

# VISUAL IMPACT ASSESSMENT

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## ASHTON COAL PROJECT

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Prepared for:

**ASHTON COAL OPERATIONS PTY LTD**

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## **1.0 INTRODUCTION**

### **1.1 Background**

Ashton Coal Operations Pty Ltd has commissioned Moir Landscape Architecture to prepare a visual impact assessment (VIA) for proposed raising off an overburden emplacement. The scenic assessment forms part of an amendment to an Environmental Impact Statement (EIS) being lodged with Planning NSW. The report details the results of the field work, documents the assessment of the proposal and makes recommendations concerning ways to mitigate any visual impacts arising from the proposal. The proposal is to raise the height of an overburden emplacement, known as the Eastern emplacement, from RL 125 to RL 135. This would eliminate the need for a second emplacement located on the western side of the New England Highway and known as the Western emplacement.

Fieldwork for this VIA was undertaken during March and April of 2004.

### **1.2 Objectives**

Objectives of the study include an assessment of:

- 1) The site in relation to any landscapes of local or regional significance.
- 2) Visibility from the general surrounds including major roads and surrounding residential areas.
- 3) Visual impacts from the shape, location and size of overburden emplacements and stockpiles.
- 4) Proposed mitigation measures to reduce visual impacts including overburden emplacement construction and the location and extent of proposed landscape screen planting, both on and off the site.
- 5) The visual impact of the final landform.

## **2.0 STUDY METHOD**

### **2.1 Visual Quality**

Visual quality measures the degree to which the visual aesthetics of a landscape are valued from a human point of view. Relevant studies have concluded that we tend to prefer landscapes that are relatively natural and vegetated, especially those with water features, dramatic topography, and contrasting features. Landscapes we usually least prefer are those with a high degree of human disturbance, as well as landscapes with few trees and landforms that are flat and unvaried (Wright, 1973; State Pollution Control Commission, 1981; and Colleran and Gearing 1980).

Visual quality for this study has been based on scenic quality ratings and on the following generally accepted assumptions arising from scientific research (DOP, 1988):

- Visual quality increases as relative relief and topographic ruggedness increases;
- Visual quality increases as vegetation pattern variations increase;

- Visual quality increases due to the presence of natural and/or agricultural landscapes;
- Visual quality increases owing to the presence of waterforms (without becoming common) and related to water quality and associated activity; and ,
- Visual quality increases with increases in land use compatibility.

In addition to the above, cultural items may also endow a distinct character to an area and therefore contribute to its visual quality due to nostalgic associations and the desire to preserve items of heritage significance.

## 2.2 Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different areas. The assessment is based on the number of people affected, landuse, and the distance of the viewer from the proposal. (EDAW, 2000).

For example, a significant change that is not frequently seen may result in a low visual sensitivity although its impact on a landscape may be high. Generally the following principles apply:

- Visual sensitivity decreases as the viewer distance increases.
- Visual sensitivity decreases as the viewing time decreases.
- Visual sensitivity can also be related to viewer activity (e.g. a person viewing an affected site whilst engaged in recreational activities will be more strongly affected by change than someone passing a scene in a car travelling to a desired destination).

Sensitivity ratings are defined as high moderate or low and are shown in the table below (EDAW, 2000).

<b>VISUAL SENSITIVITY TABLE</b>			
	<b>DISTANCE ZONES</b>		
<b>LAND USE</b>	<b>Foreground (0-1km)</b>	<b>Middleground (1-6km)</b>	<b>Background (&gt;6km)</b>
Residential: Rural or Urban	High Sensitivity	High Sensitivity	Moderate Sensitivity
Tourist or Passive Recreation	High Sensitivity	High Sensitivity	Moderate Sensitivity
Major Travel Corridors	Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity
Tourist Roads	High Sensitivity	Moderate Sensitivity	Low Sensitivity
Minor Roads	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Agricultural Areas	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Industrial Areas	Low Sensitivity	Low Sensitivity	Low Sensitivity

**Table 1 - Visual Sensitivity Table.**

### 2.3 Visual Effect

Visual effect is the interaction between a proposal and the existing visual environment. It is often expressed as the level of visual contrast of the proposal against its setting or background in which it is viewed.

Low visual effect occurs when a proposal blends in with its existing viewed landscape due to a high level of integration of one or several of the following: form, shape, pattern, line, texture or colour. It can also result from the use of effective screening often using a combination of landform and landscaping.

