures.

Visual Amenity

Visual impacts were assessed by comparing the visual modification and visual sensitivity and generally relate to the ability of the landscape to absorb visual modification. The degree to which the environment can absorb any visual impacts is influenced by topography (whether it can be

screened) and vegetation (whether it can be concealed). In general, there are more opportunities to minimise the visual impact of a development from distant views and in varied and undulating landscapes than areas of flat terrain.

Photomontages were used to assess the impacts of the ash placement areas at Lamberts North and Lamberts South. Photomontages were produced for three key locations which would have views of the proposed development. The photomontages show that only the tops of the proposed ash placement areas would be visible from the surrounding areas. It follows that the beginning of the placement below ground would not be visible from these places.

Without mitigation it is evident that high visual impact would result on one key location due to the close proximity of the sensitive receiver to the proposed ash placement areas. Visual impacts from 2 sites would be low to moderate, given their proximity to the proposed development and existing land use. For the finished profile of the sites, the ash placement areas are expected to appear greyish in colour from the viewpoint locations.

Following ash placement, the resultant ash mounds would be capped, revegetated and rehabilitated. Given that the rehabilitated and revegetated ash placement areas would be readily absorbed into the surrounding natural environment and the long distances between the sensitive viewing locations and the proposed ash areas, the visual impact of the proposed development would be low.

Development of ash placement areas at Neubecks Creek and Ivanhoe No 4 of a similar scale to those proposed at the Lamberts North and South are likely to result in visual impacts to surrounding receivers. A detailed visual impact assessment including line of sight analysis would be undertaken once preliminary design of ash placement areas is completed. This would be used to identify potentially visually sensitive sites in the study area.

Environmental Assessment of Other Issues

Other issues considered included socio-economic, traffic and transport, European heritage, waste management and land use. Any impacts from these issues would not be apparent or would be managed by standard management practices.

Environmental Management and Draft Statement of Commitments

The mitigation measures identified as commitments in this Environmental Assessment, along with any conditions of approval issued by the Minister for Planning, would be incorporated into the construction and operation of the ash placement areas, as well as the preparation of Construction and Operational Environmental Management Plans (EMPs) for the project.

Project Justification

In preparing this Environmental Assessment, the potential environmental impacts from the proposed development have been investigated and a range of mitigation measures developed to minimise any adverse effects. All mitigation measures proposed in the Environmental Assessment have been developed based on the principles of ESD.

It is clear that the principles of inter-generational equity and conservation of biological diversity are met and, if there is any doubt about potential detrimental effects on the environment, a precautionary approach is applied.

It is concluded that the development of the Mt Piper Ash Placement project is justified:

- In terms of addressing NSW Government policy for providing power generation capacity by providing an appropriate place to store ash products from power generation, thus allowing the existing power station to operate over its full life cycle and provide for a new power station;
- In providing social and environmental benefits for the general community whilst managing any potentially negative impacts on local communities by adopting appropriate management measures; and
- In that it would not detrimentally affect the health, diversity and productivity of the environment and would assist in these elements being maintained for the benefit of future generations.

Mt Piper Power Station
Ash Placement Project

ENVIRONMENTAL ASSESSMENT

CHAPTER 1 - INTRODUCTION

August 2010

Contents

1. Introduction

This chapter provides information on the proponent (Delta Electricity), background on the project and its objectives, outlines the environmental impact assessment process and approval requirements and identifies the structure of the Environmental Assessment report.

The chapter also addresses the Director-General's requirement for:

- *consideration of any relevant statutory provisions including the consistency of the project with the objects of the Environmental Planning and Assessment Act 1979; and*
- *identification of any third party approvals that need to be in place to allow the development of the project and an overview of how the project would interact with any such approvals (where relevant).*

1.1. Background

Delta Electricity owns and operates Mt Piper Power Station, located approximately 17 km north-west of Lithgow (refer to **Figure 1-1**). The station currently comprises two coal-fired generating units, each of which is operating at 700 MW.

In 1990 Lithgow City Council granted Delta Electricity consent for ash placement in the former Western Main open cut mine void adjacent to the power station. This area is known as Area 1 and employs dry ash placement. Currently, approximately 780,000 m^3 of ash is placed in Area 1 annually.

Based on the planned operation of the Mt Piper Power Station, the present ash placement area is expected to reach capacity in five to six years – i.e. by around 2015, well before the power station reaches the end of its economic life. Accordingly, there is a need to obtain development consent for ash placement beyond that time.

This Environmental Assessment (EA) report has been prepared to support Delta Electricity's application for relevant approvals for the construction and operation of four sites which represent the Mt Piper Ash Placement. It addresses the requirements for the preparation of an Environmental Assessment for the project, issued by the Director General of Planning under Section 75F of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The report supports an application to the Minister for Planning under Section 75O for concept approval for four sites and under Section 75J for project approval for two of those sites.

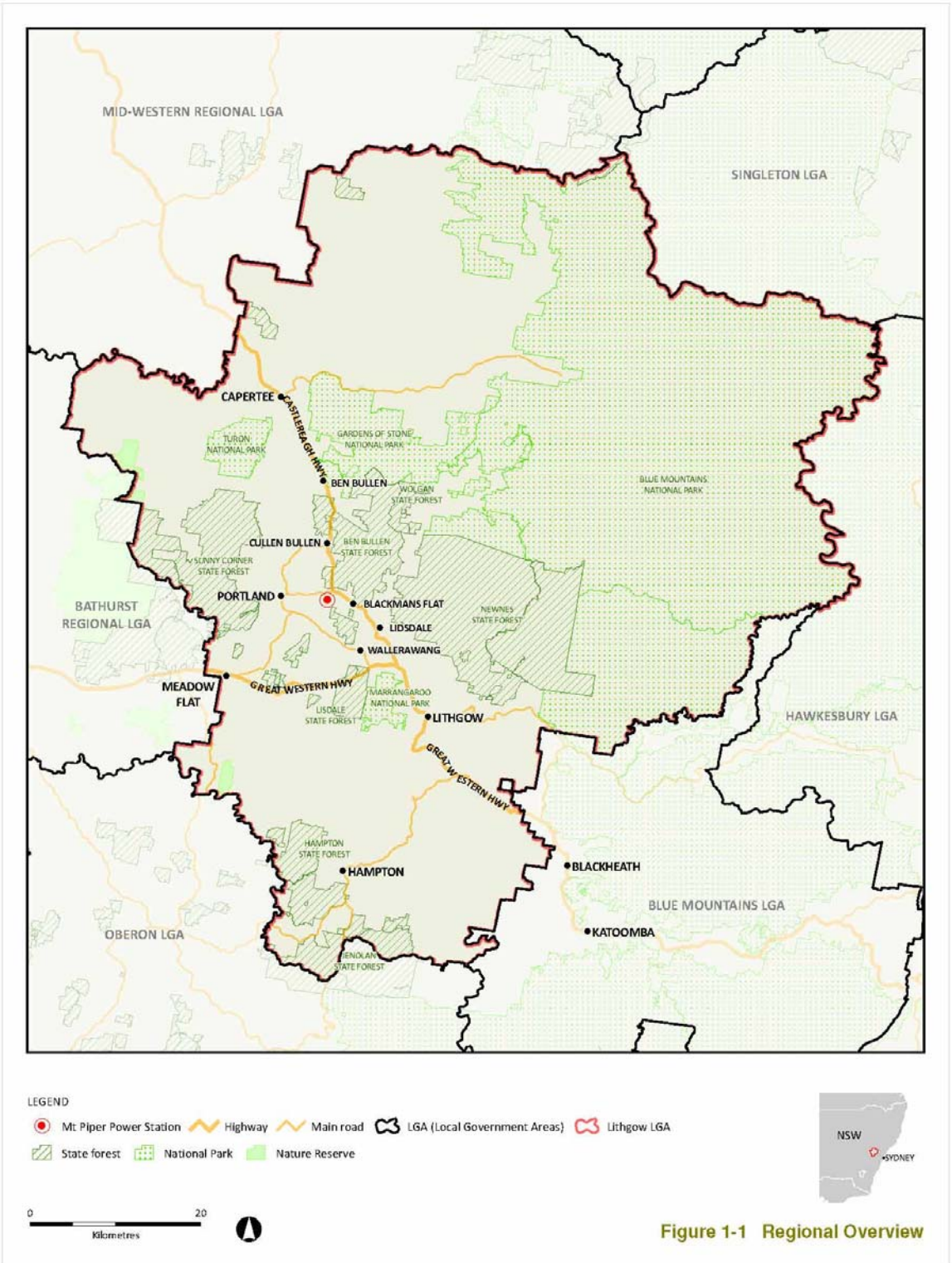


Figure 1-1 Regional Overview

1.2. The Proponent

Delta Electricity (Delta) is a New South Wales State-Owned Corporation whose purpose is primarily to maintain and operate facilities for the generation and supply of electricity into the National Electricity Market (NEM). Delta was formed in March 1996, when the NSW Government Authority Pacific Power was separated into three State-owned generation companies.

Delta's business objectives are aligned with the legislation under which it operates and with Government policy direction. This legislation includes the *NSW Energy Services Corporations Act 1995 No 95* that lists the main objectives for electricity generators, as follows:

- To be a successful business and, to this end:
  - to operate at least as efficiently as any comparable business
  - to maximise the net worth of the State's investment in it
  - to exhibit a sense of social responsibility by having regard to the interests of the community in which it operates;
- To protect the environment by conducting its operations in compliance with the principles of ecologically sustainable development contained in section 6 (2) of the *Protection of the Environment Administration Act 1991*;
- To exhibit a sense of responsibility towards regional development and decentralisation in the way in which it operates;
- To operate efficient, safe and reliable facilities for the generation of electricity;
- To be an efficient and responsible supplier of electricity; and
- To be a successful participant in the wholesale market for electricity.

1.3. Overview of the Proposal

A full description of the proposal is provided in detail in Chapter 3– Project Description.

In brief, Delta has identified a need to expand its current ash placement facilities, which service the Mt Piper Power Station, to enable the further placement of ash once the existing ash placement area has reached capacity. Previous feasibility and site selection studies have selected four broad sites on which Delta is proposing to undertake planning activities and obtain relevant approvals for ash placement. The four sites are described as:

- Lamberts North;
- Lambert South;

- Neubecks Creek; and
- Ivanhoe No. 4.

With the ongoing operation of Units 1 and 2 at Mt Piper, the present ash placement area is expected to reach capacity within five to six years. Accordingly, there is need to obtain development consent for ash placement beyond this time and throughout the power station's economic life.

As such, Delta is seeking Concept Approval and Project Approval for two of the proposed placement sites Lamberts North and Lamberts South and Concept Approval for the future development of Neubecks Creek and Ivanhoe No.4. Lamberts North and Lamberts South are currently being mined for coal and Project Approval is being sought for these sites to allow for their development for ash placement from around 2015.

The ash storage available at Lamberts North and Lamberts South is sufficient to provide for the existing Mt Piper Power Station Units 1 and 2 until about 2042-2045, which is the nominal life of the power station. It is unlikely that further ash storage areas would be required beyond that time for this power station.

A proposal to extend the generation capacity at the power station site by the construction of an additional 2000MW of gas or coal fired generation capacity was considered by the Department of Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Concept approval under Section 75O of the EP&A Act was issued for the new power station, called Mt Piper Extension, on 12 January 2010.

If the Mt Piper Extension project proceeds as a coal fired plant, the life of Lamberts North and Lamberts South would be less and they would effectively be filled by about 2026.

Concept approval is being sought for Neubecks Creek and Ivanhoe No 4 as it is necessary to provide an approval process for ash storage should Mt Piper Extension proceed as a coal fired plant and Neubecks Creek and Ivanhoe No 4 are required for both plants beyond 2026. Should Mt Piper Extension proceed, project approval for the use of Neubecks Creek and Ivanhoe No 4 as ash storage areas would be required before 2026.

The objectives of the proposal are therefore:

- To provide suitable ash placement areas to ensure the ongoing operation of the existing power station site beyond 2015, in order to maintain the existing level of power supply in NSW;
- To provide sufficient storage areas for ash from the proposed Mt Piper Extension power station should it be coal fired; and

- To minimise and manage any environmental or social impacts which may result from the construction and operation of the proposed ash placement areas.

The general location and land tenure of the Mt Piper Ash Placement areas is shown in **Figure 1-2.**

Land tenure and ownership of the proposed ash placement sites is described in **Table 1-1.**

Table 1-1 Land ownership details for proposed ash placement locations

Ash Placement Area	Current Land Owner	Lot/Plan Details
Lamberts North	Centennial Coal	9 DP804929 15 DP804929
Lamberts South	Centennial Coal	15 DP804929 501 DP825541 13 DP751651 357 DP751651
Neubecks Creek	Centennial Coal Delta Electricity	12 DP751636 16 DP751636 342 DP751636 343 DP751636 43 DP827626 45 DP827626 46 DP827626 48 DP827626 50 DP827626
Ivanhoe No. 4	Centennial Coal Delta Electricity	162 DP751638 108 DP751638 5 DP858201 1 DP1092737 7 DP1092737 59 DP751636 21 DP832446

1.4. Statutory Planning

1.4.1. Objectives of the Environmental Assessment

Development in NSW is subject to the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). Environmental planning instruments prepared pursuant to the Act set the framework for approvals under the Act.

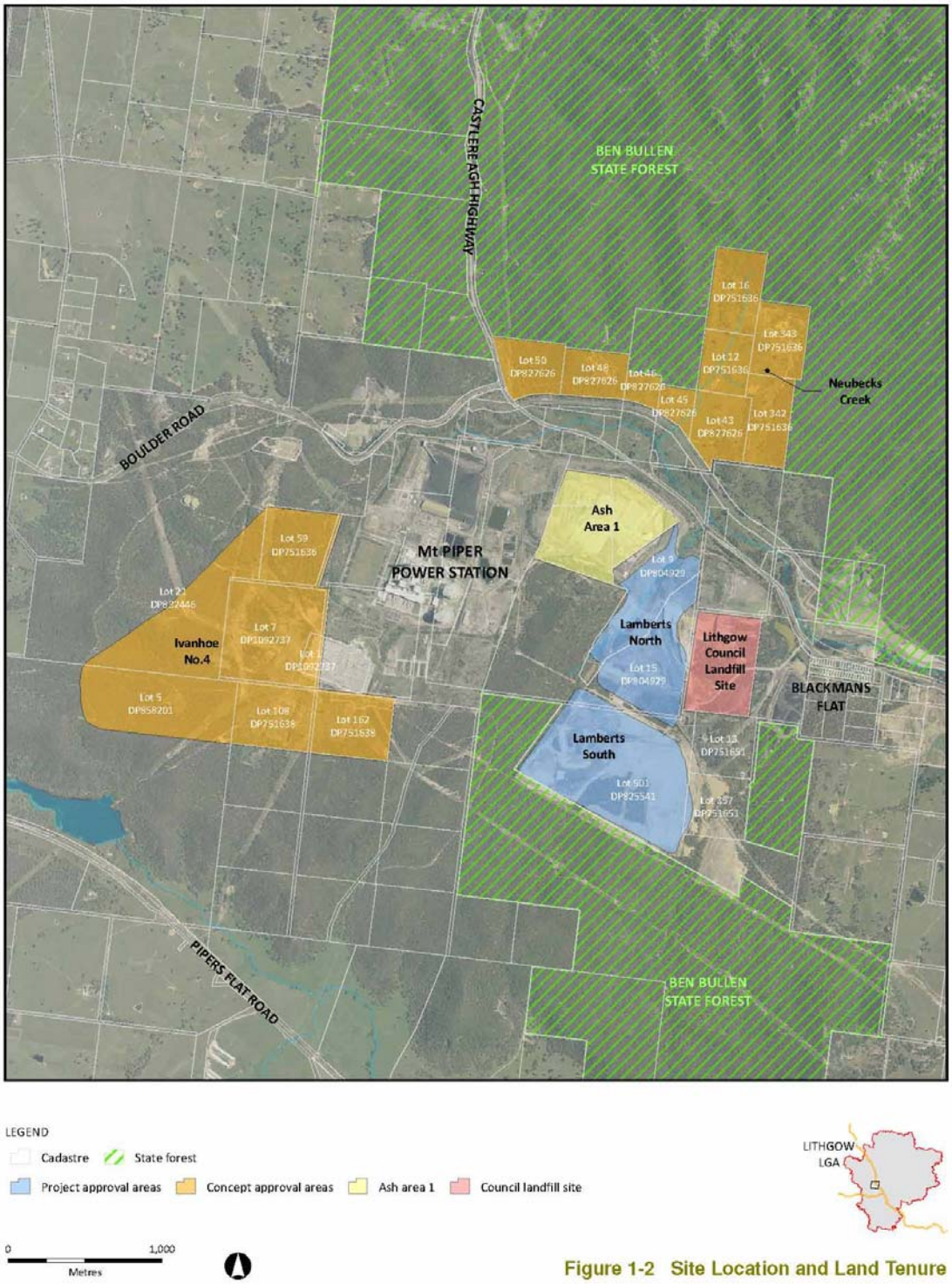


Figure 1-2 Site Location and Land Tenure

The Mt Piper Power Station Ash Placement Project is consistent with the objectives of the EP&A Act in that it seeks to provide utility services (power generation) while ensuring the proper management of resources and the protection of the environment.

This Environmental Assessment (EA) of the proposed ash placement areas will be assessed under Part 3A of the EP&A Act. By order of the Minister, the Mt Piper Ash Placement Project was declared to be a project to which Part 3A of the EP&A Act applies, due to its State and regional planning significance, on 20 October 2009. The approval authority for Major Projects is the Minister for Planning.

The objectives of the EA are:

- To comply with the requirements of the EP&A Act, as formalised in specific requirements issued by the Director-General of the Department of Planning (DoP) issued 12 November 2009 and attached in Appendix A;
- To provide the Minister for Planning with sufficient information to make an informed decision on the environmental impacts and benefits of the proposal; and
- To inform the community about the proposal.

