



Mt Piper Power Station Ash Placement Project

ENVIRONMENTAL ASSESSMENT
CHAPTER 10 – VISUAL AMENITY

■ August 2010



Contents

10. Visual Amenity	10-1
10.1. Project Approval	10-1
10.1.1. Introduction	10-1
10.1.2. Methodology	10-1
10.1.3. Visual characteristics of the environment and proposed development	10-3
10.1.4. Visual Impact Assessment	10-4
10.1.5. Mitigation of Visual Impacts	10-13
10.2. Neubecks Creek and Ivanhoe No 4 Sites	10-14
10.2.1. Potential Visual Impacts of Sites	10-14
10.2.2. Visual Impact Assessment	10-15
10.2.3. Mitigation of Visual Impacts	10-16

10. Visual Amenity

This chapter addresses the key issue relating to visual amenity and addresses the Director-General's requirements for:

- *Neubecks Creek and Ivanhoe No 4 sites (concept plan) - provide a general screening of likely visual impacts (considering cumulative effects) should these sites be developed and available mitigation/ treatment options for minimising impact, including key constraints and design criteria that would require further investigation prior to site development.*
- *Lamberts North and Lamberts South sites (project application) - include an assessment on the potential visual impact of the sites (for both the finished profile of the sites and after the finished sites have been rehabilitated by treatments) 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.*

10.1. Project Approval

10.1.1. Introduction

This section provides an assessment of the potential visual impacts of the proposed new ash placement areas at Lamberts North and Lamberts South. It considers the existing and proposed visual environment together with associated potential visual impacts to provide an assessment of the significance of impacts to sensitive receivers in the area.

10.1.2. Methodology

The following methodology was undertaken for the visual impact assessment:

- Line of sight analyses: where potentially visually sensitive sites in the study area were determined;
- Selection of representative sites: where locations from the line of sight analyses were chosen as being representative of the views from neighbouring residences and adjacent roads. There are no areas of public domain or watercourses used for public recreation purposes in the vicinity of the proposed ash placement areas. Digital photographs were taken at each of these locations during the field survey;
- Development of photomontages: where photomontages of key locations were produced to assist with the visualisation of the proposed development and assessment of visual impacts; and
- Development of mitigation measures: where mitigation measures were developed which would reduce the level of visual impact of the proposed ash disposal placement areas.

The visual impact assessment was by considering the degree of visual modification and the visual sensitivity of the surrounding areas.

Visual Modification

The degree of visual modification of the ash placement areas is the expression of the visual interaction between the development and the existing visual environment of the ash placement areas. It can also be expressed as a level of visual contrast of the development to the visual setting within which it is placed. The different levels of visual modification are described in **Table 10-1**. The degree of visual modification generally decreases as the distance between the proposed development and the viewer increases.

■ **Table 10-1 Levels of Visual Modification**

Level of Visual Modification	Description
High	Proposed development is a major element that contrasts strongly with the existing environment. Little or no natural screening or integration with existing environment.
Medium	Proposed development is visible and contrasts with the surrounding environment but is integrated to some degree. Surrounding vegetation / topography provides some visual screening.
Low	Proposed development may be noticeable but does not markedly contrast with the existing environment. High level of integration in terms of form, shape, colour or texture.

Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape would be viewed from various areas. The visual sensitivity depends on a range of characteristics such as land use, the number of viewers, the viewing time and the distance between the proposed development and the viewer. These characteristics were all considered in developing the different levels of visual sensitivity from land uses surrounding the proposed ash placement areas (refer to **Table 10-2**).

■ **Table 10-2 Levels of Visual Sensitivity**

Land Use	Foreground		Middleground		Background
	0 – 0.5 km	0.5 – 1 km	1-2 km	2-3 km	>3 km
Natural Area – recreation	H	H	H	M	L
Rural residential	H	H	H	M	L
Local roads	M	L	L	L	L
Main roads	M	L	L	L	L

Typically, residential areas are more sensitive to changes in the visual environment than roads. This is primarily due to the different lifestyle contexts associated with these land uses. Hence, rural residential areas have been rated quite highly in terms of their visual sensitivity. The main and local

roads have been given a low to medium visual sensitivity rating as there are some people that could view the development whilst travelling on these roads.

Visual Impact

The visual impact of the proposed development is determined by considering both the degree of visual modification and the visual sensitivity. A matrix has been developed to identify the level of impact for each combination of visual modification and visual sensitivity (refer to **Table 10-3**).