Moderate visual effect occurs where a proposal is visible and contrasts with its viewed landscape, however, there has been some degree of integration (e.g. good siting principles employed, retention of significant existing vegetation, provision of screen landscaping, appropriate colour selection and/or suitably scaled development.)

High visual effect results when a proposal has a high visual contrast to the surrounding landscape with little or no natural screening or integration created by vegetation or topography.

### 2.4 Visual Impact

Visual impact is the combined effect of visual sensitivity and visual effect. Various combinations of visual sensitivity and visual effect will result in high, moderate and low overall visual impacts as suggested in the below table (EDAW, 2000).

VISUAL IMPACTS TABLE				
		VISUAL EFFECT LEVELS		
		High	Moderate	Low
VISUAL SENSITIVITY LEVELS	High	High Impact	High Impact	Moderate Impact
	Moderate	High Impact	Moderate Impact	Low Impact
	Low	Moderate Impact	Low Impact	Low Impact

Table 2 - Visual Impacts Table.

### 2.5 Methodology

The method applied to assess the visual impact of raising the Eastern Emplacement included the following tasks:

- 1) A review of the local and regional context of the proposal.
- 2) Assessment of visibility of the proposal.
- 3) Review of the components of the proposal including lighting associated with raising the emplacement.
- 4) Identification and description of significant viewpoints that represent the range of possible views of the proposal.

- 5) Assessment of the visual sensitivity of the significant viewpoints and their localities.
- 6) Assessment of visual impact of the proposal based on synthesis of visual sensitivity and visual effect.
- 7) Recommendations of mitigation measures to reduce the visual impact.

### **3.0 EXISTING VISUAL CHARACTER**

#### **3.1 Regional context**

The site is located in the upper Hunter Valley, approximately 15kms west of Singleton and 30kms east of Muswellbrook. Both townships are located on the transport corridor created by the New England Highway and the Great Northern Railway.

The region is characterized by a range of landscapes from steep sloping peaks to gently undulating foothills and flat floodplains. Much of the upper Hunter Valley has been cleared for livestock grazing, agriculture and timber activities. Some of the mountain ranges are well vegetated. Vegetation on peaks ranges from open to closed woodland. Irrigated croplands and improved pastures are concentrated on flatter areas with creeklines and rivers skirted by native riparian vegetation dominated by casuarinas.

Major plant species tend to be gums with paperbarks and she-oaks occurring in wetter areas, Most frequently occurring species are Narrow leaved Ironbark and Grey Gum with River Oaks along creeklines and in wet areas.

*The impacts of mining in the area can be viewed clearly from the New England Highway as one travels between Singleton and Muswellbrook. The presence in this locality of a number of coal mines is the dominant visual feature and there is an agglomeration of mines between Singleton and the Bayswater and Liddell Power Stations.'*

(HLA Envirosciences, 2001)

The current landscape and visual character of the region is a result of the various landuses which have taken place over the years. These include tree clearing, agriculture, quarrying and mining, with the region containing the highest proportion of coal mining in the state, the majority being open-cut. Much of the Hunter Valley is picturesque. Agricultural areas, undulating hills, wooded peaks contribute to the scenic qualities of the area.

#### **3.2 Local Setting**

The site, as stated, is located between the two major townships of Singleton and Muswellbrook. The small village of Camberwell is located directly south-east of the site. Glennies Creek meanders around the village with the majority of houses located north of the New England Highway.

Glennies Creek Road, located off the New England Highway, provides access to the small village of Camberwell further north to Glennies Creek and Falbrook. The road runs along a minor ridgeline immediately north of

Camberwell and parallel to the south boundary of the Ashton Coal Mine. Entry to the coal mine is via this road.

Ravensthorpe, a smaller village, is located approximately four kilometres north-west of the site and is located just off the New England Highway. Smaller clusters of homesteads are dotted across the landscape.

The major visual elements dominating views from the New England Highway are of grazing land, creeklines and floodplains, and infrastructure and earthworks associated with open cut mining throughout the region.

### **3.3 Landscape character of the site**

The Main Northern Railway is situated on the Northern boundary of the site. There are dual tracks that provide rail links to Newcastle and north-west NSW. The rail provides movement of both freight and passengers. Glennies Creek Road runs along the south boundary.