1.4.2. Environmental Impact Assessment Process

Prior to the preparation of this Environmental Assessment (EA), Delta submitted a Project Application for the proposal to the Department of Planning. A Preliminary Environmental Assessment (PEA) was prepared to support the application and outlined the potential environmental and social impacts associated with the project. The Project Application and PEA were made publicly available on the Department's website in October, 2009.

The Part 3A planning and approval process is outlined in **Figure 1-3** below.

Preparation and Exhibition of the EA

This EA, along with a draft Statement of Commitments, will be made publicly available by the Department of Planning for comment for a minimum of 30 days. Notice of exhibition dates and locations will be given by the Department in relevant newspapers. The EA will also be available for inspection on the Department of Planning Website (www.planning.nsw.gov.au).

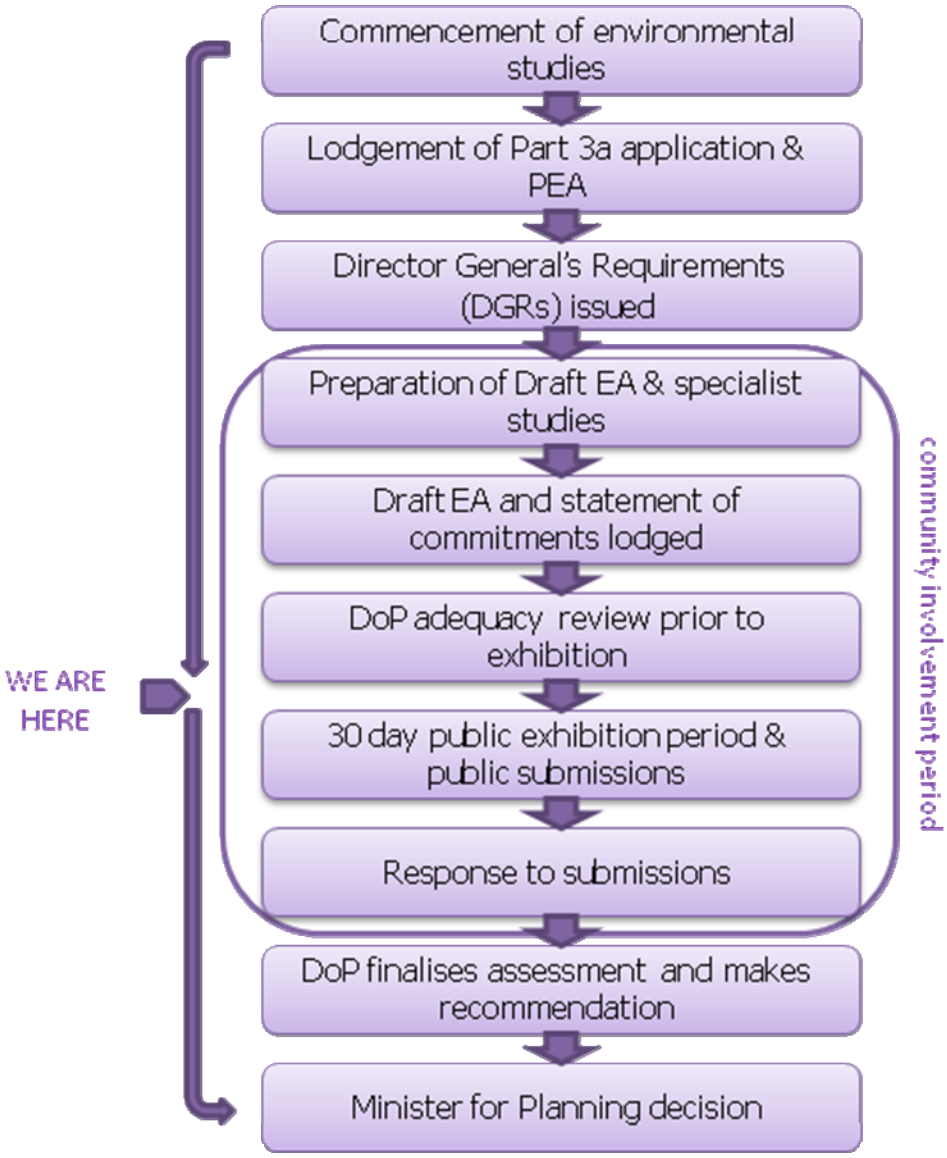


Figure 1-3 Planning Approval Process

Delta has made available a 1800 project information line during the preparation of the EA. This line (1800 257 484 toll free) will remain available throughout the EA exhibition period to allow access to the project team should any further information be required. Alternatively there is also a project email address - mtpiperashstorage@de.com.au. The EA will also be available on Delta's web site (www.de.com.au).

Assessment and Decision

Following exhibition of the EA, copies of submissions received by the Department of Planning will be provided to Delta. Delta will review the submissions and consider and respond to issues raised, including the need or otherwise to modify the proposal. Delta's response to these issues will be submitted to the Department of Planning.

The Department will prepare an assessment report on the proposed Mt Piper Ash Placement Project which will take into account comments from the relevant Government authorities, the community and Delta's Submissions Report. The assessment report will be provided to the Minister for Planning, who will make a decision on approval and conditions in accordance with the EP&A Act.

1.4.3. Statutory Planning Framework

Environment Planning and Assessment Act 1979

Part 3A of the EP&A Act provides for project assessment and approval and/or concept assessment and approval for major projects. A concept plan is a non-detailed description and assessment of a project, outlining the scope of the project and any development options. As a detailed description of the project is not required for a concept plan, it is therefore suitable for projects where the specifics would be defined more accurately or altered at the project approval stage or where construction would not begin within the short term. In most cases, project approval still needs to be obtained for projects with an approved concept plan.

Due to the proposed timing and the number of development options associated with the ash placement project, a sufficient level of assessment has been undertaken for the Lamberts North and Lamberts South sites to allow project approval to be sought following concept approval being obtained for those sites. Since the existing ash placement area would have sufficient capacity to cater for Mt Piper Power Station for the next five to six years, and Lamberts North and Lamberts South would cater for a period up to about 2042-2045, effectively the life of the existing Mt Piper Power Station Units 1 and 2. Project approval would only need to be sought for Neubecks Creek and Ivanhoe No.4 if Mt Piper Extension is constructed as a coal fired plant and / or the life of Mt Piper 1 and 2 is extended beyond 2042-2045.

Even though project approval would not be sought until a later stage, from an operational perspective, it is important for this project to have some certainty provided by a concept approval for Neubecks Creek and Ivanhoe No 4 to ensure the ongoing viability of the Mt Piper Power Station and Mt Piper Extension should it be coal fired. It is also important for the concept approval to have an adequate level of assessment to ensure the environmental implications of the project are understood. Further detailed environmental assessments would then be undertaken for each proposed ash placement area as part of the project approval process.

Section 75U of the EP&A Act specifies certain approvals that are not required for an approved project under Part 3A. Consequently, if the Minister grants approval to carry out the project under section 75J (1) of the Act, the following approvals would not be required:

- An approval under Part 4 or an excavation permit under section 139 of the *Heritage Act 1977;*
- A permit under section 87 or a consent under section 90 of the *National Parks and Wildlife Act 1974* in relation to Aboriginal objects or places*;* and
- A water use approval under section 89, water management work approval under section 90 or an activity approval under section 91 o*f* the *Water Management Act 2000.*

Under section 75V of the EP&A Act, if the project is granted approval under Part 3A of the EP&A Act, certain approvals, if necessary for carrying out the approved project, cannot be refused by the relevant approval authority and such approvals must be substantially consistent with the terms of the project approval. These approvals are described below.

Protection of the Environment Operations Act, 1997

The *Protection of the Environment Operations Act, 1997* (POEO Act) is the primary piece of legislation regulating pollution control and waste disposal in NSW and is administered by the Department of Environment, Climate Change and Water (DECCW). Under Section 48 of the POEO Act, premise-based scheduled activities (as defined in Schedule 1 of the Act) require an Environment Protection Licence (EPL).

Electricity generating works (including associated water storage, ash and waste management facilities) that supply or are capable of supplying more than 30 MW of electrical power from energy sources (including coal), are listed under Schedule 1. The existing power station at Mt Piper is subject to EPL 13007.

The Mt Piper Ash Placement Project would require an Environment Protection Licence (EPL) for construction and operation. An amendment to EPL 13007 would be required by Delta Electricity for the proposed ash placement.

Roads Act, 1993

Under the *Roads Act, 1993* consent under Section 138 is required to erect a structure or to carry out a work in, on or over a public road. For State or regional roads the road authority is the Roads and Traffic Authority. For local roads, the authority is the local council.

No access to public roads would be required for works proposed at Lamberts North or Lamberts South. It is possible, however, that approval by the relevant road authority under Section 138 of

the Roads Act would be required for works associated with the provision of a new access routes for haulage of ash to Neubecks Creek or Ivanhoe No.4.

Water Management Act, 2000

Under the Water Management Act, 2000 (WMA) a water use approval under Section 89, water management work approval under Section 90 or an activity under Section 91 may be required, except where the project is a major project approved under Part 3A of the EP&A Act.

Under the WMA the NSW Office of Water can prepare a range of statutory water management plans covering aspects such as water sharing and water use. Draft Water Sharing Plans (WSPs) for the Greater Metropolitan Region have been prepared and are on public exhibition. The WSPs are scheduled to be implemented in the second half of 2010. Until the WSPs are implemented there remains an embargo on new water extraction activities in the area and the existing water entitlements remain in place.

Mt Piper Power Station obtains its water supplies from the Fish River and Coxs River Water Supply Scheme. Delta is entitled to extract from the Coxs River Scheme under the terms of its Water Management Licence issued under Part 9 of the *Water Act, 1912*. Following the acceptance and implementation of the WSPs the water extraction licence for Mt Piper Power Station will be considered in the context of the WSPs and will be issued under the terms of the WMA. There will be no need to seek a change to the water extraction limits specified in the existing licence as a result of this project, as no extra water would be required for activities at the ash placement site.

1.4.4. Environmental Planning Instruments

A number of State Environmental Planning Policies (SEPPs) are relevant to the proposed development. As part of updates to the State's planning system, as of 1 July 2009, regional environmental plans (REPs) are no longer part of the hierarchy of environmental planning instruments in NSW. All existing REPs are now deemed State environmental planning policies (SEPPs). The relevant SEPPs and former REPs relevant to the proposed development include:

Drinking Water Catchments Regional Environmental Plan No. 1

The Drinking Water Catchments Regional Environmental Plan No 1 (the REP) is one of a range of initiatives to address water quality issues in the catchment areas. The REP sets water quality objectives for the catchments , requires the Sydney Catchment Authority to develop rectification action plans (RAPs), requires councils to prepare and review local environmental plans (LEPs), including considering strategic land and water capability assessments (SLWCAs), and requires councils to assess and approve new developments and activities in the catchments, and to apply the requirement for proposals to have a neutral or beneficial effect (NorBE) on water quality.

Sydney REP No. 20 - Hawkesbury–Nepean River (No. 2 - 1997)

The aim of this plan is to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context.

1.4.5. Local Planning Controls

The development site is located within the Lithgow LGA and is subject to the provisions of the *Greater Lithgow Local Environmental Plan (LEP), 1994*. The development site is zoned Rural (General) 1 (a). This zone was established to provide flexibility whilst protecting rural land. Certain industrial developments, including the proposed works, are permitted within the zone with consent.

The LEP also notes that Council's *Development Control Plan (DCP) No. 6 – Industrial Development* sets development standards, including that the impact of industrial development on neighbouring land users must be considered. In particular, the DCP considers the principles and requirements for industrial development in rural zones. Hence, the development standards outlined in the DCP were generally followed in the concept development of the site.

1.4.6. 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, except in circumstances which are set out in the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act*).* Approval from the Commonwealth is in addition to any approvals under NSW legislation.

Matters of national environmental significance include:

- World heritage properties;
- Commonwealth heritage properties;
- Ramsar wetlands;
- Nationally threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions, including uranium mining.

Studies undertaken for the project identified the presence of suitable habitat for EPBC Act listed threatened species within the proposed ash placement site areas. In addition, a number of these species have previously been recorded near the vicinity of the power station and surrounding lands. The project was referred for the consideration of the Commonwealth Department of

Environment, Water, heritage and the Arts as to the status of the project as a "controlled action". DEWHA notified Delta on 16 July 2010 that the proposed action is not a controlled action.

1.5. EA Structure

This assessment has been prepared in accordance with relevant guidelines and the Director-General's Environmental Assessment requirements. A summary of the information contained within each chapter of the report is provided below:

- **Chapter 1** - introduces the project and provides an overview of the environmental assessment process and statutory requirements;
- **Chapter 2** - provides the strategic planning and justification of the project, outlining the need for the proposed ash placement, consideration of alternatives and an analysis of the suitability of the preferred site. It also addresses ash management options (in terms of reuse) with the aim of maximising the use of the resource;
- **Chapter 3** - provides a detailed description of the project;
- **Chapter 4** – discusses the consultation processes undertaken with the community and Government agencies. The issues for consideration in the assessment are identified;
- **Chapters 5-10** - provide an assessment of the key issues identified by the Director-General in terms of air quality, noise and vibration, water management, ecology, indigenous heritage, and visual amenity. Where impacts were identified or anticipated, mitigation measures were described and residual environmental impacts assessed;
- **Chapter 11** - provides a general 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;
- **Chapter 12** - provides a justification for undertaking the project, with consideration of the benefits and impacts of the proposal, and an overall conclusion;
- **Chapter 13** - summarises environmental management and mitigation measures and provides a draft Statement of Commitments;
- **Chapter 14** - lists the references used during the study.

Appendices to this report provide information relevant to the Environmental Assessment. Appendices included in the report are as follows:

- Appendix A – Project Declaration and Environmental Assessment Requirements;
- Appendix B – Air Quality;
- Appendix C – Noise and Vibration;
- Appendix D – Water Management;
- Appendix E – Biodiversity;
- Appendix F – Heritage.

Mt Piper Power Station
Ash Placement Project

ENVIRONMENTAL ASSESSMENT

CHAPTER 2 – STRATEGIC PLANNING AND JUSTIFICATION

August 2010

Contents

2. Strategic Planning and Justification

This chapter addresses the key issue relating to strategic planning and justification. The Director-General's requirements are:

- *The environmental assessment must provide a strategic assessment of the project, including justification of the need, scale, scope and location for the project;*
- *The environmental assessment must include an overview of the relationship between the project and its relevance to the existing Mt Piper Power Station Units 1 and 2, the existing brine and ash co-placement area for the Mt Piper Power Station Units 1 and 2 and the proposed Mt Piper Power Station Units 3 and 4[1];*
- *The environmental assessment must also illustrate how the project will effectively respond to the management of flyash (generated by combustion of coal) and brine (the product of the water treatment process) generated by the existing Mt Piper Power Station Units 1 and 2 and must illustrate how the project will cater for the management and storage of potential waste products produced from the Mt Piper Power Station Units 3 and 4 (flyash and brine);*
- *The environmental assessment must also describe the strategy for developing and implementing short, medium and long term ash management options (including ash reprocessing, reuse and recycling options) with the aim of maximising the use of this potential resource and maximising the available emplacement area life.*

2.1. Need for the Project

2.1.1. Background

Ash removal, placement and storage are critical to the long-term ongoing operation of the existing Mt Piper Power Station. In the absence of a significant increase in reuse opportunities or an alternative area to place the ash produced during power generation activities, Mt Piper Power Station Units 1 and 2 would be required to either reduce production to extend the operational life of the existing ash placement area or close down the operations of the power station when the present ash placement area reaches capacity. Either of these outcomes would have associated impacts on the electricity supply to NSW and both are considered highly undesirable. As a result, this project involving the provision of further storage areas for ash is required to maintain the existing level of power supply in NSW.

[1] While the DGRs refer to Mt Piper Units 3 & 4, all documentation associated with the ash placement project will refer to it as Mt Piper Extension. This is in accordance with the documentation for the Mt Piper Extension project's concept approval.

By the end of 2009 approximately 10.1 million tonnes of ash from Mt Piper 1 & 2 had been placed in the present ash placement area, Area No. 1. Under planned operations, the approved ash storage area is expected to reach capacity by around 2015, well before the existing power station reaches the end of its economic life. Accordingly, there is a need to undertake planning activities and obtain approvals to enable the continued placement of ash once the existing ash placement area reaches capacity. The selection of additional ash placement areas is required to maintain the operation of the Mt Piper Power Station Units 1 and 2 and to provide for the operation of the proposed Mt Piper Extension should it be constructed as a coal fired plant.

In January 2010 Delta obtained concept approval (Application 09_0119) for the development of 2,000MW of new generating capacity at the Mt Piper site (known as Mt Piper Extension). This new capacity would be either coal fired or gas turbines and if it were to proceed as a coal-fired plant there would be a need for ash placement areas. This was addressed in the documentation seeking concept approval of the Mt Piper Extension project.

The Mt Piper Extension development site has been made available for sale to the private sector as part of the NSW Government's Energy Reform Strategy. Should the buyer seek project approval to build a coal-fired power station then there would be additional demand for ash storage facilities that would be best met by use of the same ash repository sites as those sought for Mt Piper Units 1 and 2. Accordingly, this environmental assessment includes provision for ash storage requirements of Mt Piper Extension should it be coal fired.

2.1.2. Current Ash Production

The existing power generation capacity at Mt Piper Units 1 and 2 results in the production of approximately 105,000 tonnes per year of furnace (bottom) ash and 750,000 tonnes per year of fly ash (total 855,000 tonnes per year). Fly ash is conditioned with water or wastewater to give 15% moisture content to facilitate its handling and to prevent dust emissions during transport by conveyor and placement. Furnace ash is transported by truck to the ash placement area and is placed separately from the fly ash. Given the existing ash re-use rate of about 200,000 tonnes per year and a combined ash density of 1.2 t/m^3, approximately 786,000 m^3 per year is placed in Area 1. **Table 2-1** outlines the current ash production details for Mt Piper Units 1 and 2. Based on the planned operations and power generation, the present ash placement area is expected to reach capacity by about 2015.