■ **Table 10-3 Visual Impact Matrix**

		Visual Sensitivity		
		High	Medium	Low
Visual Modification	High	H	H	M
	Medium	H	M	L
	Low	M	L	L

10.1.3. Visual characteristics of the environment and proposed development

The site of the proposed ash placement areas is predominantly surrounded by rural and extractive industries (mining), Ben Bullen State Forest to the north and south, and some rural residential and village areas. The Mount Piper Power Station is located to the west of the proposed ash placement areas. The nearest township is located at Blackmans Flat, approximately 1 km from the eastern boundary of the proposed Lamberts North site. The townships of Portland and Lidsdale are also located approximately 5 km west and 3 km south-east, respectively, from the proposed ash placement areas.

The proposed ash placement areas are characterised by open cut mining operations in a region dominated by State Forest, power generation facilities and mining. The Lamberts North and Lamberts South sites are currently open cut mines which would be used for ash placement as part of this project. These sites would progressively be established over an approximate 30 year timeframe. The Lamberts South site would have a final maximum relative level (RL) of 1000 metres AHD, which is higher than the current RL of 960 metres being used for the existing ash placement Area 1. The Lamberts North site would have a final maximum RL of 980 metres, with the majority of the site at a RL of 950 metres. The current RL of the Lamberts North site is approximately 920 metres. The topographic character of the area is undulating. Thus due to the topography and vegetation screening, the placement areas would not be dominant visual features in the landscape as the majority of the ash placement areas would be hidden from view.

10.1.4. Visual Impact Assessment

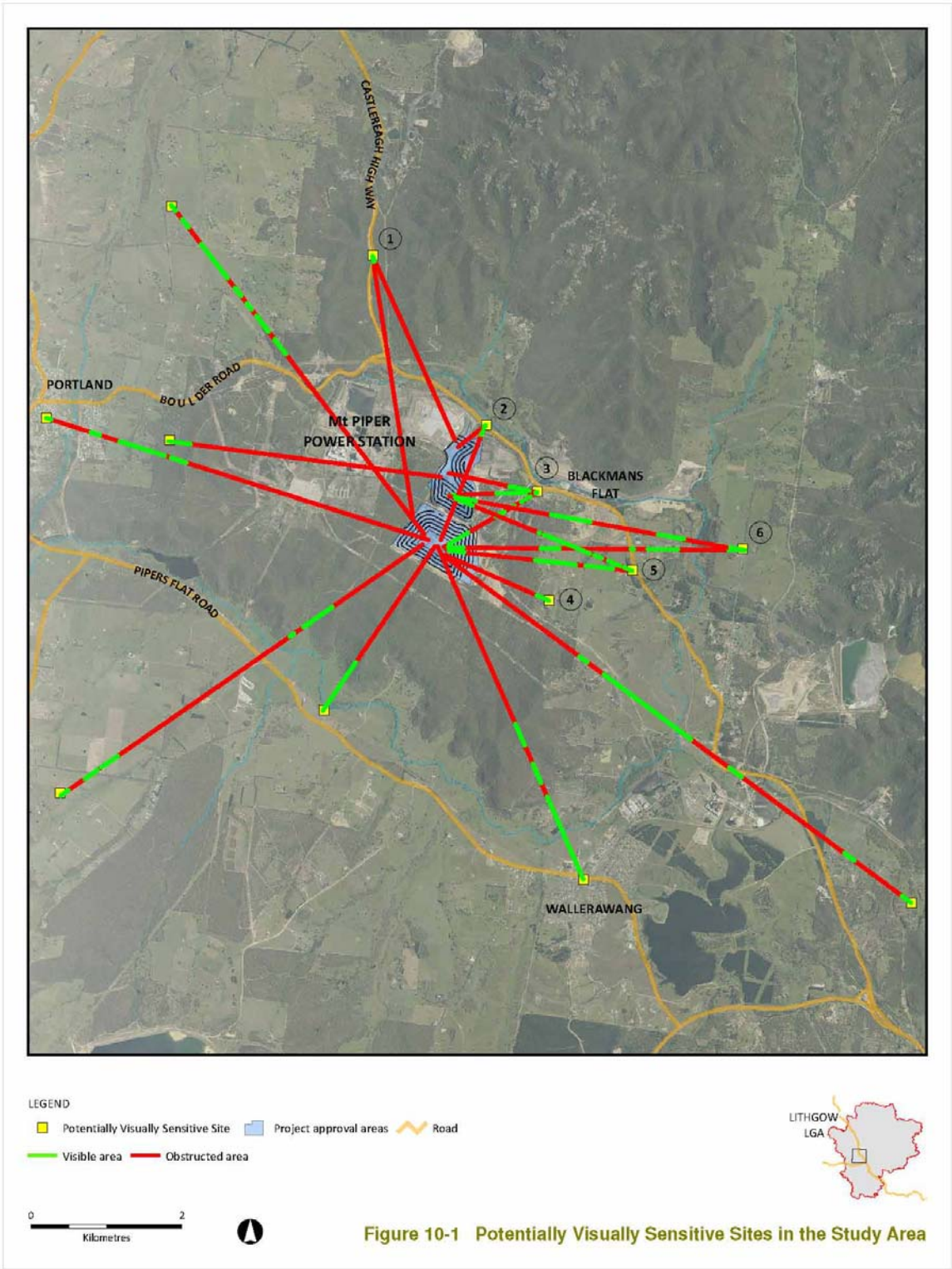
Visual impacts were assessed by comparing the visual modification and visual sensitivity (using the matrix outlined in **Table 10-3**) and generally relate to the ability of the landscape to absorb visual modification. The degree to which the environment can absorb any visual impacts is influenced by 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. For the purpose of this study, the views were developed by assuming a viewer height of two metres above ground and using a terrain model which included the typical height of existing vegetation. This represents the likelihood of a person being able to see the proposed ash placement areas from these viewpoints.