The main mine infrastructure is located immediately east of the New England Highway. An environmental earth bund is located between the highway and the mine. It has been planted with native trees and once established, will screen the majority of mine operations from passing motorists.

There are two office complexes comprising demountable buildings and car park areas. Vegetation on site is concentrated towards the centre and is dominated by ironbarks and bullocks.

An area of Ashton Coal Mine land is located to the west of the New England Highway. This area will be undermined in the future and is the site where the approved western emplacement was to occur.

## **4.0 THE PROPOSAL**

### **4.1 General description**

The purpose of this VIA relates to the proposed raising of the Eastern Emplacement from RL 125 to RL 135. Raising the Eastern Emplacement to this height will eliminate the need for a second emplacement known as the western emplacement located on the western side of the New England Highway. Underground mining will take place in this area as opposed to open cut methods on the eastern side of the New England Highway. The visual impact within this area will therefore remain the same, as an area of grazing land with scattered trees.

Field work for this report was conducted when the Eastern Emplacement was at the approved height of RL 125. The slope of external batters from toe to crest will have a maximum slope of 14 degrees (or 1V:4H).

Assessment of the visual effects and impacts of having two emplacements and exploring alternatives has been outlined in this report

## 5.0 VISUAL IMPACT

### 5.1 Viewpoint Analysis

This part of the scenic assessment considers the likely impact the proposal may have on the local environment.

The viewpoints, as shown in **Figure one** were selected on the basis of where the proposal would appear to be most prominent, either based on the degree of exposure or the number of people likely to be affected.

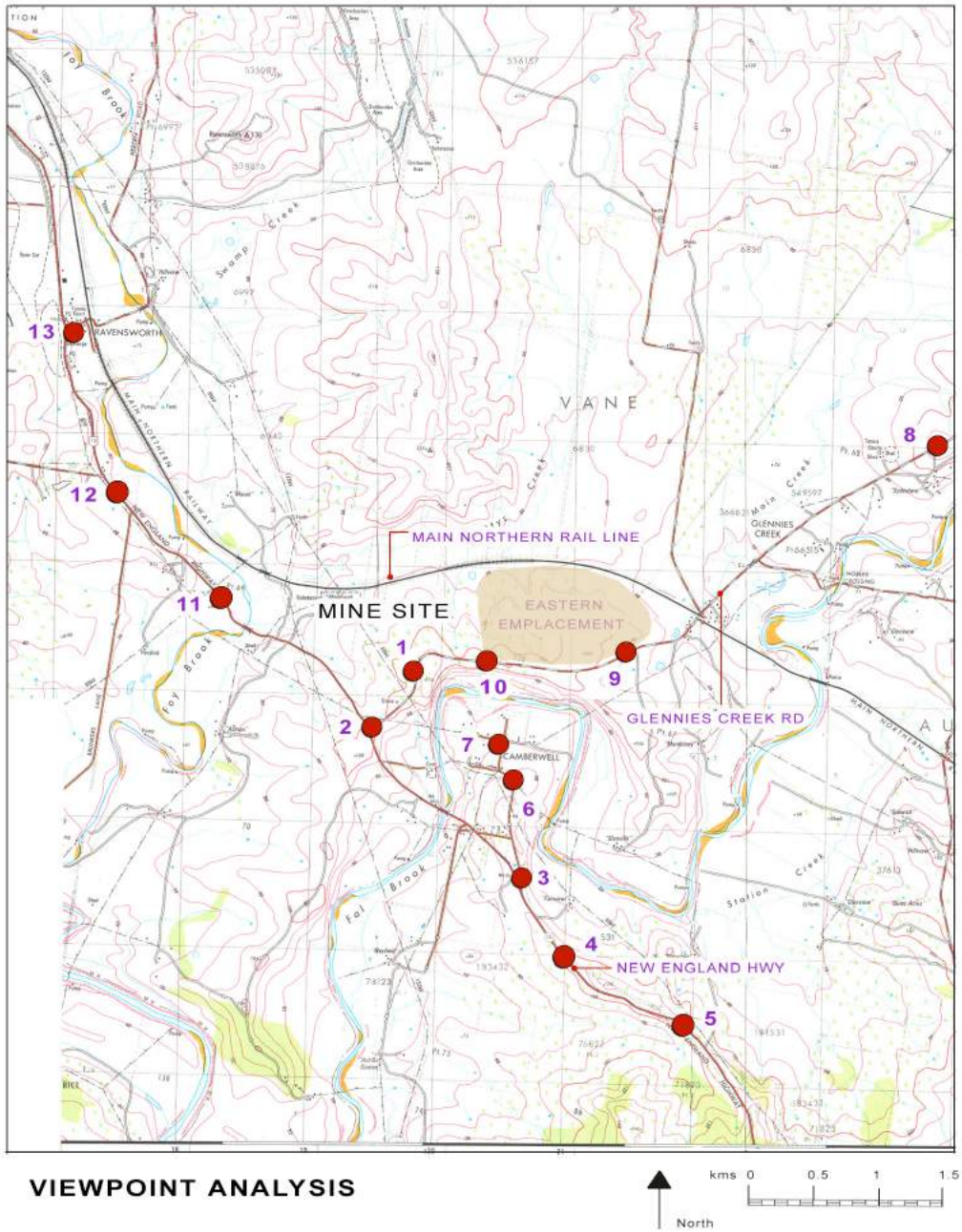
Sites were first selected by using topographical maps. This was followed by field inspections to ascertain the visibility from these sites. Further viewpoints were selected by driving or walking around the site area.