Table 2-1 – Current approximate ash production at Mt Piper Power Station

Mt Piper Power Station Units 1 & 2 (2 x 700 MW)	
Coal consumption	Average 3.8 Mt/yr (10,400 tonnes per day)
Ash production rate	Coal ash fraction (air-dried basis) 25.5% wt.
Ash production volume	855,000 tonnes per year
Ash split	Fly ash 85-90% (0.75Mt/yr), Bottom ash 10-15% (0.1Mt/yr)
Ash reused	200,000 tonnes per year
Ash required for placement	655,000 tonnes per year or 786,000m^3/year

Advanced water treatment processes within the Mt Piper plant are used to treat water produced at the plant that is not suitable for direct recycling and reuse or discharge to Neubecks Creek. The treatment process reduces the waste water volume by recovery of good quality water for reuse and concentrates salts in the residual waste brine. The reuse of treated water has been estimated to reduce demand for freshwater by about 100 ML/year. Brine production within the power station varies between about 8 and 15 ML/year and the brine product is then used for ash conditioning. Up to about 30% of fly ash is conditioned by brine.

Delta is currently undertaking environmental assessment for the installation of a 6 ML/day RO plant at Wallerawang Power Station. It is also proposed to treat the waste from this plant at Mt Piper and to dispose of the resultant brine as co-placement with ash at Mt Piper. This would add brine of up to 18 ML/year to be disposed of at Mt Piper through co-placement with ash.

The use of brine for ash conditioning is intermittent (about twice per year) and occurs when the ash is to be directed to the approved co-placement area and when conditions for use of brine are favourable. Brine is stored in ponds and, when used, is sent to the ash conditioning plant. At the plant it is used to condition ash to about 15% moisture prior to the ash being directed to the approved brine and ash co-placement site. The current approved area for co-placement of brine in ash is at the western end of the dry ash placement area. Here the brine conditioned ash is placed above a level of 946m AHD above a layer of freshwater conditioned ash and a basal layer of mine spoil. The brine is essentially immobilised in the pores of the dry ash and not leached out by the relatively low rate of rainfall infiltration in the area.

The use of brine for ash conditioning has the main benefit of providing a means of disposal of the concentrated salts which result from the water treatment processes. It also provides a saving of 8-15 ML/year of water that would not be needed for ash conditioning. Without disposal of brine waste in the ash storage area these water savings would not be able to be achieved.

2.1.3. Forecast Ash Production

The existing power station has been operating since 1992 and ash Area 1 has about 5 years of life remaining. Forecasting of ash placement based on a predicted further 32 years of further operation of the power station (to 2042-2045) indicates that there is a requirement for approximately an additional 21.2 million m^3 of new ash placement capacity (27 years x 786,000m^3/year), assuming no increase in ash re-use (ash re-use is discussed in Section 2.2).

If the proposed 2,000 MW Mt Piper Extension were to be built as a coal fired generation plant, this additional coal fired generation at Mt Piper could produce up to an additional 1.32 million m^3 of ash per year, or a combined total of approximately 2.1 million m^3/year. **Table 2-2** outlines the predicted ash production rates based on the existing plant operation and the additional units of Mt Piper Extension. The total predicted total ash generation for the existing power station from 2015 and the additional coal fired units for the first approximately 30 years of its operation is approximately 63 million m^3.

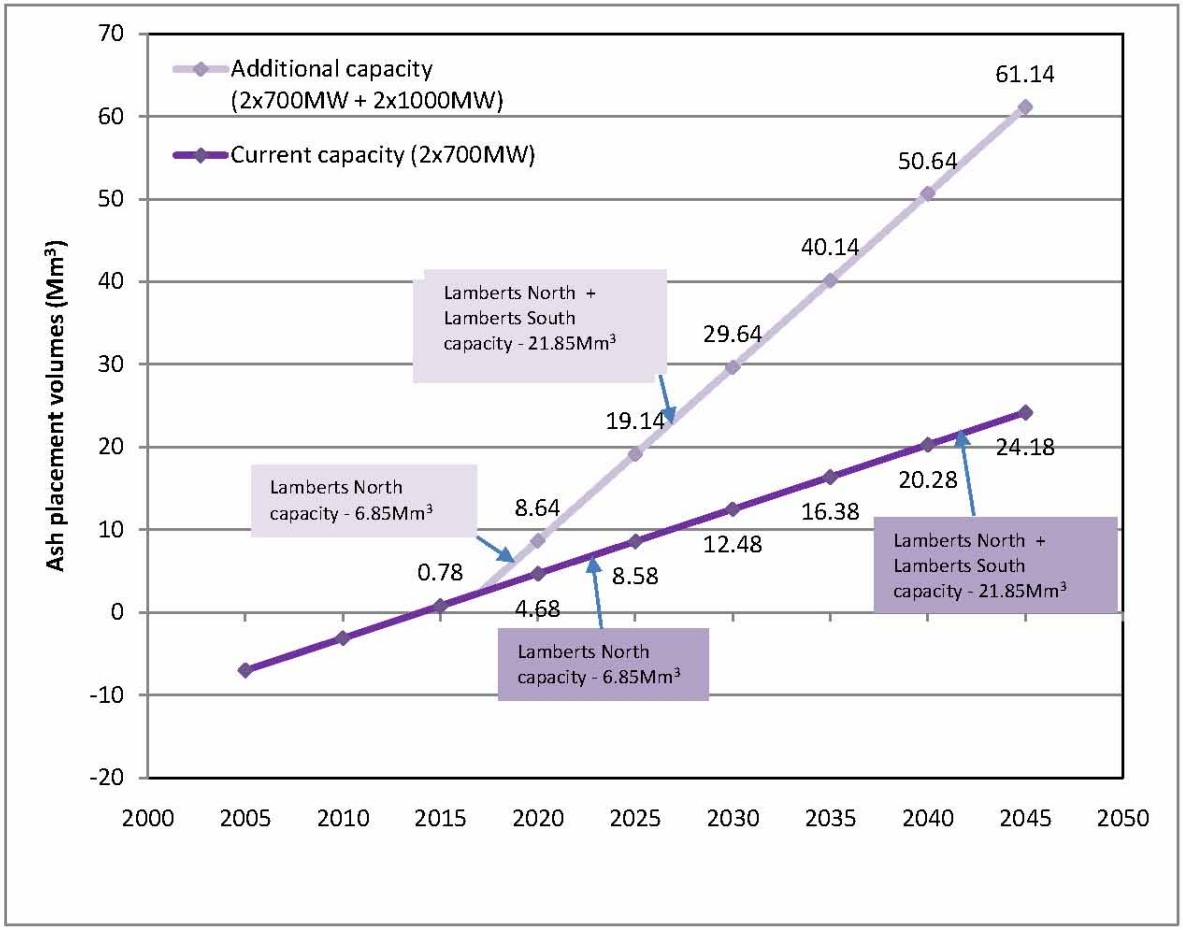
Table 2-2 – Predicted ash production at Mt Piper

Mt Piper Units 1 & 2 plus Mt Piper extension (2 x 700 MW + 2 x 1000 MW)	
Coal consumption	Average 10.4 Mt/a (28,500 t.p.d)
Ash production rate	Coal ash fraction (air-dried basis) 25.5% wt.
Ash production volume	2,500,000 tonnes per year
Ash split	Fly ash 85-90% (2.13Mt/a), Bottom ash 10-15% (0.25Mt/a)
Ash reused	200,000 tonnes per annum
Ash required for placement	2,300,000 tonnes per annum or 2,100,000m^3/a

Figure 2-1 illustrates the predicted ash volumes for operation of Mt Piper based on current generation capacity and the additional 2,000MW of capacity. For the purposes of this assessment it is assumed that the Mt Piper Extension project would begin operation from 2016/2017. This assumes the need for a project approval over 1-2 years and a construction period of about 5 years.

As with the existing ash placement area (Area 1), there will be a need for co-placement of brine with fly ash to allow for disposal of the brine product from the water treatment plant and a reduction in the demand for fresh water for ash conditioning. It should be noted that the amount of brine co-disposal will be contingent on water treatment at Mt Piper 1 and 2, Wallerawang and possibly Mt Piper Extension.

Figure 2-1 – Predicted ash volumes for current and additional Mt Piper generating capacities



Note: Predicted capacities at Lamberts South and Lamberts North are discussed in Chapter 3 – Project Description

2.1.4. Selection of Ash Placement Locations

Potential Sites

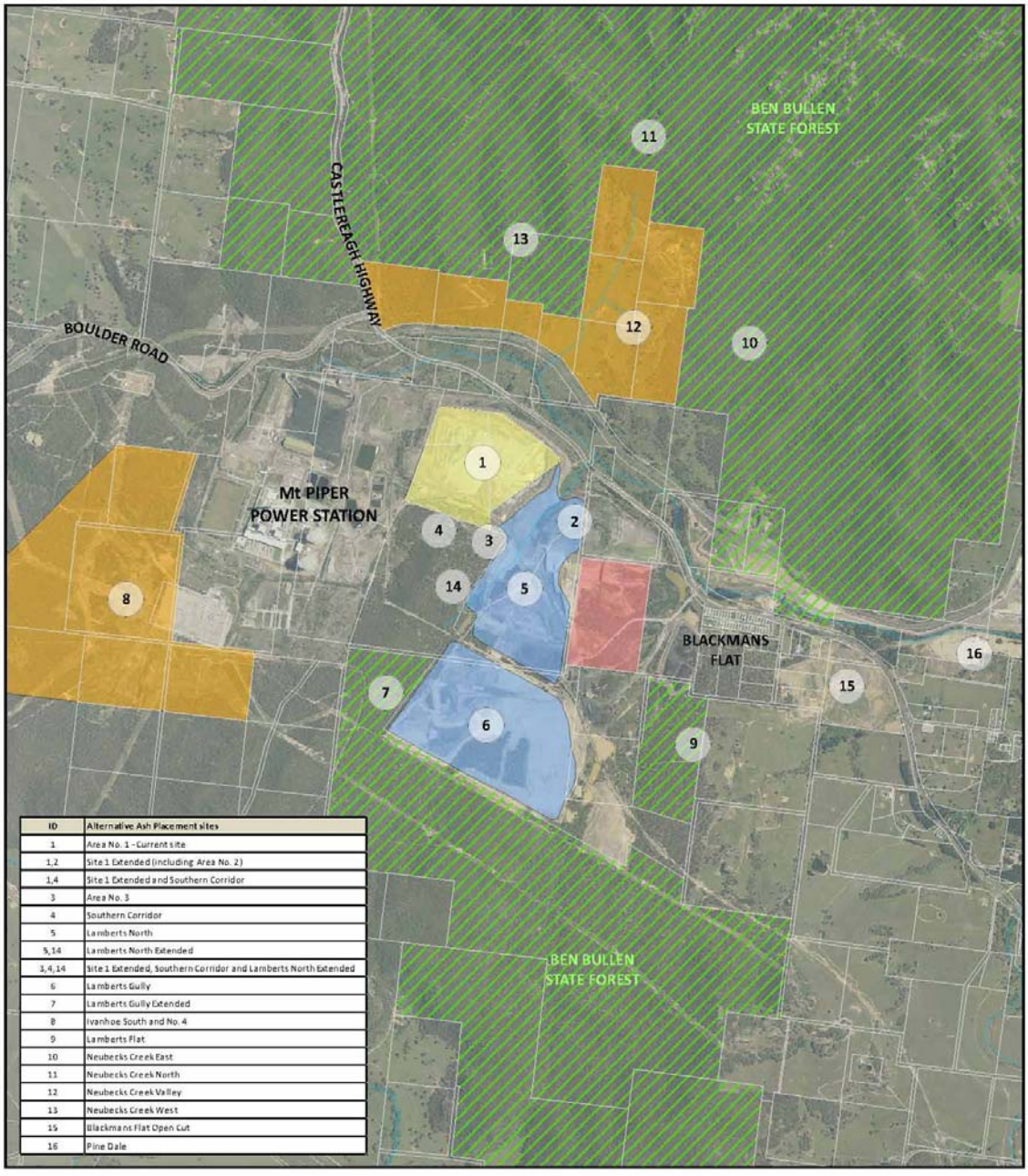
In 2006 Delta undertook a feasibility and site selection study in which potential ash placement sites were selected to be assessed and evaluated. In total, 25 potential ash placement sites were identified in the surrounding area located up to 13km from the power station. The study also allowed for consideration of potential expansion of the generating capacity of Mt Piper. Ash placement schemes were considered for two scenarios – the current generation capacity for units 1 and 2 and also the addition of a further 2000 MW of coal fired generation capacity. The volume of storage required and the probable area available at each of the sites indicated the need for multiple storage sites.

In the original potential ash storage site study, 25 potential sites were assessed. These are listed in **Table 2-3.**

Table 2-3 Potential Ash Storage Sites

Site	Identifier	Site	Identifier
Existing Area 1	1	Lamberts North Extended	14
Area 2	2	Blackmans Flat Open Cut	15
Area 3	3	Pine Dale Coal Mine	16
Southern Corridor - Site 1 Extended	4		
Lamberts North	5	Kerosene Vale Open Cut	17
Lamberts Gully (Lamberts South)	6	Baal Bone Open Cut	18
Lamberts Gully Extended	7	Cullen Valley Open Cut	19
Ivanhoe South (Ivanhoe No. 4)	8	Extension	20
Lamberts Flat	9	Pit West Open Cut	21
Neubecks Creek East	10	Invincible Open Cut	22
Neubecks Creek North	11	Renown East open Cut	23
Neubecks Creek Valley	12	Pit Top Open Cut	24
Neubecks Creek West	13	Ivanhoe North Open Cut	25

Sites 1-16 are shown according to their identifiers in **Figure 2-2**. Other sites listed were outside the area of the map. All sites generally comprise former coal extraction sites or areas proposed or under consideration for coal extraction. An assessment of each site was undertaken considering the potential volume available at each site, planning and operational issues and environmental and social impacts. As a means of ranking the identified sites, a Triple Bottom Line Assessment (TBL) was used to assess a variety of options against multiple criteria.



ID	Alternative Ash Placement sites
1	Area No. 1 - Current site
1,2	Site 1 Extended (including Area No. 2)
1,4	Site 1 Extended and Southern Corridor
3	Area No. 3
4	Southern Corridor
5	Lamberts North
5,14	Lamberts North Extended
1,4,14	Site 1 Extended, Southern Corridor and Lamberts North Extended
6	Lamberts Gully
7	Lamberts Gully Extended
8	Ivanhoe South and No. 4
9	Lamberts Flat
10	Neubecks Creek East
11	Neubecks Creek North
12	Neubecks Creek Valley
13	Neubecks Creek West
15	Blackmans Flat Open Cut
16	Pine Dale

LEGEND

Cadastre | State forest | (2) Alternative Ash Placement sites

Project approval areas | Concept approval areas | Ash area 1 | Council landfill site

0 1,000
Metres

Fig 2-2 Alternative Ash Placement Sites

Throughout the process a number of assumptions and observations were noted including:

- The sites closer to the power station were ranked more highly due to proximity and therefore minimising the need of transporting ash across, or on public roads and the added benefit a reduction in transportation costs;
- Many of the sites further from the power station site had smaller storage capacities as they were generally on smaller sites;
- Backfilling of underground workings was generally not considered practical due to the limited available space and excessive placement costs, and possible groundwater management issues;
- It was considered there would be minimal environmental disturbance at areas with prior disturbance by open cut mining.

Based on the recommendations of that feasibility study, Delta selected four sites (as shown in **Figure 2-3**) within the defined investigation areas, these being Lamberts North, Lamberts South, Neubecks Creek and Ivanhoe No. 4, for further consideration. The feasibility and site selection study found that, compared with the other options, the four preferred sites would:

- Optimise the economic costs and benefits;
- Enable the placement of ash within land owned by Delta Electricity or Centennial Coal;
- Enable the ash to be placed in areas that are either currently subject to open cut mining or intended for coal extraction;
- Enable the ash to be transported via conveyor or private haul roads and minimise the requirement to utilise public roads; and
- Minimise undesirable environmental and social impacts in already developed areas.

Sites that were not chosen for further study were generally further away from the Mt Piper Power Station site, requiring the construction of additional infrastructure and had limited storage capacity due to being small sites.

Primary Sites

Lamberts North and Lamberts South were regarded as the first priority (with project approval being sought) as they would be available by 2015 and are the closest, forming a logical extension of the existing Area 1. These sites also involve minimum cost and minimal environmental disturbance. They are currently being mined for coal and the mining would be completed before 2015, so the sites would be ready for ash placement when required. The total area available at the two sites would be about 21.85 million m^3. This would provide storage capacity for Mt Piper Units 1 and 2 until 2042-2045 and or for Mt Piper Units 1 and 2 plus Mt Piper Extension until 2026.