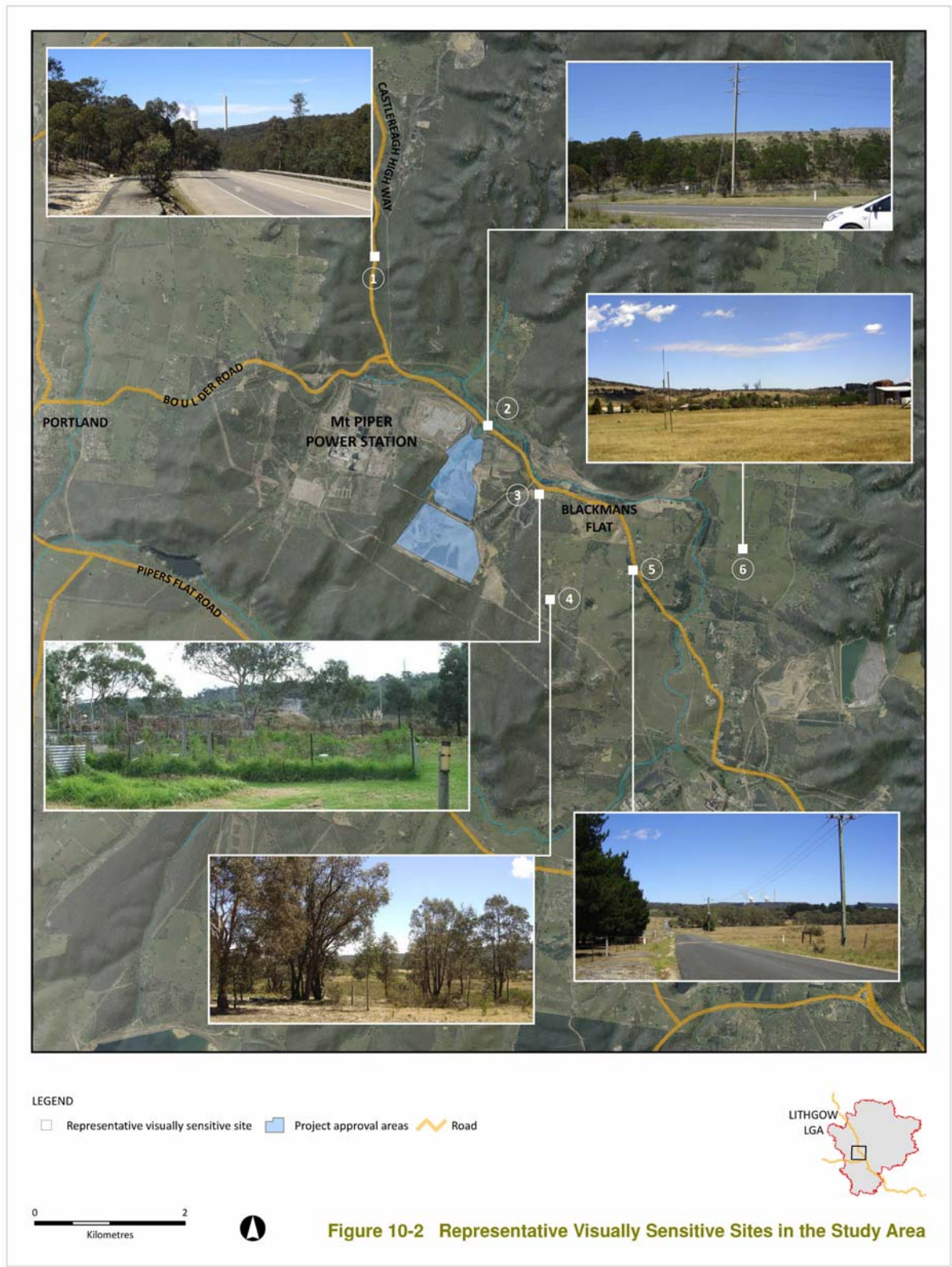
A line of sight analyses were undertaken to determine sites in the area which would be potentially visually affected by the proposed development. Fourteen sites were chosen within the study area to represent a variety of land uses (including neighbouring residences and adjacent roads), elevation and viewing angles (refer to **Figure 10-1**). A line of sight was determined between each site and the proposed ash placement areas. The red sections of the line indicate that the proposed development would not be visible from those locations, and the green sections indicate that the proposed development would be visible from those locations.