Within the primary visual catchment there are a number of significant viewing locations.

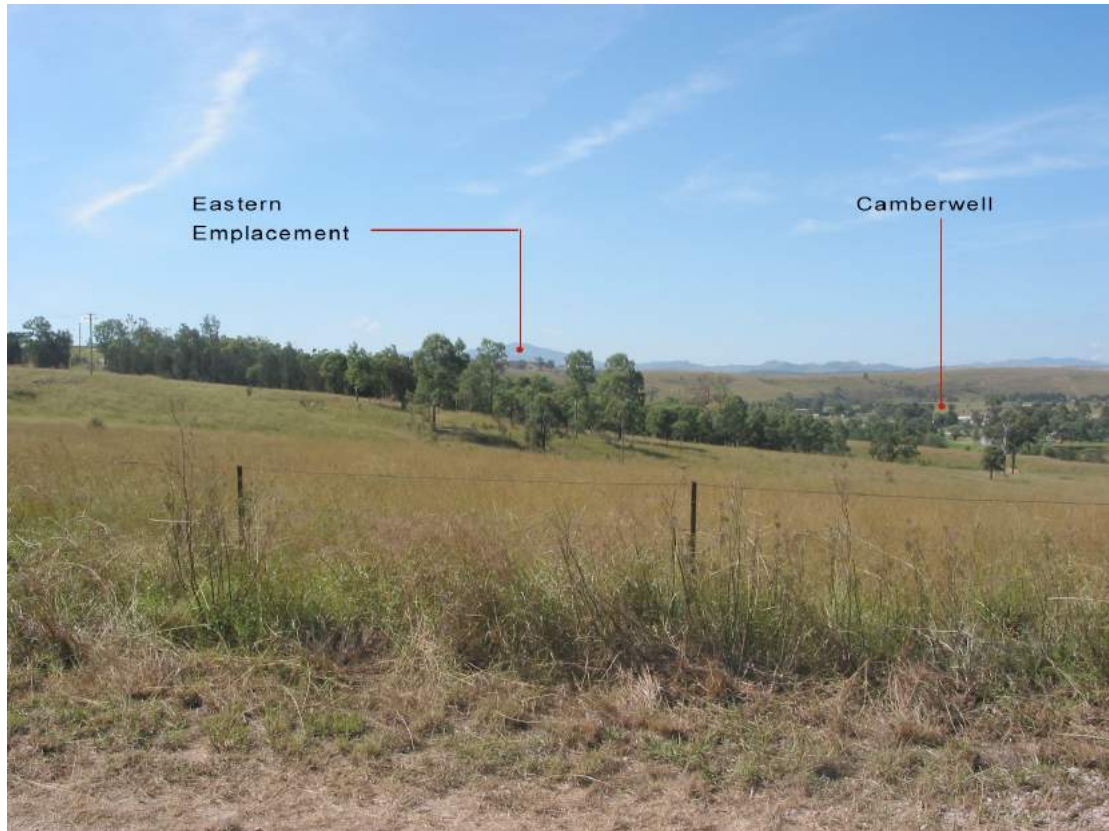
These include:

- New England Highway – Northbound traffic traveling towards Muswellbrook, south of the site,
- New England Highway - Southbound traffic traveling towards Singleton, north of the site,
- Camberwell Village, and
- Glennies Creek Road.