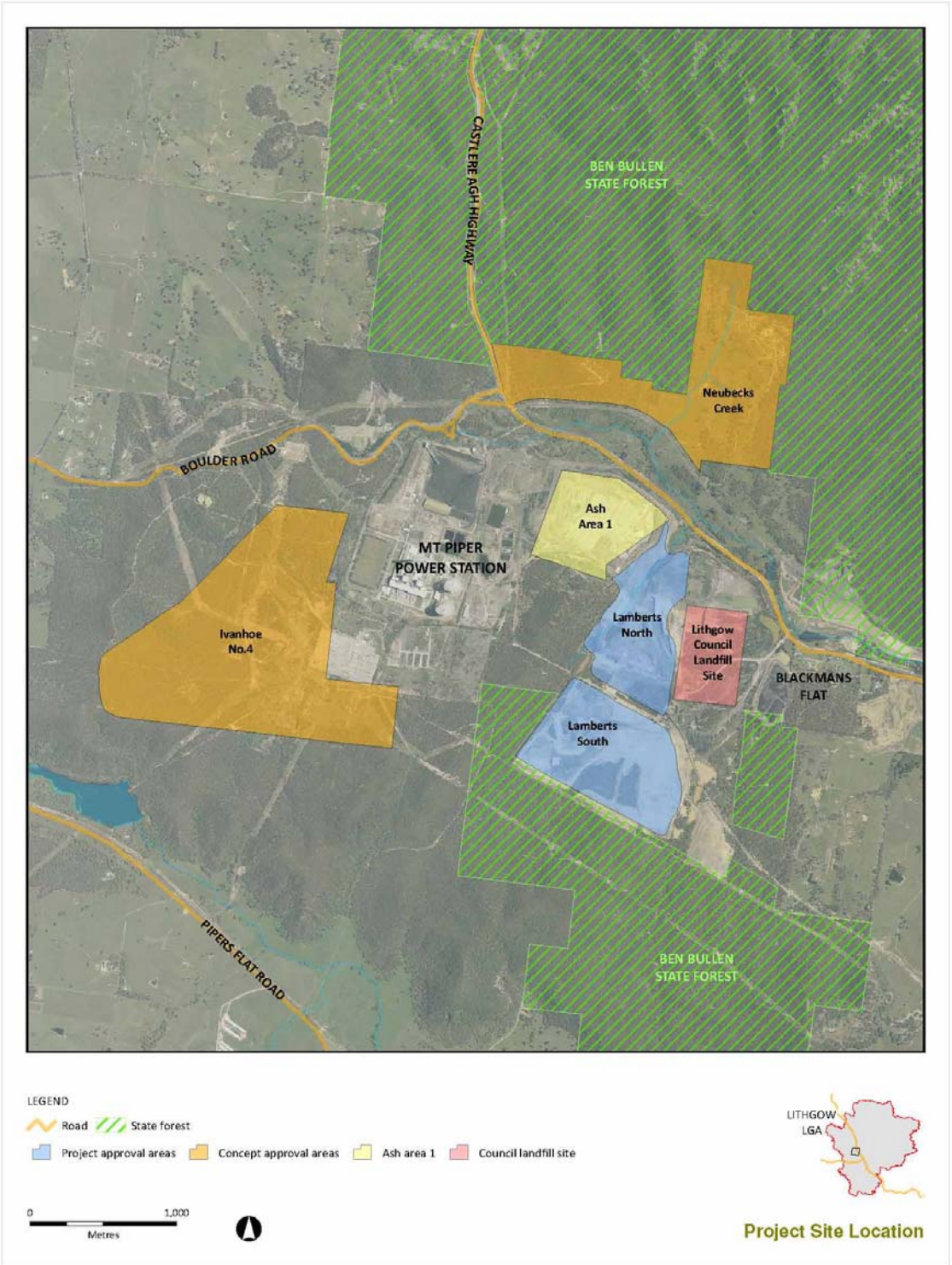


Figure 2-3 – Selected Ash Placement Sites

These volumes have been calculated assuming the ability to fill the area between the existing Area 1 and Lamberts North. This area comprises a drainage area known as the Eastern Drain or Huon Creek (it is in fact a drain or gully and for the purposes of this report will be called Huon Gully) to provide extra capacity for ash placement in a manner which would allow for logical, sequenced deposition of ash between Area 1 and Lamberts North[2]. The use of this drainage area for ash storage and provision of subsurface drainage (in the manner proposed in Chapter 3) would allow the ash storage areas to extend over the current channel providing extra capacity for the site. Without this assumption the volumes available would be reduced by 2.1 million m^3, representing about 3 years of storage for Mt Piper 1&2 or approximately 1.5 years of storage for Mt Piper 1&2 plus Mt Piper Extension.

Similarly, an area of Lamberts South is not being mined as it is not within the existing mine plan being implemented by Centennial Coal, due to high strip ratios and associated costs. This area would need to be used for ash placement as without it the area available to be filled would be reduced significantly by about 6.2 million m^3. This represents about 8 years of storage for the operation of Mt Piper 1&2 or about 3 years of storage for the operation of Mt Piper 1&2 plus Mt Piper Extension.

In both cases the loss of these areas for ash placement would result in a significant reduction in the longevity of these primary ash storage areas and would bring forward the need for the secondary sites (Neubecks Creek and Ivanhoe No.4).

Secondary Sites

Longer term sites for development were regarded as Neubecks Creek and Ivanhoe No 4. Although some mining activity has been undertaken at these sites in the past, there is a possibility of more extensive mining in these areas as there is still a considerable coal resource present.

Concept approval only is being sought for these sites as it is important to identify and plan for longer term storage areas. Whether these sites proceed and project approval is sought in the future would depend on whether Mt Piper Extension is constructed as a coal fired plant. If Mt Piper Extension does not proceed as a coal fired plant it is likely that Lamberts North and Lamberts South would provide adequate ash storage for the life of the existing Mt Piper Power Station.

The volume of ash storage available at Neubecks Creek is estimated at 12.9 million m^3 while Ivanhoe No. 4 has approximately 6 million m^3 available, and the total area available at the two sites is therefore estimated at approximately 19 million m^3. The estimated volumes are based on current geometrical data but this does not allow for loss in volume due to the final shaping of the storage areas.

[2] The status of this area as a creek or drainage channel is discussed in Chapter 3- Project Description and Chapter 7 – Water Management

2.2. Ash Reuse and Recycling

Ash from power generation activities can be beneficially reused for cement making, horticultural purposes, soil stabilisation, engineered fill and road bases, aggregates and geopolymers and zeolite production, subject to the quality of the ash produced. Opportunities for re-use are described in **Table 2-4**.

Delta will continue to investigate the reuse of the ash by-product of its power generating activities in each of the potential reuse areas. Through a process of supporting research and participating in market research and development, Delta has been working to stimulate interest in this co-product. Delta is a member on the board of the Ash Development Association of Australia (ADAA) and the Cooperative Research Centre for Coal in Sustainable Development (CCSD).

The ADAA strives to market ash for a broad range of uses and the CCSD is focussed on strengthening the collaborative links between industry, research organisations and government agencies.

As noted in **Table 2-4,** Delta (Mt Piper) currently sells approximately 200,000 tonnes per year of fly ash to the cement industry.

2.2.1. Use of Flyash

Flyash will continue to have a major role in the cement industry. The focus of the flyash re-use strategy is to be where the greatest potential impacts exist. The road base market has large potential as general purpose cement rather than as a structural item, while geopolymers have great potential for GP concrete.

There are many “niche” opportunities which are available in the cement industry. The exploiting of these opportunities depends on how Delta is positioned to gain advantage when the opportunities arise. This requires Delta to have detailed data at hand that can demonstrate relevance to the particular end user needs, so that these opportunities may exploited in a timely manner.

Delta has employed a firm with expertise in selling products that do not have a 'normal' use. This firm has been charged to identify opportunities for the re-use of flyash so that market opportunities may expanded and maximise the re-use of flyash.

Table 2-4 Reuse opportunities for ash

Reuse	Opportunities
Cement	Dry un-conditioned ash can be used in cement. Australian Standards for premix concrete allow for up to 40% of Portland cement to be replaced with fly ash .Delta (Mt Piper) currently on sells 18% or 200,000 tonnes of fly ash each year to the cement industry. Generally the market for cementitious reuse of ash is constrained by market forces and the geographical location of Mt Piper and generally limits the reuse of ash for this purpose.
Horticulture	Owing to the dominance of silt sized particles and porous nature of the components in fly ash, addition of the fly ash to soils may help to increase the water holding capacity and modify the permeability of otherwise unfavourable soils. Recent regulatory restrictions on the use of fly ash in horticultural applications have seen a significant drop in horticultural opportunities, although the ADAA has negotiated an exemption from the regulation to allow ash from Western Stations to be utilised in the field.
Soil stabilisation, engineered road fills and road bases.	Fly ash may also be added to otherwise well-sorted (poorly graded) sandy soils to fill void spaces increasing the overall density and aiding in compaction. In some cases the self cementing properties of the ash may actually help to bind the soils. Such stabilisation increases the capacity of the soil to support roads (Road Base) and maintain the soils stability for the lifetime of the structure. The fly ash and soil may be compacted into layers (structured fills), or in a mixture of fly ash soil water and Portland cement for flow able fills. Delta actively supports programs to test the properties of fly ash in these areas.
Aggregates and geopolymers	Coarse (Gravel sized) and fine (sand sized) aggregates for concrete and other applications can be produced, from fly ash, by partially or completely melting the ash. Alternatively, aggregates can be produced by binding ash particles into larger masses with a cementing agent. Delta in concert with the ADAA is actively researching both applications and methods for this process.
Zeolites	The abundant aluminosilicate glass component of the fly ash provides a potential raw material for zeolite synthesis. Zeolites are used in control release fertilisers, soil conditioners and ion exchange media, detergent builders, pesticide carriers and animal dietary supplements. There is little research being done in this area due to the high inherent costs and the location of 'normal' fertiliser production facilities.
Backfilling and landfill	A number of reviews and trials have been carried out by Delta to measure the effectiveness of fly ash in open cut voids and as a pumped medium in underground mine workings. Results of these trials are positive and Delta feels that these properties will lead to greater usage in the future.
Bottom Ash Use	Bottom ash can be used as part of stability berms and other site stability structures to minimise the need to use naturally extracted materials. Ongoing reviews and research into this type of application for large dams and civil structures is ongoing through the ADAA. Delta will continue to review opportunities to use bottom ash within site works and with third parties to minimise demand on natural resources and in an attempt to extend the life of any development resulting from this application.

2.2.2. Management Options

Delta Electricity has recently developed its ash reuse strategy further. The plan provides details of short, medium and long term goals for making utilisation or reuse of ash more achievable.

Key issues that are seen as impeding ash reuse currently are:

- Structure of agreements/contracts for taking ash;
- The structure of the existing plant to suit the purpose of easily removing ash;
- Logistical issues with getting ash from distant power stations to centralised markets;
- Consistency issues with ash dependent on certain critical operational factors.

To overcome or, at least minimise the impact of these items Delta's strategy is:

Short Term

- A simplified agreement document is being proposed for companies that wish to send a truck to site to collect ash. A legal review is currently underway;
- Delta is proposing to join research which is both relevant and timely within fleeting market opportunities -
  - CSRP through CURTIN University - researching Geopolymers
  - Research review through University of Wollongong - Researching early life strength issues in high ash concretes;
- Delta has joined the DECCW's Sustainability advantage to gain support and networking opportunities;
- Delta is currently considering joining the Waste Management Association of Australia for connection to potential opportunities.

Medium Term

- Delta will retain membership of the Ash Development Association of Australia (ADAA);
- Delta has entered into discussions with regulators with regard to impacts of ash reuse opportunities;
- Delta has contracted a marketing firm (DMC Advisory) to set up a marketing plan and strategy document for various applications;
- As part of marketing plan same firm is reviewing critical ash properties that make ash usable. From this a 'model' of affecting operational parameters is being designed so that consistency and marketability can be maintained within production constraints.

Long Term

- Delta is assessing the viability of changing the logistical profile of ash markets by supporting alternative transport options such as rail;
- Delta is supporting end users and potential end users on an ongoing basis.

2.3. Consequence of Not Proceeding

The "do nothing" option involves the discontinuing of ash placement once the existing Area 1 is filled. As discussed in previous sections, the removal of ash is critical to the long-term ongoing operation of Mt Piper Power Station. In order to maintain existing power station operations, ash needs to be either provided for beneficial reuse purposes and/or stored, possibly for re-use at a later date. Based on planned operations, the present ash placement area is expected to reach capacity by around 2015, well before the existing station reaches the end of its economic life. Therefore, failure to find new storage sites prior to this time could potentially result in reduced operation or closure of the power station as it is not feasible to secure full re-use over this period nor in the foreseeable future.

Currently, NSW has reserve capacity to meet both peak and base-load electricity demands. However, it is possible that NSW will experience a reserve deficit and reliability of supply may be compromised in the near future unless existing capacity is maintained and additional capacity is brought to the market.

Closure of Mt Piper Power Station from about 2015 if additional ash placement areas are not available would most probably result in an increase in the wholesale price of electricity due to demand-supply imbalance. It would also lead to an increase in the NSW CO_2 coefficient as Mt Piper is one of the most thermally efficient coal fired power stations in NSW.

Closure of the power station could also have flow-on negative social and economic impacts as the Mt Piper Power Station provides direct employment opportunities and economic opportunities to the region.

In summary, the "do nothing" option may result in interruptions to the power supply and have serious social, economic and environmental impacts.

Mt Piper Power Station
Ash Placement Project

ENVIRONMENTAL ASSESSMENT

CHAPTER 3 – PROJECT DESCRIPTION

August 2010

Contents

3. Project Description

This chapter provides a detailed description of the project. It addresses the Director General's requirements, including:

- *Construction, operation and rehabilitation details including a timeline for construction works and the operating sequence of the project;*
- *The general location of the components relevant to the concept plan and the detailed location and dimensions of all those components relevant to the project application including construction compounds and access roads;*
- *The finished profiles of the sites, including maximum height and treatment details.*

3.1. Project Overview

The proposal comprises Concept and Project Approval for the development as ash storage sites of the previously mined areas referred to as Lamberts North and Lamberts South and Concept Approval for sites known as Neubecks Creek and Ivanhoe No 4 (refer **Figure 1-2).** The proposal for each Project Approval area is as follows:

- **Lamberts North:** Extension of the existing Area 1 into the Lamberts North area, with construction of a capped ash emplacement facility. The ash emplacement would be constructed with typically 1(V):4(H) side slopes, with approximately 10 m wide benches constructed for each 10 metre vertical height. The finished surface of Lamberts North would vary from RL966 to RL980 m AHD, with the exposed ash areas progressively capped as areas reach their design elevations. The available volume for ash placement in Lamberts North has been estimated at approximately 6,850,000 cubic metres (in-situ volume) based on the design footprint of 43 hectares;
- **Lamberts South:** Lamberts South area is located immediately to the south of the Lamberts North Area, and would be constructed to similar geometry as Lamberts North. The finished surface of Lamberts South would be RL1000 m AHD. The available volume for ash placement in Lamberts South is approximately 15,000,000 cubic metres (in-situ volume) based on the design footprint of 61 hectares.

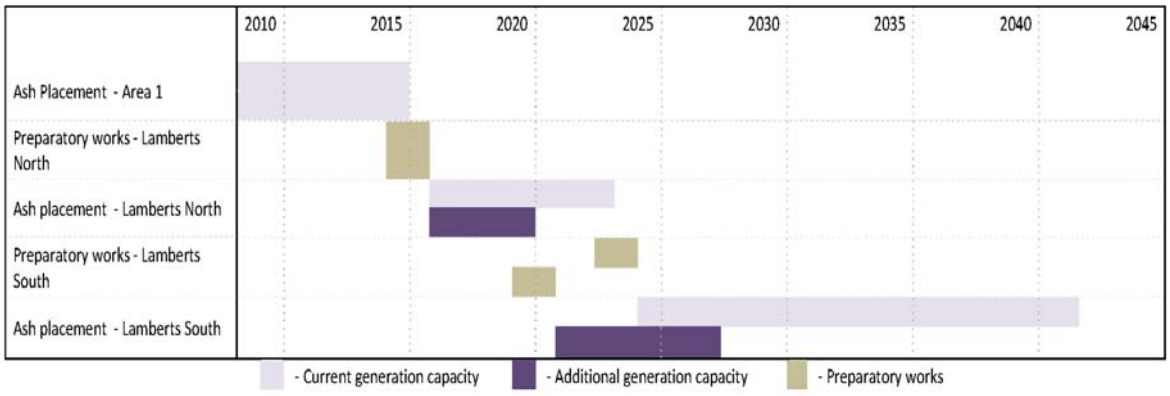
The timeline for the placement of ash in the Lamberts North and South is provided on **Figure 3-1**, and has been estimated based on the following predicted annual ash production rates:

- Current generation capacity of Mt Piper Units 1 and 2 of 1,400 MW = 0.75 Mm^3/annum (based on 1.2 tonnes ash /m^3); and
- Current generation capacity of Mt Piper Units 1 and 2 and the proposed additional capacity of the proposed Mt Piper Extension of 2,000 MW (should it be coal fired), give a total of 3,400 MW which is equivalent to 2.1 Mm^3/annum based on 1.2 tonnes ash /m^3.

The staging for ash placement would include the completion of Area 1 and preparation works for Lamberts North followed by the progressive filling of Lamberts North. Nearing completion of Lamberts North, preparation and then filling of Lamberts South would commence.

Concept approval is also being sought for additional ash disposal sites at Neubecks Creek and Ivanhoe No 4. These areas would only be considered for ash placement when space is no longer available at Lamberts North and South and it is likely they would only be required should the Mt Piper extension project proceed as a coal fired plant. Further discussion on the potential development of these sites can be found in Section 3.3.9 and Section 3.4.8.

Figure 3-1 – Proposed timeline of construction and operational activities



3.2. Site Location and History

3.2.1. Site Location

The project investigation area is located in the Central West region of NSW, approximately 17 km north-west of Lithgow in close proximity to the existing Mt Piper Power Station. The land proposed for the project is predominantly located on the current workings of the Centennial Coal operated Lamberts Gully Mine on land owned by either Delta Electricity or Centennial Coal.

The nearest townships to the proposal are:

- Portland, approximately 1.5 km to the west of Ivanhoe No. 4 site and 4 km from the western boundary of the proposed Lamberts North and Lamberts South sites;
- Blackmans Flat, approximately 1 km from the eastern boundary of the proposed Lamberts North site;
- Lidsdale, approximately 3.5 km to the south-east of the eastern boundary of the proposed Lamberts South site;
- Wallerawang, approximately 4km southeast of the eastern boundary of the proposed Lamberts South site.

The project sites are surrounded predominantly by State forests (Ben Bullen State Forest located north east and south east of Mt Piper Power Station), coal mines and power generation facilities (Wallerawang Power Station is located to the south-east).

The concept approval sites (Neubecks Creek and Ivanhoe No. 4) are previously disturbed (by mining) sites with some woodland / open forest and are surrounded by undulating topography. The project approval sites (Lamberts North and Lamberts South) are highly disturbed as they are currently the site of open-cut mining activities.