From the line of sight analyses, it was found that:

- Areas to the west, south -west and south were likely to be screened by topography and dense vegetation. As a result, sites in the west, south-west and south were not considered further as the proposed development would not be visible from these areas,
- The proposed development was likely to be screened by topography and dense vegetation when viewing from sites along the Castlereagh Highway and major roads to the north,
- The proposed development was likely to be viewed wholly or partially from sites located to the east and south-east of the proposed development.

Six representative sites were chosen from those sites identified in the line of sight analyses. The six representative sites were chosen to represent a variety of landforms, vegetation coverage, land use and proximity to the proposed development (foreground, middle ground, background) and are shown in **Figure 10-2**. They were also chosen to represent different directions from the development (ie from the north, south, east and west). The visual assessment in **Table 10-4** assesses these six representative sites.





■ **Table 10-4 Visual Assessment**

Location	Distance from sensitive viewpoint to proposed ash placement areas	Level of visual modification	Viewer Sensitivity	Visual Impact	Comment
1	View from Castlereagh Highway 2.6 km from Lamberts North 3.5 km from Lamberts South	L	L	L	The ash placement areas would not be visible from the Castlereagh Highway as it would be screened by the topography and concealed by existing vegetation, and also due to the distance to the proposed area. These areas would therefore not be visible by drivers travelling down the highway. Figure 10-1 shows that the line of sight from this location to the proposed ash placements is completely obstructed. As a result, this location has not been considered further as the proposed development would not be visible from this location.
2	View from Castlereagh Highway 0.5 km from Lamberts North 1.6 km from Lamberts South	L	L	L	The ash placement areas would not be visible from the Castlereagh Highway as it would be screened by the topography and existing vegetation. Therefore it would not be visible by drivers travelling down this section of the highway. The line of sight from this location to the proposed ash placements is completely obstructed (refer to Figure 10-1). As a result, this location has not been considered further as the proposed development would not be visible from this location.
3	Sensitive receiver 1.2 km from Lamberts North 1.6 km from Lamberts South	M	H	H	The ash placement areas would be visible for this sensitive receiver within 500 metres within the proposed development. This receiver currently has views of the existing Mt Piper Power Station. The topography is generally flat, with the proposed ash placement areas extending above the existing ground level. The maximum height of the proposed ash placement areas that would be visible from this location would be 10 metres of the Lamberts North ash placement and 50 metres of the Lamberts South ash placement. An indicative visualisation is provided in Figure