**Figure one – Viewpoint Analysis**



<b>Viewpoint</b>	1
<b>Location:</b>	Glennies Creek Road, near Ashton Entry
<b>GPS Coordinates:</b>	32°28.1905S 151°04.798E
<b>Height:</b>	101M
<b>Distance:</b>	1.2 km

**Description:**

From this viewpoint the emplacement (at RL 125) can just be seen behind tree tops and through tree canopies. The village of Camberwell can be seen on the low lying land to the right of the photograph. Glennies Creek road runs along the top of the ridge to the left of the photograph.

**Comments:**

This area isn't a prominent viewing location as drivers in either direction would not be directly facing the emplacement. Additional clumps of trees planted within the foreground and along the ridgeline will provide screening of the emplacement and contribute positively to the overall landscape character of the area.



<b>Viewpoint:</b>	2
<b>Location:</b>	Intersection of New England Highway and Glennies Creek Road
<b>GPS Coordinates:</b>	32°28.379S 151°04.914E
<b>Height:</b>	82M
<b>Distance:</b>	1.7 km

**Description:**

Viewpoint looking in an north-easterly direction from the intersection of the highway and Glennies Creek Road. Glennies Creek and associated riparian vegetation can be seen in the middle-ground of the photograph. The emplacement at RL 125 can be clearly seen along the ridgeline behind mature trees.

**Comments:**

Supplementary tree planting along the ridgeline will, overtime, screen the emplacement from view. Clump tree planting along the slope of the emplacement will help disguise the silhouette of the mound against the skyline. Extensive tree planting along the toe of the emplacement will screen the transition between the toe of the emplacement and the existing treeless section of hilltop.



<b>Viewpoint:</b>	3
<b>Location:</b>	View from New England Highway and Camberwell intersection
<b>GPS Coordinates:</b>	32°28.787S 151°05.539E
<b>Height:</b>	87M
<b>Distance:</b>	2.2km

**Description:**

View looking north from the turn-off from the New England Highway into the village of Camberwell. The emplacement at RL 125 is visible along the top of the hill to the right of the house in the foreground.

**Comments:**

Revegetation of the emplacement slopes will help reduce the visual impact from this viewpoint. The emplacement area will appear as a vegetated ridgeline.



<b>Viewpoint:</b>	4
<b>Location:</b>	View from New England Highway
<b>GPS Coordinates:</b>	32°29.113S 151°05.761E
<b>Height:</b>	100M
<b>Distance:</b>	2.8 Km

**Description:**

View looking north for motorists traveling towards Muswellbrook. The emplacement at RL 125 can be seen in the distance along the ridgeline.

**Comments:**

Supplementary tree planting along the upper slopes of the emplacement and along the top of the ridgeline will help reduce the visual impact and screen the emplacement from view. Clump tree planting, especially around the toe of the emplacement, will help integrate the emplacement into the line of the ridge.



<b>Viewpoint:</b>	5
<b>Location:</b>	View from New England Highway
<b>GPS Coordinates:</b>	32°29.406S 151°06.358E
<b>Height:</b>	111M
<b>Distance:</b>	3.4 Km

**Description:**

View looking north towards the site from the New England Highway. The view is obscured somewhat by vegetation within the foreground and middle-ground. Travel speeds mean only glimpse views are available for motorists as they pass this point.

**Comments:**

Supplementary tree planting at this point will screen the emplacement completely from view. Supplementary tree planting along the upper slopes of the emplacement and along the top of the ridgeline will help reduce the visual impact and screen the emplacement from view. Clump tree planting, especially around the toe of the emplacement, will help integrate the emplacement into the line of the ridge.