Delta is currently undertaking negotiations with Centennial coal regarding the transfer of ownership of parcels of land which will be required for ash placement. This transfer includes outright purchase of lands required for planned initial placement and controlled options for progressive transfer as mining activities are concluded. Ownership of specified areas including the mines washery will remain with the mining company for the foreseeable future.

3.2.2. Site History

The Lamberts Gully area, which broadly covers both Lamberts North and Lamberts South, lies within the former Western Main Colliery holding, which occupies the land immediately east of the power station. This mining lease is now held by Centennial Coal. Since the 1940s the Lithgow Seam here has been worked by shallow underground bord and pillar methods and subsequently by open cut, the latter being generally ‘roof lifting’ exercises to extract pillar remnants. Open cut mining has generally focussed on removing the remnants of the Lithgow seam and extracting from the Lidsdale seam. The most extensive period of open cut mining occurred between 1992 and 1998 (HLA-Envirosciences, 2005). Underground mining ceased in the 1990s and open pit extraction in Lamberts Gulley is due to be completed by 2011/2012.

The bord-and-pillar method of mining formerly employed at Western Main involved driving a network of tunnels (‘roadways’) in the seam to outline coal pillars, which may later be wholly or partly extracted by splitting or skirting. The initial stage is referred to as First Working and does not result in subsidence, but it does leave large open voids (the access tunnels and bords or ‘rooms’). Pillar extraction (Second Working) does cause subsidence and severe surface disturbance

over shallow working areas, at depths less than 30m (as is the case here). The degree of surface subsidence and the sizes of voids left depends, therefore, on the extent of First and Second Workings at the time of underground mine closure.

Superimposed on this are the effects of subsequent open cut mining, where old pillars and unmined ('solid') coal are removed in areas of thin overburden. Although detailed plans of the former Western Main and Lamberts Gully workings have not been provided, their present condition is most likely to be an extremely irregular pattern of:

- Open voids in old access tunnels and in the shadow of pillar remnants. Some weaker pillar remnants ('stooks') have probably been crushed since the mine was abandoned, but further failures could continue for decades;
- Collapsed and poorly consolidated roof strata ('goaf') filling the larger mined-out underground cavities. Similar but slightly more compact spoil has been dumped in former open cuts;
- Varying degrees of subsidence and blast induced fracturing in roof strata, in pillar-supported areas;
- Flooding in lower workings, generally down-dip and towards the eastern side of the mine holding. It should be noted that this water level may rise rapidly after heavy rain, such that the area of flooded workings within the Lithgow Seam may vary.

The existing drainage arrangements at the Lamberts Gulley mine site are shown in **Figure 3-2**. The area known generally as Huon Gully or Creek is a drainage gully between the existing Ash Area 1 and the Lamberts North part of the Lamberts Gully mine. It receives drainage from elevation of RL 1050m AHD to the west and south west of the mine and generally flows over the terrain to the north east. It may have formed from the creek known as Lamberts Creek (as per CMA Topographic Map 8931, 1973) which drained through the former Western Main lease site to Neubecks Creek. The drainage alignment has changed significantly due to coal operations in the area and it is not clear if the Huon drainage gully formed part of the original creek alignment. There is no surface connection between the Huon Creek drainage gully and Neubecks Creek.

The second drainage alignment (known as Lamberts Gully) is located on the eastern side of the Lamberts Gully mine site. It may represent the original Lamberts Creek and joins Neubecks Creek downstream of the proposed ash placement areas.

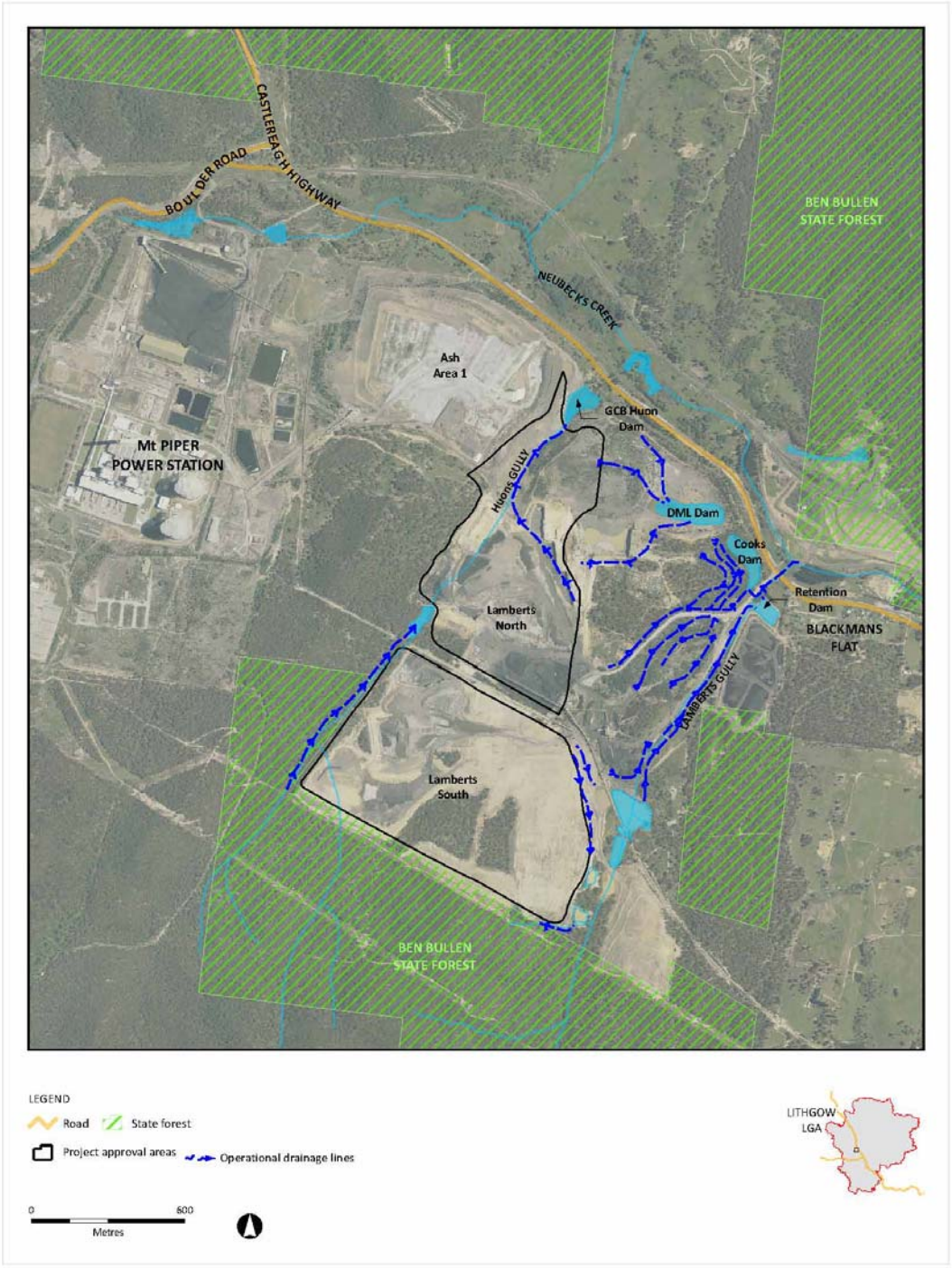


Figure 3-2 Lamberts Gully Sites – Current Layout

3.2.3. Power Generation

The Mt Piper Power Station was constructed on part of the former Western Main Colliery. Approval for the development was sought in 1980 and received in 1981. The existing Mt Piper Power Station was commissioned in stages over 1992 and 1993, comprising two 660 MW steam turbine generators (Units 1 and 2) which were recently upgraded to 700 MW. It was originally intended to construct four 660 MW generators on the site, but the third and fourth units were not built. Some preliminary earthworks were undertaken, however, and space was left for the possible construction of further power generation units.

At the time of the original approval the ash was intended to be "wet storage" in an ash dam in the area of the Neubecks Creek site east of the Castlereagh Highway. In 1990, a subsequent consent was obtained from Lithgow Council for the current dry ash storage and method of placement in part of the former open cut mining site east of the power station site, west of Castlereagh Highway, now known as Area 1.

3.2.4. Other Land Uses

In 2005, Lithgow City Council (LCC) sought approval to develop the Blackmans Flat Waste Management Facility on a parcel of land adjacent to the current Lamberts Gully mine site utilising a mine void located in the area. The development would include the establishment of the Waste Management Facility including the preparation of the mine void for landfilling and construction of a waste transfer and recycling facility and weighbridge. Land parcels in the proposed landfill area were previously unreserved Crown land and are currently owned by Centennial and part of the current negotiations for transfer to Delta upon extinguishment of the mining lease. Transfer of this land to LCC is expected, subject to satisfactory completion of agreements between Centennial and Delta.

3.3. Construction of the Ash Storage Sites

This section provides a detailed description of the works needed to establish the sites to receive ash from the power station.

3.3.1. Overview

As previously outlined in Section 3.2.2, the Lamberts North and Lamberts South areas have been worked by shallow underground methods and more recently by open cut methods to extract pillar remnants across the site. Open cut mining activities in Lamberts North are basically complete with the Lamberts South area expected to be completed by 2011/12 upon which the site will be made available for ash storage.

At the completion of mining activities, remaining overburden materials excavated to extract coal will be placed back into excavations and/or remain in stockpiles, where materials can be later used in construction of earth banks, fill areas and for use as capping materials for the ash storage facility. Re-profiling of the landform will be necessary to re-establish surface water and drainage across the site and to prepare the area for future ash placement. Where areas are not programmed to receive ash for many years, maintenance such as stabilisation of quarry areas/benches may be necessary for safety/operational purposes, with temporary rehabilitation of stockpile and disturbed areas to control soil erosion until these areas are later required for ash placement. These construction and preparatory works would be required at various stages of the project, timed to allow continual placement of ash as outlined above. Construction and preparatory works prior to placement of ash are divided into the following general categories and are discussed in more detail in the following sections:

- Civil works in preparation of ash placement;
- Establishment of haul and access roads;
- Construction of surface drainage and adjustments of surface water and drainage systems as ash placement progresses; and
- Construction of sub-surface drainage.

3.3.2. Preparation of Lamberts North

Prior to completion of ash placement in Area 1 (Mt Piper's current ash placement area), the northern area of Lamberts North, immediately east of Area 1 would be prepared by:

- Clearing and grubbing of the proposed footprint area and re-grading/re-profiling of the Huon Creek to remove/relocate any existing stockpiles remaining from mining operations. Existing stockpiles of spoil and overburden would be made available for current capping activities of Area 1 with suitable materials also stockpiled for future capping of the areas;
- Extension of haul roads from Area 1 by the placement of fill to maintain road grades of less than 10%;
- Earth banks would be constructed around the boundary of the proposed Lithgow City Council landfill site to maintain site levels and to maintain surface drainage lines. Earth banks and bunding would also be incorporated into the surface water management of run-off from ash areas by the construction on containment bunds around the footprint;
- A subsurface rock drainage blanket (as described below in Section 3.3.7**)** would be installed in the invert of the gully.

The approximate extent of preparatory works for Lamberts North is as shown on **Figure 3-3a,b**.

3.3.3. Preparation of Lamberts South

Approximately 12 months in advance of the Lamberts North site reaching its ash placement capacity, site preparation works would commence in the Lambert's South site to make the area suitable for placement of ash. Proposed preparation works would include:

- Clearing and grubbing of the proposed footprint area and re-grading/re-profiling of the surface for placement of ash;
- Existing stockpiles of spoil and overburden would be made available for current capping activities of Lamberts North with suitable materials also stockpiled for future capping of this area;
- Extension of haul roads from Lamberts North by the placement of fill to maintain road grades of less than 10%;
- Earth banks would be constructed around the boundary to maintain site levels and to maintain surface drainage lines. Earth banks and bunding would also be incorporated into the surface water management of run-off from ash areas by the construction on containment bunds around the footprint.

The approximate extent of preparatory works for Lamberts South is as shown on **Figure 3-3c**.

3.3.4. Civil Preparatory works in preparation of ash placement

Civil preparatory works will be required to make the sites suitable for ash placement. These works are divided into the following general categories:

- Clearing and Grubbing: In advance of ash placement, areas designated for ash placement will be cleared of any vegetation and unsuitable founding materials. Clearing and grubbing would be undertaken using dozer and or excavators;
- Re-grading/re-profiling: Earthworks comprising relocation and rehabilitation of stockpiles and excavation areas remaining from previous mining activities and grading of base areas for placement of ash materials. This activity would require the grading of the site with dozers and/or graders and stockpiling and/or hauling of materials across the site to required surface levels;
- Earthworks and Fill Construction**:** As necessary, engineered soil banks would be constructed to assist in the containment and placement of ash to form the proposed profiles around boundary areas (i.e. Council Boundary Area) and also to assist with surface water diversion and containment across the site. Soil banks would be constructed from on-site soils and overburden materials disturbed during previous mining activities (site stockpiles or borrow areas), and placed in compacted layers to required design levels. Construction of these features would be undertaken by the hauling of suitable materials to proposed fill areas,

spreading in 200 to 500 mm loose thick layers with dozer and/or graders and compacting using pad foot and/or rubber tyred compaction equipment or dozer tracked (dependent or required fill density). Subsequent layers of fill would then be spread and compacted (as above) to achieve the required design levels. Indicative locations of starter banks and fill areas for both Lamberts North and South are shown on **Figures 3-3a,b,d**.

- Temporary Rehabilitation and Stockpile Remediation: Areas previously disturbed by mining activities would be maintained and remediated to control surface water flows and soil erosion by implementation of appropriate controls such as sedimentation ponds, surface water diversion and vegetation of disturbed areas. Where areas are not programmed to receive ash for many years, maintenance such as stabilisation of quarry areas/benches may be necessary for safety/operational purposes, with temporary rehabilitation of stockpile and disturbed areas to control soil erosion until these areas are later required for ash placement.

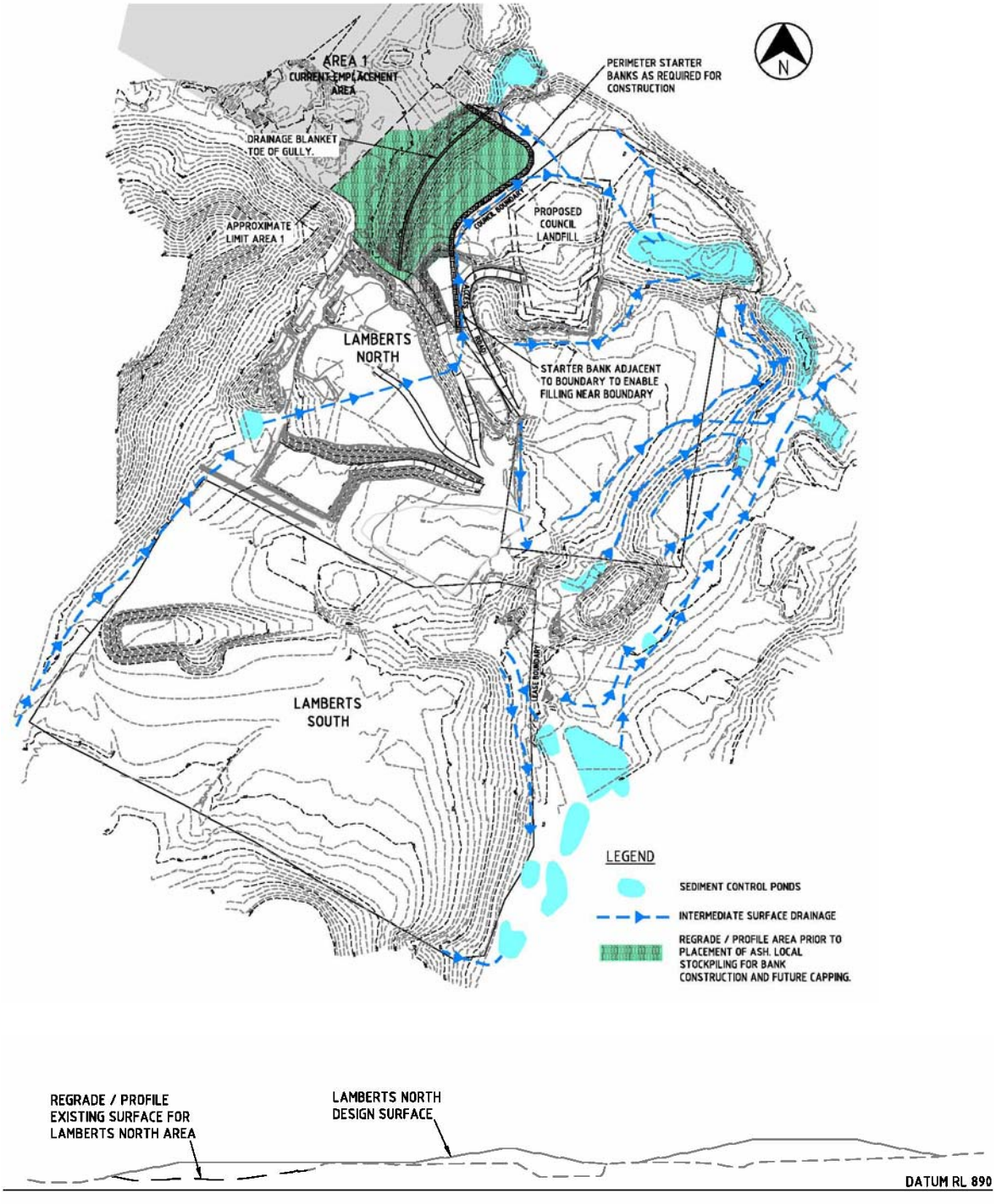
3.3.5. Access and haul roads

Access and haul roads would be created in the same manner as that undertaken for existing ash placement activities. Typically haul roads are in the order of 12 m wide or three times the width of the largest vehicle. Access and haul roads would be established progressively as ash placement continues to the face areas.