Location	Distance from sensitive viewpoint to proposed ash placement areas	Level of visual modification	Viewer Sensitivity	Visual Impact	Comment
					10-4. Existing vegetation shields the development from the sensitive receiver to some degree. There are areas, however, where existing vegetation does not provide adequate cover to shield views of the ash placement area. There are opportunities to further mitigate the views by planting new vegetation closer to the viewpoints. Figure 10-5 shows the potential view from this receiver, following rehabilitation of the placements areas. Once the ash has been placed, the site would be rehabilitated and revegetated. The visual impact of the remediated site would therefore be minimised by blending with the existing rural and natural landscape.
4	Sensitive receiver 1.8 km from Lamberts North 1.5 km from Lamberts South	L	L	L	It is unlikely that the ash placement areas would be visible from this sensitive receiver. The area is shielded by the topography and existing vegetation. This location has not been considered further as the proposed development would not be visible from this location.
5	View from local road/Castlereagh Rd 2.6 km from Lamberts North 2.5 km from Lamberts South	M	M	M	The ash placement areas would be highly visible in the middle ground from the road. The area would protrude above the existing vegetation due to the undulating topography. Drivers traversing along Castlereagh Street near this location would observe views of the ash placement areas to the west, however, road usage for the local road is anticipated to be low. The Mount Piper Power Station is also currently highly visible in the middle ground from this location. As there is a small valley between the viewpoint and the ash placement area, there is limited opportunity for vegetation screening. The maximum height of the proposed ash placement areas that

Location	Distance from sensitive viewpoint to proposed ash placement areas	Level of visual modification	Viewer Sensitivity	Visual Impact	Comment
					would be visible at this location would be 30 metres of Lamberts North placement area and 40 metres of Lamberts South placement area. An indicative visualisation is provided in Figure 10-7 . Once the ash has been placed, the site would be rehabilitated and revegetated. This would blend in better with the existing rural and natural landscape. An indicative visualisation of the rehabilitated area is provided in Figure 10-8 .
6	View from Wolgan Road 4.0 km from Lamberts North 3.9 km from Lamberts South	M	L	L	The ash placement areas would be visible from this road. The topography of the existing environment of this location is undulating. The proposed development would blend into the existing environment due to the undulating nature of the ash placement area, and it is unlikely that the area would protrude above the existing topography. The maximum height of the proposed ash placement areas that would be visible at this location would be 30 metres of the Lamberts North ash placement and 40 metres of the Lamberts South ash placement. The Mount Piper Power Station is the dominant feature from this viewpoint. The proposed development would be above existing vegetation. Following completion of the ash placement, the site would be rehabilitated and revegetated. The visual impact of the remediated site would therefore be minimised by blending with the existing rural and natural landscape. Refer to Figure 10-9 and Figure 10-10 and Figure 10-11 for existing views, the finished profile and following rehabilitation of the ash placement areas.

Photomontages were produced for key locations 3, 5 and 6 as these locations would have views of the proposed development. Locations 1, 2 and 4 were not considered further as the proposed development would not be visible from these locations.

The extent of modification and sensitivity for key locations 3, 5 and 6 can be identified from the photomontages in **Figure 10-3** to **Figure 10-11**, in which the new ash placement areas have been superimposed on photographs of existing viewpoints. The photomontages include the finished profile of the ash placement areas prior to rehabilitation of the sites, and also following rehabilitation of the sites.

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.

It is evident that high visual impact would result on key location 3 due to the close proximity of the sensitive receiver to the proposed ash placement areas, although opportunities to mitigate this impact would include the planting of screening trees. Locations 1, 2 and 4 would experience no visual impact, given that the proposed ash placement areas would not be viewed from these locations. Visual impacts from locations 5 and 6 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.

■ **Figure 10-3 Existing view from Location 3 (foreground location)**



- **Figure 10-4 Photomontage of potential view (finished profile) from Location 3 (foreground location)**



- **Figure 10-5 Photomontage of potential view (after rehabilitation) from Location 3 (foreground location)**



- **Figure 10-6 Existing view from Location 5 (middle ground location)**



- **Figure 10-7 Photomontage of potential view (finished profile) from Location 5 (middle ground location)**



- **Figure 10-8 Photomontage of potential view (after rehabilitation) from Location 5 (middle ground location)**



- **Figure 10-9 Existing view from Location 6 (background location)**



- **Figure 10-10 Photomontage of potential view (finished profile) from Location 6 (background location)**



- **Figure 10-11 Photomontage of potential view (after rehabilitation) from Location 6 (background location)**



10.1.5. Mitigation of Visual Impacts

In areas where the topography does not conceal the development from surrounding areas, vegetation can be used to screen the development from sensitive viewpoints. In general, smaller trees with low canopies can be used effectively on gentle slopes or flat areas to screen developments, and taller trees with high canopies are more effective on steeper slopes.