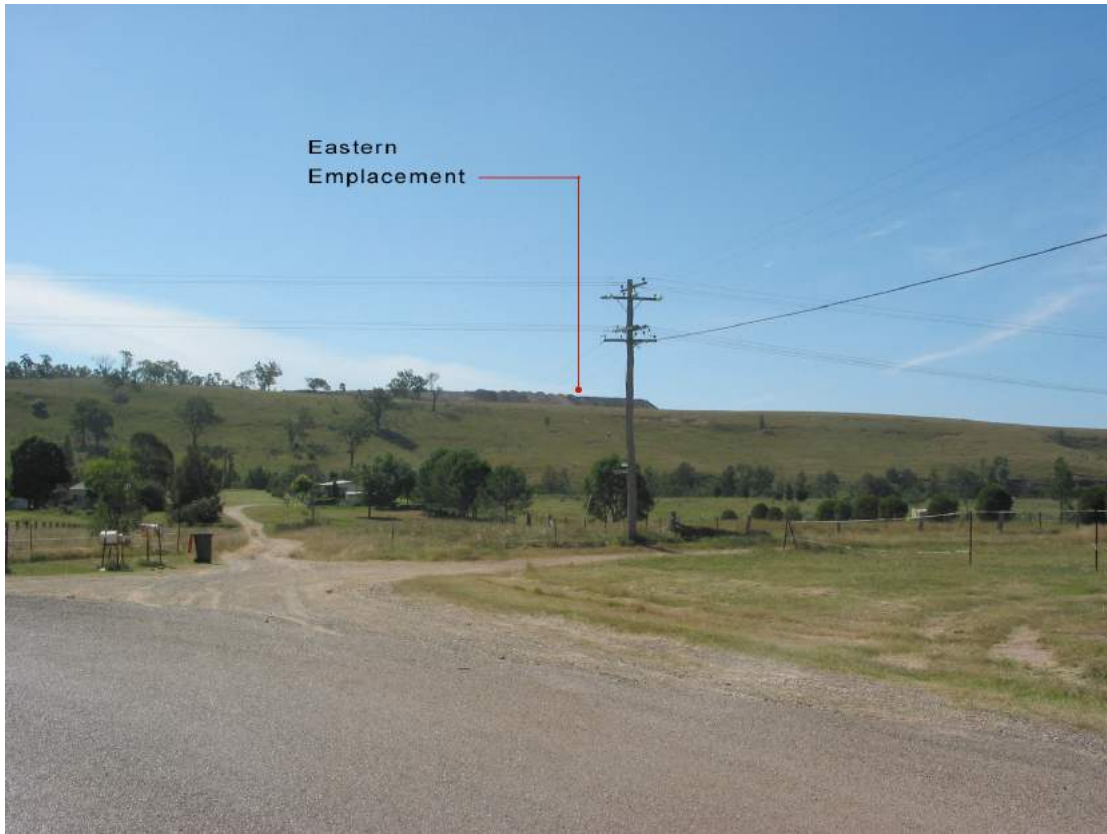
<b>Viewpoint:</b>	6
<b>Location:</b>	View in Camberwell.
<b>GPS Coordinates:</b>	32°28.382S 151°05.502E
<b>Height:</b>	85M
<b>Distance:</b>	1.4 Km

**Description:**

View looking north from a section of Camberwell Village. The area is characterized by pasture grasses with scattered groupings of trees within fields and around houses.

**Comments:**

From this viewpoint the emplacement will be clearly visible at RL 135. Proposed tree planting would obscure some of the view to distant ranges. The form of the final emplacement would be larger when compared to the original landform. Supplementary tree planting along the slopes of the emplacement and along the southern side of the ridge will help visually integrate the proposal and contribute positively to the overall visual quality of the region.



<b>Viewpoint:</b>	7
<b>Location:</b>	View in Camberwell
<b>GPS Coordinates:</b>	32°28.219S 151°05.442E
<b>Height:</b>	73M
<b>Distance:</b>	1.0 km

**Description:**

View looking north from a section of road in Camberwell Village. The area is characterized by pasture grasses with scattered groupings of trees within fields and around houses.

**Comments:**

From this viewpoint the emplacement will be clearly visible at RL 135. Proposed tree planting would obscure some of the view to distant ranges. The form of the final emplacement would be larger when compared to the original landform. Supplementary tree planting along the slopes of the emplacement and along the southern side of the ridge will help visually integrate the proposal and contribute positively to the overall visual quality of the region.





<b>Viewpoint:</b>	8
<b>Location:</b>	View from Glennies Creek Road.
<b>GPS Coordinates:</b>	32°29.961S 151°05.539E
<b>Height:</b>	87M
<b>Distance:</b>	3.3Km

**Description:**

View looking south west from an elevated section of Glennies Creek Road. The emplacement and mining operations are visible as disturbed earth. Mountain ranges are visible in the background

**Comments:**

The emplacement from this viewpoint appears most evident because of the bare earth. Tree planting and grass cover will help reduce the visual impact and provide a continuation of tree coverage across the hilltop. This is the first point along Glennies Creek Road where the emplacement will be clearly visible. Topography, roadside vegetation, and distance obscure the mine from view when traveling in a southerly direction along Glennies Creek Road.