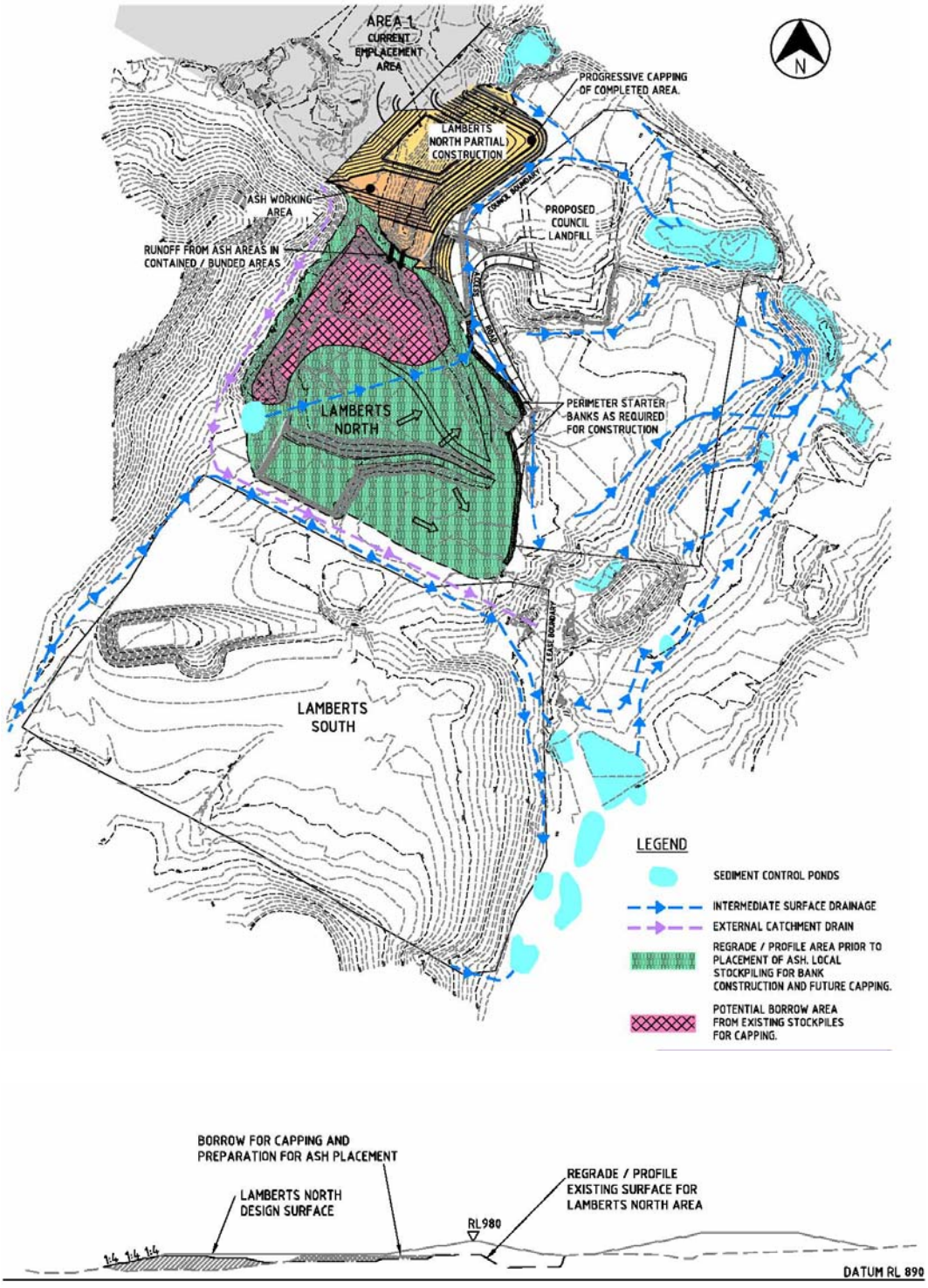
The existing haul road extends across the southern boundary of Ash Area 1. It is proposed to continue the existing haul road access from Area 1 for ash placement to provide access to Lamberts North, generally as shown on **Figure 3-3e**. The haul road would extend to the boundary of and across the Lamberts South site.

Consideration would be given to relocating/extending the existing ash conveyor from its current location near Area 1 to Lamberts North (Option 1) or to a site closer to Lamberts South (Option 2) to minimise the requirement for truck haulage across the site. Conveyor options are shown in **Figure 3-3e**. Conveyor Option 2 would follow the alignment of the existing coal conveyor between Springvale Mine and Mt Piper Power Station.

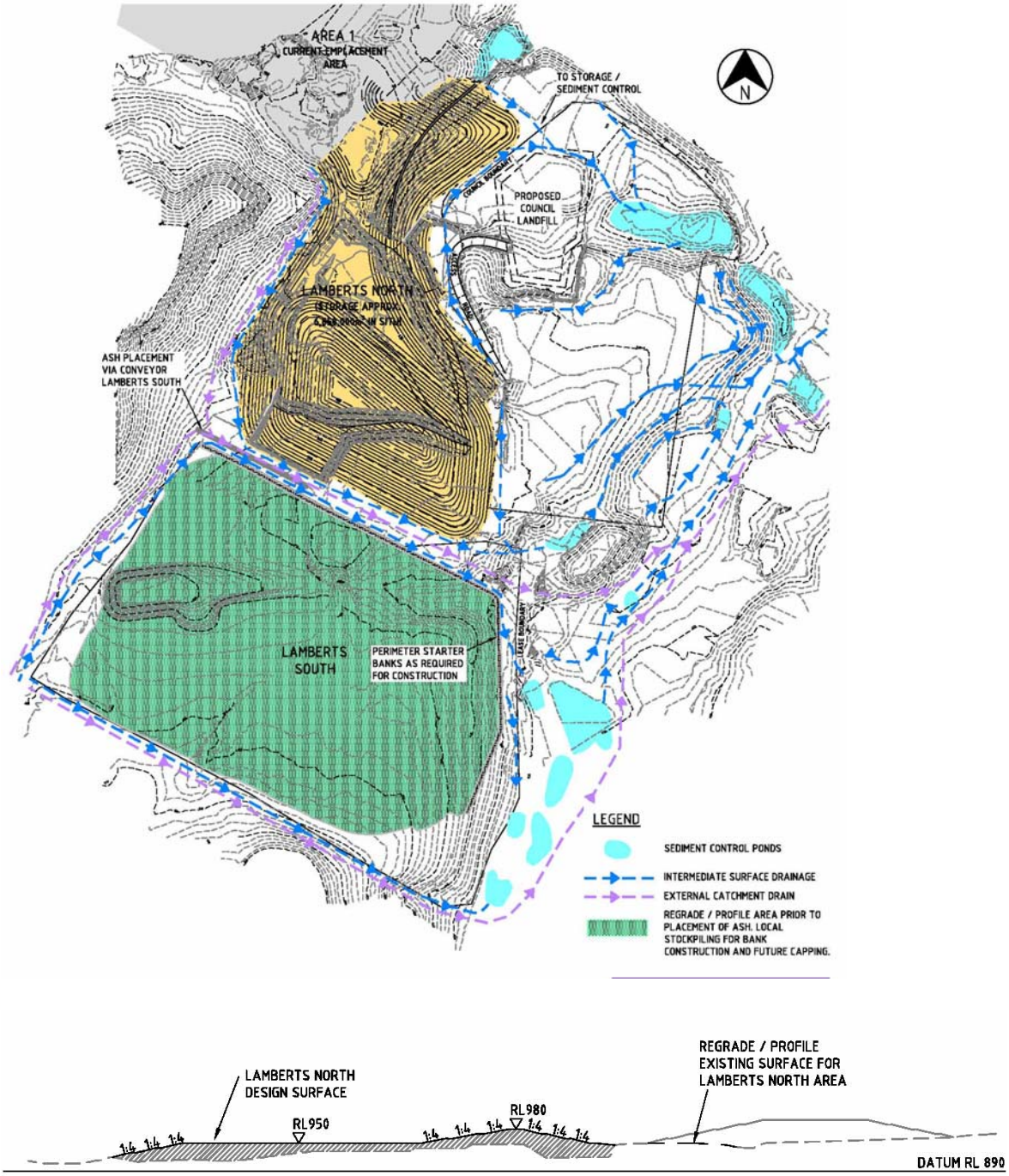
- **Figure 3-3a Lamberts North Site Preparation Works**



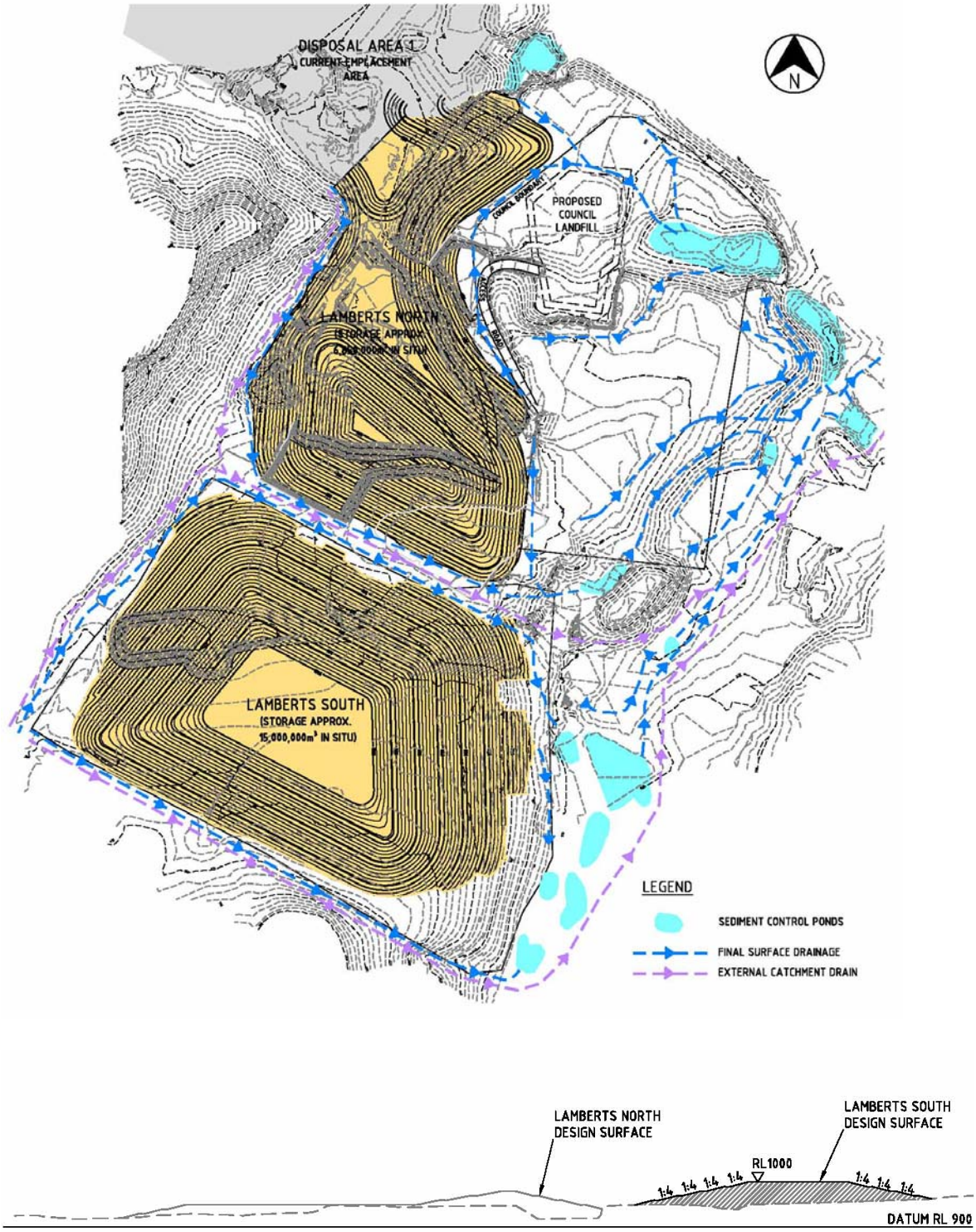
- **Figure 3-3b Lamberts North Partial Construction Stage and Site Preparation Works**



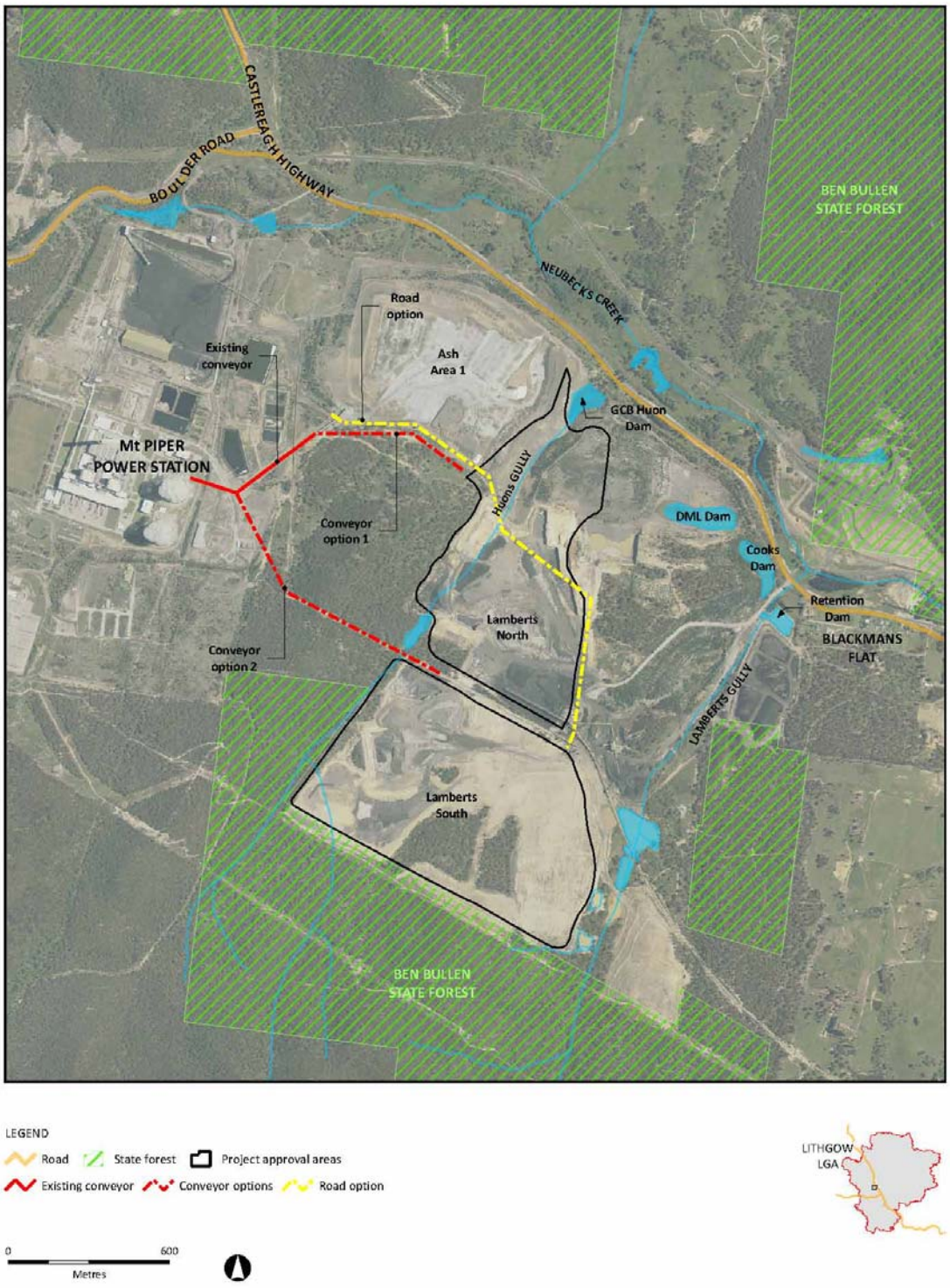
- **Figure 3-3c Lamberts North Layout Plan and Lamberts South Site Preparation Works**



- **Figure 3-3d Lamberts South Layout Plan**



- **Figure 3-3e Options for Conveyors and Road Haulage**



3.3.6. Construction of Surface Drainage Works

Surface water requires management on exposed ash and overburden material on permanent batters. In order to manage surface water run-off and prevent discharge into Neubecks Creek, it would be necessary to manage operational water use and surface water run-off on the site throughout the project. The surface water management would be staged during the construction of Lamberts North and Lamberts South based on the changing landform and drainage requirements as shown schematically on **Figures 3-3a,b,c**. A Water Management System would be developed for the facility with the following key principles:

- stormwater runoff from undisturbed areas surrounding the Project site would be diverted away from disturbed areas and released directly into adjacent waterways;
- design of any drainage systems operating for the life of the Project to ensure erosion minimised;
- staging ash placement to minimise the operational area exposed at any one time to reduce the potential for erosion;
- separation of sediment-containing stormwater from other sources of polluted water on the site such as the ash placement area;
- incorporating the reuse of contaminated stormwater into the overall water management strategy for the Project to meet the demands for rehabilitation and dust suppression; and
- minimisation of extent and duration of disturbed areas by implementing a progressive rehabilitation strategy including prompt stabilisation of landforms.

Rainfall runoff on the proposed ash placement facility will be managed by a series of sediment dams, water storages, a Dirty Water Storage Area and diversion drains. Water collected in the Dirty Water Storage Area will be used for rehabilitation and dust suppression. As the ash placement areas are progressively capped and rehabilitated, the runoff from these areas would be directed to sediment dams.

Sediment Dams

Sediment dams will be required to entrap soil and other particles eroded from rehabilitated areas due to rainfall runoff. There will be a number of sediment dams which accept the runoff from capped and rehabilitated areas of both the Lamberts North and Lamberts South.