The visual impacts of the new ash placement areas have been mitigated, as far as practicable, through its location and design.

Location

The location of the ash placement areas have been sited within open cut mines to utilise pre-disturbed land, reduce the need to use undisturbed land, and provide an opportunity to rehabilitate the mine site at the completion of mining activities. Utilisation of pre-existing mine sites also minimises the requirements for vegetation clearance. The ash placement sites are located in a region dominated by open cut mining operations, State Forest and power generation facilities such as the existing Mount Piper Power Station directly adjacent to the proposed development. The study area is not located in an area of high scenic value. The location of the ash placement areas within existing mines would minimise any impacts as far as practicable.

Design and landscaping

The ash placement areas would be progressively established over a number of years. Following the placement of the ash into the Lamberts South and Lamberts North sites, the ash placement areas would be capped with a layer of reclaimed overburden and rehabilitated/revegetated in accordance with the Site Rehabilitation Plan. This would ensure that the visual impact of the ash placement areas would be absorbed into the existing, surrounding natural and rural settings. A large amount of the ash would be placed below ground, thus minimising visual intrusion. The placement areas are anticipated to be about 50 metres above the existing ground level.

To further minimise the impacts on direct view of the new ash placement areas, landscape planting would be considered at key locations around the ash placement sites.

On the basis that these mitigation measures are implemented, residual visual impacts would be considered to be low.

10.2. Neubecks Creek and Ivanhoe No 4 Sites

This section provides a general outline of the potential visual impacts of the proposed ash placement areas at Neubecks Creek and Ivanhoe No 4 sites. Possible mitigation and treatment options for these sites, should they be developed, are also presented in this section, along with key constraints and design criteria requiring further investigation prior to the sites being developed.

10.2.1. Potential Visual Impacts of Sites

Development of ash placement areas of a similar scale to those proposed at the Lamberts North and South are likely to result in visual impacts to surrounding receivers. The following locations are those considered as likely to have potential visual amenity impacts from ash placement in the Concept Approval sites:

- Neubecks Creek
 - Blackmans Flat (approximately 1.2 kms south of the southern border of Neubecks creek),

- Lidsdale (approximately 4 kms south east of the southern border of Neubecks creek),
 - Stretches of the Castlereagh Highway in proximity to Neubecks Creek,
 - Some rural residences in elevated locations east of the current Centennial mine site
-
- Ivanhoe No. 4
 - Areas of the east of Portland (approximately 1.5 km west of the Ivanhoe No. 4),
 - Pipers Flat (approximately 2.5 km south west of Ivanhoe No. 4),
 - Residences to the north east of Ivanhoe No. 4,
 - Stretches of Boulder Road and Black Cullen Bullen Road.

A detailed visual impact assessment including line of sight analysis would be undertaken once preliminary design of ash placement area is completed. This would be used to identify potentially visually sensitive sites in the study area.

Depending on the requirement for volume at each site and the surrounding topography, the ash placement areas are likely to be similar in height to those at Lamberts North and South and are not expected to be higher than an RL of 1,000 m.

10.2.2. Visual Impact Assessment

At the time of seeking Project Approval for these sites, a visual impact assessment will be undertaken in accordance with the Concept Approval requirements. For the purposes of this study, it is anticipated that the methodology followed for the Lamberts North and Lamberts South sites (Section 10.1.2) would form the basis of any assessment at a later date, and include:

- Line of sight analyses;
- Selection of representative sites;
- Development of photomontages; and
- Development of mitigation measures.

Development of a visual impact assessment methodology would also be undertaken in line with standards visual assessment practices at that time and based on a preliminary design of the ash placement areas.

10.2.3. Mitigation of Visual Impacts

All possible mitigation measures relevant to each site will be considered during assessment and development of the sites. Where possible, the siting of ash placement areas will be undertaken to maximise the use of surrounding topography as a visual shield. In this regard it is suggested that areas to the east of Neubecks Creek (such as Lidsdale) and the south of Ivanhoe No. 4 (Pipers Flat) may have reduced visual impact through prudent siting of ash placement areas to best utilise surrounding hills. The study area is not located in an area of high scenic value..

Cumulative impacts would also be minimised at this time due to the continued rehabilitation and revegetation of Lamberts North and Lamberts South.