<b>Viewpoint:</b>	9
<b>Location:</b>	Direct view of emplacement from Glennies Creek Road.
<b>GPS Coordinates:</b>	32°27.856S 151°05.994E
<b>Height:</b>	109M
<b>Distance:</b>	0.3 Km

**Description:**

View from Glennies Creek Road travelling west toward the New England Highway showing construction of the environmental bund.

**Comments:**

It is recommended that the bund be planted with native trees endemic to the region. This area will appear as woodland, fragmenting views to the mine operation.



<b>Viewpoint:</b>	10
<b>Location:</b>	View of emplacement from Glennies Creek Road.
<b>GPS Coordinates:</b>	32°27.871S 151°05.474E
<b>Height:</b>	112M
<b>Distance:</b>	0.4 Km

**Description:**

View looking east along Glennies Creek Road. Construction of the environmental bund is visible to the left of the photograph. Distant views in the background of the photograph show overburden emplacements associated with a neighbouring mine.

**Comments:**

Existing trees along the site boundary are to be retained and batters of the emplacement are to be planted with native trees. This area will appear as woodland, screening the mine operations from view. It is recommended that the area to the right of the photo (on the opposite side of the road) be revegetated to provide additional screening.



<b>Viewpoint:</b>	11
<b>Location:</b>	View of mine from New England Highway.
<b>GPS Coordinates:</b>	32°27.102S 151°03.502E
<b>Height:</b>	76M
<b>Distance:</b>	2.5 km

**Description:**

View looking east towards the emplacement along the New England Highway. At this point the emplacement is difficult to see as it blends with vegetation along the ridge, a recently planted environmental bund.

**Comments:**

Additional tree planting along the floodplain and within the riparian corridor will screen the emplacement and mine activities from motorists traveling along the New England Highway.



<b>Viewpoint:</b>	12
<b>Location:</b>	View of mine from New England Highway.
<b>GPS Coordinates:</b>	32°27.503S 151°03.502E
<b>Height:</b>	73M
<b>Distance:</b>	2.8 Km

**Description:**

View from New England Highway looking east south east towards the Ashton Coal Mine. Riparian vegetation dominated by casuarinas is visible in the middle-ground and forms visual relief from distant views to the mine visible in the background

**Comments:**

Additional tree planting along the floodplain and within the riparian corridor will screen the emplacement and mine activities from motorists traveling along the New England Highway.



<b>Viewpoint:</b>	13
<b>Location:</b>	View from Hebdon turnoff.
<b>GPS Coordinates:</b>	32°26.460S 151°03.318E
<b>Height:</b>	91M
<b>Distance:</b>	4.4 Km

**Description:**

View from Rasensworth at the Hebdon turnoff. The Main Northern Rail Line is evident in the mid-ground of the photograph. Vegetation associated with Bowmans Creek and the slight rise behind the watercourse provides significant screening of the emplacement construction.

**Comments:**

The emplacement will be visible at RL 135. Visual impact will be moderate during construction however overtime the vegetated emplacement will blend with the middle-ground vegetation.

## 5.2 Visual Impacts

Overall, the proposed raising of the Eastern Emplacement from RL 125 to RL 135 will result in impacts on the existing surrounding environment in terms of landscape and scenic values. The visual impacts associated with the raising of the emplacement will vary depending on the viewing location.

The emplacement is already visible from certain viewpoints at RL 125 and it is undeniable that it will be more visually prominent at RL 135. However, the visual impact will be primarily during the construction phase. By adopting and implementing the mitigation strategies outlined in the report the emplacement, overtime, will appear as a natural feature of the landscape.

The impacts would be of greater significance to viewers in closest proximity to the emplacement, particularly the residents of Camberwell. The village of Camberwell has a high sensitivity and will experience a high visual impact in the initial period up until the outer slopes of the emplacement are constructed and vegetated. Overtime, as the vegetation matures, the impact will be moderate and ultimately low. There will be some visual impact associated with the incremental raising of the emplacement when the slopes are bare.