The sediment dams will provide additional storage for water captured on site and water from the sedimentation dams will be used for rehabilitation and dust suppression. There will be no planned releases from the sediment dams to natural waterways off site. Overflows from any sedimentation dams will be collected in the Retention Dam.

The sedimentation dams will be designed in accordance with the guidelines from the NSW Department of Environment and Climate Change: *Managing Urban Stormwater, Soils and Construction, Volume 2E Mines and Quarries (2008).*

Dirty Water Storage Area

The Dirty Water Storage Area will be used to collect and store rainfall runoff from the active ash placement area. The excess runoff stored in this area will be used for rehabilitation and dust suppression as required. The Dirty Water storage area would move with the progression of the active ash placement area.

Water Storages

There is a number of existing water storages on project site which will be utilised as part of the Site Water Management System. The existing water storages would be used as part of the management system for sediment only contaminated runoff from the capped and rehabilitated areas of the proposed ash placement facility.

Diversion Drains

There is external catchment to the proposed ash placement facility, which is undisturbed land in the Ben Bullen State forest. Diversion drains would be included in the proposed ash placement areas to management clean water runoff from catchment external to the disturbed areas. The diversion drains would be designed to convey the 100 year ARI flood event from the external catchments.

3.3.7. Construction of Sub-Surface Drainage Works

Lamberts North and Lamberts South have previously been affected by underground and open cut mining activities. Until future landforms are re-established at these sites to intercept and divert clean water from rehabilitated areas of the site, a significant proportion of rainfall would be intersected via infiltration (through the loosely replaced overburden materials) and the interconnectivity of infiltration with underground voids at the interface with the base of previous mining activities. To control seepage, it is proposed to undertake site re-grading/re-profiling of the base/footprints of the ash placement facilities to divert and collect surface and subsurface water in the low lying areas to designated temporary storage areas. These works would require the grading of the site with dozers and or graders and stockpiling and/or hauling of materials across the site to designated stockpile areas.

Specific under drainage is also proposed in the Huons Gully drainage area. In this area, it is proposed to construct a rock drainage blanket along the invert of the current gully to collect subsurface flows that are expected to be perched above the Lithgow seam from surface water infiltration through the disturbed overburden and underground mining voids. Construction would comprise re-grading/re-profiling of the existing disturbed surface to maintain uniform drainage and cross-falls across the area to the lower storage dam as discussed above. The subsurface drainage

blanket would then be constructed in the invert of the gully by the placement of rock fill wrapped in geo-textile or graded filter material to reduce erosion of surrounding materials. Construction would be undertaken by the rolling out of the geo-textile across the footprint, with rock fill transported to the area via truck and dumped adjacent to the area. Rockfill would then be placed carefully in layers so as not to damage the geo-textile with an excavator (or similar). Once a cover layer of rock has been placed, rock fill can then be dumped and spread via dozer. Once rockfill has reached proposed design levels, the geo-textile is then wrapped over the completed rock drainage blanket and fill placed and compacted over the geo-textile as a protective layer prior to placement of ash.

Figure 3-4 outlines the proposed concept design of subsurface drainage of Huons Gully in the Lamberts North site.

3.3.8. Construction Hours, Workforce and Amenities

Preparation of the ash placement areas would be undertaken during the hours of 7am-6pm Monday to Friday and 7am – 1pm Saturdays. Construction activities would not occur on Sundays and public holidays.

The required workforce for construction and preparation activities is expected to peak at approximately 20 personnel for each stage of preparatory works.

The current workers' amenities (meal room as a demountable / chemical toilets) are located at the end of the conveyor and it is planned to move these as the ash placement areas are developed. If the conveyor were to be relocated to either of the options it would be the intent of the contractor to move the amenity facilities as well. There may also be a small fuel depot for the haulage vehicles. Any fuel depot would meet the requirements of AS1940-2004: *The Storage and handling of Flammable and Combustible Liquids* and the Dangerous Goods codes.

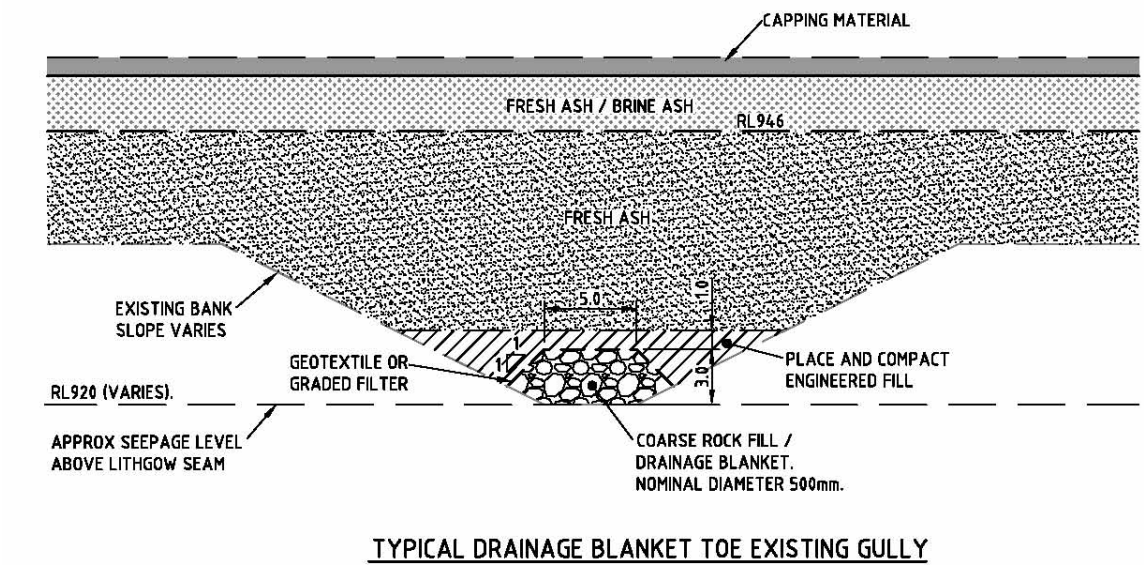
3.3.9. Construction at Neubecks Creek and Ivanhoe No 4 Locations

At this stage the detailed requirements for construction activities and the preparation of sites located in the Concept Approval areas (Neubecks Creek and Ivanhoe No 4) are not available. Ash placement within these sites would only be considered when it is clear that Lamberts North and Lamberts South will be filled. This is only likely to occur if Mt Piper Extension is constructed as a coal fired power station.

It is expected that the basic principles outlined in the sections above would also be applicable to the preparation of future sites. The general principles outlined above for construction preparation works would also apply to the future construction activities associated with the Concept Approval locations of Neubecks Creek and Ivanhoe No 4 sites. Further understanding of the profiles of these

sites post future mining activities and an assessment of potential construction constraints would be required to address in detail the potential construction activities required at these sites.

- **Figure 3-4 Typical Drainage Blanket for Gully**



3.4. Operational Activities

3.4.1. Overview

Ash placement activities in the proposed sites would be similar to that which is currently undertaken in Area 1 and are described in the sections below. In general, operations would be occurring in parallel to construction activities as described above.

Ash is generated at Mt Piper Power Station as a by-product of the combustion process. When the coal is burnt a residue of ash is produced, which is separated as either 'bottom or furnace ash' or 'fly ash'. Bottom ash consists of larger particles which fall to the bottom of the boiler and are collected, while the finer particles (fly ash) are carried up through a fly ash collection plant by the hot exhaust gases. Bottom ash is collected in a 'wet' hopper where it is dragged into a temporary loading hopper prior to being transported to Mt Piper's current ash placement area, where it is stockpiled and drained.

Fly ash is collected and generally conditioned with water although fly ash may alternatively be conditioned with brine (a boiler water treatment by-product). The brine alters the ash's chemical composition and requires that the brine ash must be placed separately within the ash placement area. Operational activities associated with ash placement include:

- Ash conveyance;
- Ash placement;
- Ash management;
- Capping; and
- Rehabilitation.

The proposed ash placement areas would be located to the east (Lamberts North and South), south-west (Ivanhoe No. 4) and north-east of the existing power station (Neubecks Creek). The ash placement areas would be developed progressively. Lamberts North would be developed first in continuation from Area 1. Lamberts South would then be developed and, if required, followed by Neubecks Creek and Ivanhoe No. 4, the timing and order of the latter two being subject to the timing of future approvals.

On completion of the existing surface mining activities and preparatory works the estimated capacity and lifespan of each placement area is outlined in **Table 3-1**.

Table 3-1 Capacity and lifespan of ash placement sites

Ash Placement Site	Capacity (volume m^3)	Estimated Lifespan (cumulative years)	
		Mt Piper 1 & 2 (1,400 MW)	Mt Piper 1&2 and Mt Piper Extension (3,400MW)
Lamberts North	6,850,000 m^3	8 years (2015 - 2023)	5 years (2015 - 2020)
Lamberts South	15,000,000 m^3	20 years (2023 - 2043)	7 years (2020 - 2027)
Combined Lamberts North and South	21,850,000 m^3	28 years (2015 – 2043)	12 years (2015 – 2027)
Neubecks Creek Ivanhoe No 4	19,000,000 m^3 (estimate only)	n/a	9 years (2027 – 2036)

The proposed staging of works associated with the ash placement project is outlined below, based on the current generation capacity at Mt Piper of 1,400 MW.

- **Placement of Ash Lamberts North:** Placement of ash in Lamberts North is anticipated to commence in 2015. There is approximately 6,850,000 cubic metres capacity (in-situ volume) in Lamberts North, with filling estimated to be completed by 2023. The ash emplacement would be constructed generally with 1(V):4(H) side slopes, with 10 m wide benches constructed for each 10 metre vertical height. The finished surface of Lamberts North would vary from RL966 to RL980 m AHD, with the exposed ash areas progressively capped as areas reach their design elevations. **Figures 3-3b,c** show the indicative partial construction of Lamberts North at approximately 50% capacity and at completion (capacity).

- **Placement of Ash, Lamberts South:** Placement of ash in Lamberts South is anticipated to commence upon completion of placement at Lamberts North in approximately 2023. There is approximately 15,000,000 cubic metres capacity (in-situ volume) in Lamberts South, with filling estimated to be completed by between 2042 and 2045. Lamberts South will be constructed to similar geometry as Lamberts North. The finished surface of Lamberts South is RL1000 m AHD. **Figure 3-3c** shows the plan of the Lamberts South Area on completion of filling activities.

The following sections provide a summary of each of the main operation activities associated with ash placement across the sites.

3.4.2. Ash Conveyance

Under existing operations, fly ash is conveyed in the fly ash collection plant by means of a dense phase system to a silo for transfer to conveyor. Furnace or bottom ash is transferred from the boilers by submerged scraper conveyor. The furnace ash then passes to a hopper for transfer to the repository by heavy haulage vehicles.

Transportation to the ash area of conditioned fly ash is by enclosed belt conveyor. The conveyor discharges into separate surge bins located in the ash storage area, from which the ash is discharged into an off-road articulated trailer-truck for ash emplacement. When the conveyor is out of service, ash is taken by truck to the ash placement area.

The current system of transport will be maintained for the proposed ash placement sites.

At some time in the future, the economic benefit of the conveyor system in its current location may be reassessed and the conveyor realigned to service ash placement as it progresses further from the current location. In particular as placement continues into the Lamberts South area, it may become more viable to relocate or extend the ash transport conveyor toward the Lamberts South area.

3.4.3. Ash Placement

Detailed methodologies have been developed for the placement of ash materials to optimise compaction and stability of the emplacement areas during and after construction. Existing ash placement methods including target moisture content, compaction density and progressive capping and revegetation, would be adopted for these sites, with ongoing monitoring and assessment of specifications to optimise placement and moisture conditioning requirements.

The current practice is that ash is placed to the desired height in ‘pads’, with materials moisture conditioned with water placed in the lower layers to an elevation of up to 946 m AHD. Above this level, ash moisture conditioned with brine is permitted. Typically ash is placed by:

- Delivering ash to the working face via truck and dumping into position;
- The ash is then spread and shaped via dozer operation;
- Ash is then compacted using a controlled number of passes with a dozer and/or truck to achieve required compaction as discussed below.

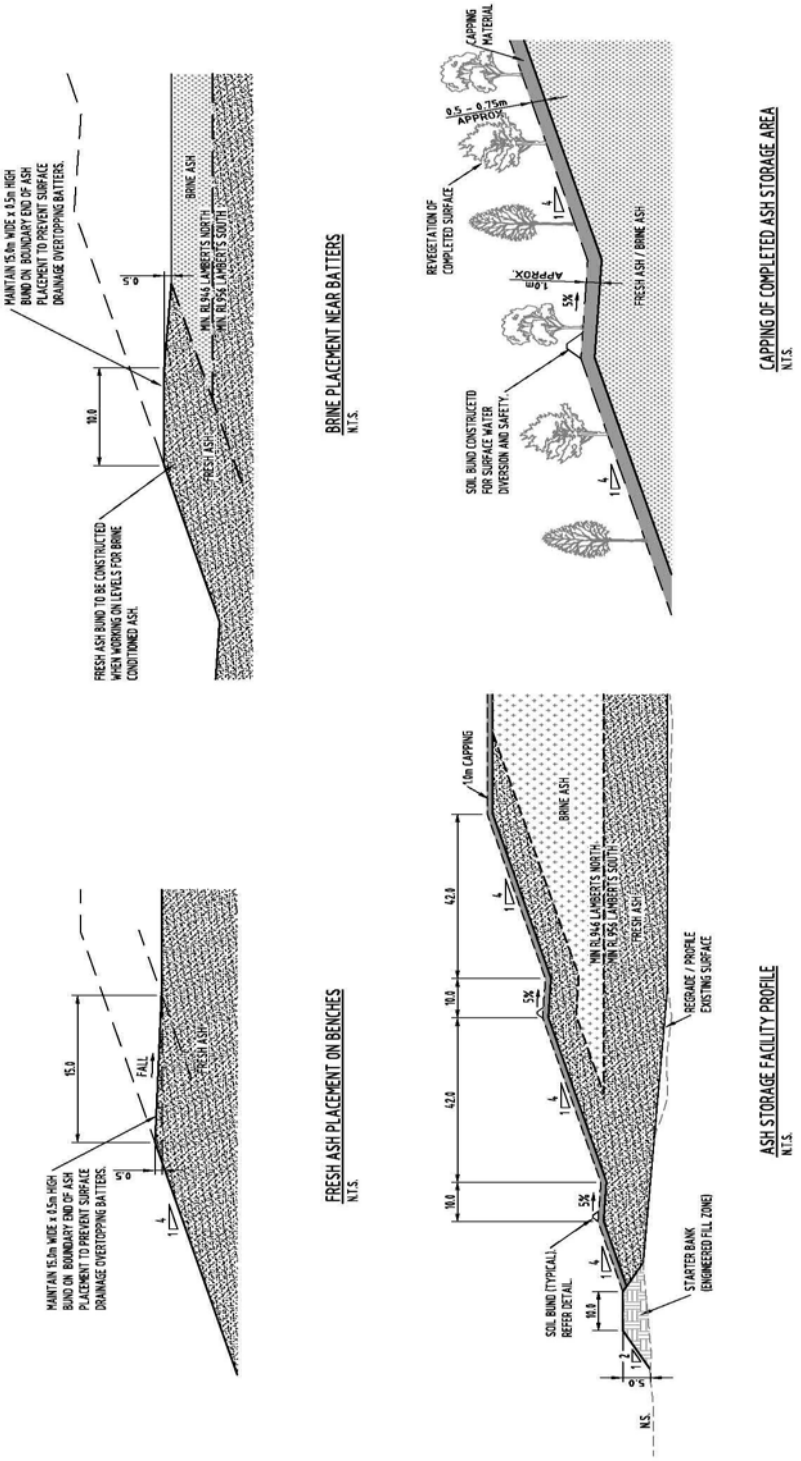
Typically, ash is placed in 500 mm lifts. The ash is treated to achieve a compaction of 95%, relative to its maximum standard compaction, through a combination of controlled addition of water (through conditioning) and a process of machine compacting with the use of rollers and rubber-tyred vehicles which are also used for the transport of the material. Ash is placed in layers and stepped to produce an overall batter slope of approximately 1(V):4(H), with benches added every 10 m in vertical height change. Typical ash placement profiles and the required separation of brine and fresh water conditioned ash near benches would be as shown on **Figures 3-5a,b**. As shown on these diagrams, bunds are constructed (minimum 500 mm) at batter extents to prevent discharge of surface water over the benches and down batter slopes to minimise scour and erosion and also to ensure separation of surface water run-off from brine conditioned areas.

For pads on their final lifts that would be left for long durations, the final surface is graded to 1 % to drain surface water away from completed batters. For working pads the surface is graded to 2 % along the pad length. Typical ash placement and completed profiles are shown on **Figure 3-5c**.

In all cases surface water runoff is drained away from permanent batters and directed to flow along benches and/or formalised channels (away from batters to maintain stability and minimise erosion). Runoff is typically directed into the centre of the ash placement area, where runoff water can be directed into the dirty water storage areas via drainage channels.

Where such diversion is not possible, away from finished batters, collected water is discharged down batters in lined channels or pipework to minimise scour.

- **Table 3-5 a,b,c,d Brine Ash Placement and Capping at Ash Placement Areas**



Design of the ash placement pads incorporates ash dry density values for fly ash and furnace ash. **Table 3-2** outlines the geotechnical properties for ash to be placed in Lamberts North and South.

Table 3-2 Geotechnical properties of Mt Piper ash

Property	Units	Fly ash	Brine Ash	Furnace Ash
Dry density	t m3	1.2	1.36	0.965
Optimum moisture content	%	22	18	48
Permeability	cm s-1	-	1.1 x 10-5	-
Texture	-	silt	Silt	gravelly sand
Saturation Percentage	%	33 – 362	-	-

Source: Bilfinger Berger, 2007

3.4.4. Ash Management

Ash is managed by carefully controlling the moisture condition during placement and also by the use of artificial dust suppressors, sprinklers and water carts to minimise the generation of dust of prepared and working areas, haul roads, stockpiles and working surfaces. Monitoring and testing of ash placement is also proposed to be undertaken on a routine basis including:

- Ash moisture content;
- Groundwater levels by piezometers in the ash pads;
- Dust within the ash placed areas;
- Compaction of ash;
- Water quality and volume;
- Ash placement levels (survey); and
- Engineering and geotechnical considerations (compaction and stability).

3.4.5. Capping

At the completion of each pad, the pad is covered with mine spoil and the area is then progressively re-vegetated as part of the power station's ongoing landscaping and re-vegetation program. Capping will occur progressively as each area reaches its design height. Capping will also be routinely applied to external and permanent batters. The standard method for capping requires the capping material to be pushed out to an approximate depth of 750 mm on 1(vertical) in 4 (horizontal) batters, with 1 m thickness on benches. Capping on benches is placed as a 1 m layer and graded with a cross fall into the bench and along its length.

Capping is typically placed by hauling suitable materials into position via truck and dumping and spreading across the completed ash areas with a dozer to the required thickness and levels. The removal of overburden will be a continuous requirement and it is a critical aspect for long-term placement for both brine conditioned ash and fresh water conditioned ash.

A typical profile for a capped area is shown in **Figure 3-5d.**

3.4.6. Rehabilitation

Revegetation of permanent batters of the ash placement area marks a final stage in the operation stage of ash placement once the ash placement areas are filled and decommissioned. Revegetation would occur progressively throughout the life of the placement areas once capping is completed.

Rehabilitation of the sites will be developed to consider both landscape and soil conservation aspects. Revegetation is to provide a landscape feature for the area and act as a functional catchment for the Coxs River. The final profile of all sites will be developed to promote surface water runoff to reduce infiltration of water into the ash pads

A rehabilitation plan would be prepared for the sites addressing revegetation, landform, surface water management and monitoring and will be periodically updated during the progressive rehabilitation of the sites.

3.4.7. Operations Hours and Workforce

Ash placement activities are expected to be between 6am-8pm Monday to Friday and 6am – 5pm Saturdays and Sundays, in line with current hours of operation at Area 1. This is required to manage the ash produced over the 24 hours a day operation of the power station and reflects current licence conditions for Area 1.

The required workforce for operation of the repository is normally two people operating the necessary plant on each shift as well as two people managing the environmental aspects of placement activities on day shift (6am until 5 pm) and one person on afternoon shift (5 pm until 8 pm) carrying out the environmental activities.

On weekends the area is operated on dayshift alone.

The staff numbers may be increased by any additional units from Mt Piper Extension and resultant placement requirements.

3.4.8. Operations at Neubecks Creek and Ivanhoe No 4 Locations

Operational activities for the Concept Approval sites (Neubecks Creek and Ivanhoe No. 4) would be similar to that outlined in the sections above. As with that proposed for the Project Approval

sites, activities involved with operating new sites would involve the conveyance of ash to the site, placement into ash pads, management of the ash pads and progressive capping and rehabilitation of the sites.

The placement of ash at either site would not be undertaken until Project Approval is sought and obtained. Based on current ash rates and the predicted life of Lamberts North and Lamberts South, development of either Neubecks Creek or Ivanhoe No. 4 would not be required (ie beyond the life of the existing Mt Piper Units 1&2) for approximately 30 years (around 2045). Should the Mt Piper Extension proceed as a coal fired plant then the need for Neubecks Creek or Ivanhoe No. 4 would eventuate and may be required as early as 2026 to store ash for both plants.

Conveyance of ash to either site would require further detailed assessment of environmental, social and heritage issues as well as a detailed assessment of cost implication associated with ash transport options. A number of ash transport options could exist for Neubecks Creek including the use of existing public roads (Boulder Road and Castlereagh Highway), the private haul road that services the Angus Place Mine and the provision of an ash transport conveyor spanning the Castlereagh Highway. Transport of ash to Ivanhoe No. 4 would occur directly from the power station to the ash placement area most likely via a dedicated haul road across Delta owned land. The transport options for both sites would be analysed as part of the project approval process in accordance with the requirements of the consent conditions of the concept approval.

Capping, rehabilitation and revegetation of these sites would be undertaken in line with the basic principles outlined for Lamberts North and Lamberts South, accepted practices of the day and in accordance with a Site Rehabilitation Plan.

Mt Piper Power Station
Ash Placement Project

ENVIRONMENTAL ASSESSMENT

CHAPTER 4 – ISSUES IDENTIFICATION

August 2010

Contents

4. Issues Identification

This chapter summarises agency and community consultation activities for the project. The Director-General's requirements were to:

- *Undertake an appropriate and justified level of consultation during the preparation of the Environmental Assessment; and*
- *Clearly describe the consultation process and indicate the issues raised by stakeholders during consultation and how these matters have been addressed.*

4.1. Agency Consultation

4.1.1. Environmental Assessment Requirements

The requirements for the content of the Environmental Assessment were issued by Department of Planning on 12 November 2009 and a copy is attached in **Appendix A**.

The requirements are summarised in **Table 4-1**, along with an indication of where in the document the requirements are addressed.

Table 4-1 Director-General's requirements for the Environmental Assessment

Summary of Requirements	Chapter of the EA
General Requirements	
The Environmental Assessment must include:	
▪ An executive summary.	Executive Summary
▪ A detailed description of the proposal including construction, operation and rehabilitation details, the general location of those components relevant to the concept plan and detailed location and dimensions of those components relevant to the project application, the finished profiles of the sites and identification of any third party approvals.	Chapter 3
▪ Consideration of any relevant statutory provisions.	Chapter 1
▪ An assessment of the key issues outlined below, during construction and operation.	Chapter 5 to 10
▪ A draft Statement of Commitments detailing measures for environmental mitigation, management and monitoring for the project.	Chapter 13
▪ A conclusion justifying the project taking into consideration the environmental, social and economic impacts of the project; the suitability of the sites and the public interest.	Chapter 12
▪ Certification by the author of the Environmental Assessment that the information contained in the assessment is neither false nor misleading.	Front of document
Key Assessment Requirements	
The Environmental Assessment must include assessment of the following key issues:	
▪ **Strategic Planning and Justification** ▪ Undertake a strategic assessment of the need, scale, scope and	Chapter 2

Summary of Requirements	Chapter of the EA
location for the project, an overview of the relationship between the project and its relevance to the existing Mt Piper Power Station Units 1 & 2, the existing brine and ash co-placement area and the proposed Mt Piper Power Station Units 3 & 4. ■ Illustrate how the project will effectively respond to the management of flyash and brine from Units 1 & 2 and how the project will cater for the management and storage of the potential waste products from Units 3 & 4. ■ Describe a strategy for developing and implementing short, medium and long term ash management options.	
■ **Air Quality Impacts** ■ For the concept plan application at Neubecks Creek and Ivanhoe No 4 provide an analysis of potential air quality constraints to the development of the sites. ■ For the project application at Lamberts North and Lamberts South sites undertake an assessment of the air quality impacts in accordance with the *Approved methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DECC, 2005).	Chapter 5 Appendix B
■ **Noise Impacts** ■ For the Neubecks Creek and Ivanhoe No 4 sites (concept plan) include an analysis of potential noise constraints to the development of these sites. ■ For the Lamberts North and Lamberts South sites (project application) a construction and operational noise assessment that identifies impacts on surrounding residential premises and other sensitive receivers, with particular consideration to traffic generated noise associated with the construction works and the transportation of flyash and brine to the ash placement areas during operation.	Chapter 6 Appendix C
■ **Water Management** ■ For the Neubecks Creek and Ivanhoe No 4 sites (concept plan) include an analysis of potential surface water, hydrology, groundwater and water supply constraints to the development of these sites. ■ For the Lamberts North and Lamberts South sites (project application) characterise and assess site hydrology and water management including drainage, stormwater, flooding and water supply and provide an assessment of potential risks to surface water and groundwater quality with consideration of relevant State policies and ANZECC water quality guidelines.	Chapter 7 Appendix D
■ **Ecological Impacts** ■ For the Neubecks Creek and Ivanhoe No 4 sites (concept plan) include an analysis of potential ecological constraints to the development of these sites. ■ For the Lamberts North and Lamberts South sites (project application) an assessment of likely impacts on native vegetation, threatened species, populations, ecological communities and their habitats, with particular reference to downstream aquatic habitats. The assessment must be prepared in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC & DPI, 2005).	Chapter 8 Appendix E
■ **Indigenous Heritage** ■ For the Neubecks Creek and Ivanhoe No 4 sites (concept plan) include an analysis of potential heritage constraints to the	Chapter 9

Summary of Requirements	Chapter of the EA
development of these sites. ■ For the Lamberts North and Lamberts South sites (project application) a detailed assessment of indigenous heritage values (archaeological and cultural) that may be impacted by the project. ■ Demonstrate effective consultation with indigenous stakeholders regarding the potential impacts of the concept plan as a whole and the particular impacts of the project application sites consistent with the draft Guidelines for Aboriginal Cultural Impact Assessment and Community Consultation (DEC, July 2005).	Appendix F Chapter 4 Appendix F
■ **Visual Amenity** ■ For Lamberts North and Lamberts South sites (project application) provide an assessment of visual impact of the sites on visual amenity with specific reference to the maximum height of the proposed ash placement areas from neighbouring residences, adjacent roads, watercourses and the public domain. ■ For the Neubecks Creek and Ivanhoe No 4 site (concept plan) provide a general screening of likely visual impacts should these sites be developed.	Chapter 10
■ **General Environmental Risk Analysis** ■ 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.	Chapter 11
Consultation Requirements	
An appropriate and justified level of consultation with the following parties during the preparation of the Environmental Assessment.	Chapter 4 Appendix A
■ NSW Department of Environment, Climate Change and Water.	Chapter 4
■ NSW Office of Water.	Chapter 4
■ Department of Industry and Investment (NSW).	Chapter 4
■ Sydney Catchment Authority.	Chapter 4
■ Lithgow City Council.	Chapter 4
■ The local community.	Chapter 4
The Environmental Assessment must clearly describe the consultation process and indicate the issues raised by stakeholders during consultation and how these matters have been addressed.	Chapter 4

4.1.2. Consultation with Agencies

Correspondence from NSW Department of Environment, Climate Change and Water and the NSW Office of Water was provided by the Department of Planning. As these letters outlined relevant issues required for consideration in the EA, there was no further consultation considered necessary. Telephone calls were made to agencies to status of relevant guidelines and plans.

Separate letters were sent to the following agencies in February 2010:

- Sydney Catchment Authority;
- Lithgow City Council; and
- NSW Department of Industry and Investment.

Responses were received from the Sydney Catchment Authority and Lithgow Council. The issues raised in the received correspondence are summarised in **Table 4-2**.

Table 4-2 Issues raised from correspondence with agencies

Issue raised	Chapter of the EA
Department of Environment, Climate Change and Water	
▪ DECCW noted that draft DGRs covered air quality, noise, visual amenity, water management and general environmental risk analysis. Additional matters required to be considered are listed below.	
▪ **Water** – The proponent should carefully consider the impacts of the proposal on the water quality of Huon Creek and Neubecks Creek.	Chapter 7
▪ **Waste and Chemicals** – The EA should include an assessment of all likely waste streams associated with the project both during construction and operation, and how waste would be managed by the project in line with the principles of waste avoidance, reuse and recycling. ▪ The EA should also consider alternative ash management measures aimed at maximising the use of the potential resource and the available life of emplacement areas. ▪ The EA should provide details of chemicals to be stored in bulk on site.	Chapter 11 Chapter 2 n/a
▪ **Contaminated Land** – The EA should assess the risk of encountering contaminated material within the proposed ash placement project area.	Chapter 3
▪ **Threatened Species and their Habitat** – Likely impacts on threatened species and their habitats should be reported on.	Chapter 8
▪ **Cumulative Impacts** – The EA should assess the cumulative impacts on air, noise and water of the proposal, given that the immediate area includes power generation and coal mining activities.	Chapters 5, 6 and 7
▪ **Aboriginal Cultural Heritage** – The EA should identify the nature and extent of any impacts on Aboriginal Cultural Heritage values across the project area and the strategies proposed to avoid/minimise these impacts.	Chapter 9
NSW Office of Water	
▪ The proposal should seek to protect, maintain and enhance waterways. Recommendations are provided for Huon Creek, Neubecks Creek.	Chapter 7
▪ The EA should assess the impact of the proposal on surface water and groundwater resources. ▪ The EA should provide details on the presence and distribution of Groundwater Dependent Ecosystems in the vicinity of the site. ▪ The need for a water licence under part 5 of the Water Act, 1912 should be addressed.	Chapter 7
Sydney Catchment Authority	
▪ **Description of the Project** – to include landform, drainage, watercourses	Chapters 3 and 7

Issue raised	Chapter of the EA
and hydrology, water quality, groundwater quality and flow, characteristics of ash and brine, water requirements and details for the management of contaminated water.	
▪ **Cumulative Impacts** – the cumulative impact assessment should consider cumulative impacts associated with other past, present and reasonably foreseeable land uses in the catchment of Neubecks Creek.	Chapter 7
▪ **Beneficial reuse –** the EA should examine further opportunities to increase the beneficial reuse of flyash.	Chapter 2
▪ **Water Cycle Management** – the water cycle management assessment should address potential implications of the project on the quality and quantity of groundwater and surface waters including Huon Creek, Neubecks Creek and the Coxs River, neutral or beneficial effect on water quality. Rehabilitation plans are recommended for Huon Creek and Neubecks Creek.	Chapter 7
Lithgow Council	
▪ Assessment of amenity issues for residents within Blackmans Flat ▪ Avoidance of road transport of ash ▪ Justification for economic, employment and social impact ▪ Impacts on infrastructure, community facilities and services ▪ Cumulative impacts of dry ash placement ▪ Water quality impacts (electrical conductivity) on downstream water bodies ▪ Potential impacts on Council's approved landfill.	▪ Chapter 11 ▪ Chapter 11 ▪ Chapter 12 ▪ Chapter 11 ▪ Chapters 5,6,7 ▪ Chapter 7 ▪ Chapters 5,6,7

4.2. Community Consultation

The Director-General's requirements requested consultation with the local community during the preparation of the Environmental Assessment. A comprehensive community consultation program was developed targeting the local community. The aim of the community consultation program was to provide accurate and timely information to the community, and to facilitate community engagement in the approval planning process.

A range of local information activities was undertaken as well as some communications activities coordinated centrally. A dedicated free-call 1800 number was established, as well as a special purpose email address. There has been one response to the 1800 number and no relevant responses to the email address. Approximately 800 newsletters were distributed to the region of Lidsdale and Blackmans Flat in February, 2010.

At the time of the Preliminary Environmental Assessment (PEA) announcement, Delta Electricity's website (www.de.com.au) was provided with the PEA and Director-General's requirements with a summary and links to the Department of Planning website. Delta's newsletter was also placed on the website.

An advertisement was placed in the Lithgow Mercury in February 2010, providing information on the project and contact details for the free-call number and the email address.

Letters were sent to Lithgow Council, State and Commonwealth members of Parliament.

A number of briefing meetings, including issues associated with ash management, have been held with Delta Electricity's Mt Piper Community Reference Group throughout 2008 and 2009 and the most recent on 17 February 2010 dealt specifically with this project.

Issues raised at various community Reference Group meetings have included the question of ash management. **Table 4-3** outlines how these issues have been addressed.

Table 4-3 Issues raised at the Community Reference Group

Issue	Where addressed
Proposed areas are too close to Blackmans Flat	Chapter 11
Information required on the "make up" of ash	Chapter 3
Concern over ash dust being blown to residential areas	Chapter 5
Consideration should be given to alternative uses for ash	Chapter 2

No other issues have been raised through any of the forums listed above.

4.3. Consultation with Indigenous Communities

The Study Area falls within the boundaries of the Bathurst Local Aboriginal Land Council (BLALC). The consultation was undertaken as outlined in Department of Environment, Climate Change and Water's Interim Community Consultation Requirements (ICCRs)[1] as recommended in the DEC 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (for Part 3A assessments).

An advertisement seeking expressions of interest from Indigenous community organisations was placed in the local paper the 'Lithgow Mercury' on the 23rd January, 2010. Letters were also issued to Aboriginal groups or individuals known to have an interest in Indigenous heritage within the Study Area, in addition to letters sent to DECCW, Lithgow City Council, the Register of Aboriginal Owners, BLALC and Native Title Services Corporation (NTSCORP). A second round of letters was then sent to additional groups identified as a consequence of the first round of advertising and agency contact.

[1] It should be noted that the new DECCW *Aboriginal cultural heritage consultation requirements of proponents 2010,* came into effect on12th April 2010. The process undertaken in this project is consistent with transitional arrangements specified in the new requirements.

As a result of these processes, 12 organisations / individuals formally registered interest by the close of Stage 1. The details of these organisations and individuals are provided in **Appendix F**.

Letters describing the proposed heritage assessment methodology were sent to all registered stakeholders on 22nd March, 2010 with a request for any specific cultural information (should any be available), as well as inviting comment / input on the methodology proposed. Input into the proposed heritage management measures for the Aboriginal Cultural Heritage Management Plan (ACHMP) was also sought. Responses to the Stage 1 and 2 letters can be found in **Appendix F**.

Desktop review had demonstrated that Lamberts South and North had been fully assessed for heritage in the past and that both were now completely disturbed through mining and consequently, full pedestrian assessment of these Study Areas was not deemed appropriate for occupational health and safety reasons. However, to ensure that the Impact Footprint lay completely within disturbed areas, a site visit was made to the Study Area on 4th March, 2010 in the company of Mr Rick Peters representing the BLALC. Due to the Project Site being within the boundaries of the BLALC, one position was made available for an Aboriginal community representative from this organisation to participate in the site visit.

Irrespective of field representation, all groups who have expressed interest in being part of the consultation process have been kept informed of the methods and results, and invited to comment on draft documents prepared for the project.

A record of all consultation with the Aboriginal groups kept during the course of the project which can be reviewed in **Appendix F.**