Another visual impact will be for motorists traveling northbound and southbound along the New England Highway. These points have been identified in the viewpoint analysis.

There are locations such as to the East along Glennies Creek Road where the emplacement may be seen. Further east, past viewpoint 8 the emplacement and mine operations are screened from the view of motorists. Roadside vegetation and the undulating nature of the land provides this screening. Also the amount of people viewing from these areas is minimal.

These impacts will be mitigated over time with the maturation of proposed landscape screen plantings, including plantings of the environmental bund and proposed off-site planting south of Glennies Creek Road along the southern side of the ridgeline. An extensive landscape works program integrated with the construction stages of the emplacement will create an attractive tree-lined ridge.

It should also be noted that raising the eastern emplacement to the proposed height would eliminate the need for the western emplacement (planned for the western side of the New England Highway). This area will remain as pastoral land, free from any visual disturbance.

There are areas along both the New England Highway and Glennies Creek Road where open cut mining and overburden emplacements (associated with other coal mines) are frequent and extremely visible. Mining, especially open cut mining has become part of the upper Hunter landscape character, especially along the New England Highway between Singleton and Muswellbrook. When compared to the overburden emplacements associated with neighbouring mines, the Ashton Coal Mine emplacement will have minimal impact on the Regional Landscape character and will be

rehabilitated within a relatively short timeframe. The immediate area has some excellent examples of mine rehabilitation and revegetation which contribute positively to the overall landscape character of the area.

## 6.0 IMPACT MITIGATION STRATEGIES

### 6.1 General

Proposed mitigation measures seek to achieve a better regional visual integration and additional visual screening of the proposal. The mitigation measures attempt to lessen the visual impact of the emplacement.

### 6.2 On-site treatments

#### REHABILITATION

Rehabilitation will comprise a staged program of planning, landform construction and monitoring. The primary objectives are to create a stable landform visually compatible with the surrounding environment and to establish a permanent self propagating vegetative cover.

The land-use objectives are

- To minimize the amount of disturbed land requiring rehabilitation. This will be achieved primarily by eliminating the need for the western emplacement.
- To provide vegetative cover to reduce the potential for erosion and the extent of bare earth.
- To provide visual enhancement of post-mining landforms and rehabilitated infrastructure areas.

#### OVERBURDEN EMPLACEMENT DESIGN

The Eastern Emplacement has been designed with an environmental bund to the southern side of the emplacement as shown in figure 2 and figure 3. The bund will be constructed to the proposed finish height of RL 135. It is intended that the bund be planted with native trees as soon as possible after initial construction and each subsequent raising of the emplacement level. This will minimise the visual impact of slopes on areas viewed from the south of the emplacement and further south of the site.

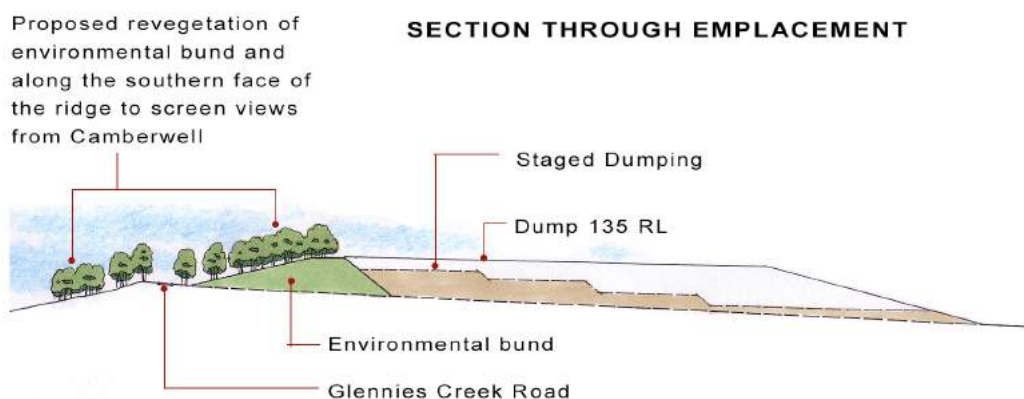


Figure 2 – Section through emplacement.



## REVEGETATION

The objectives of the revegetation program are to establish a stable, self-sustaining vegetation complex consisting of endemic trees and pasture grass. It is proposed that revegetation methods combine a mix of hydromulching and tube-stock planting in an attempt to provide screening of the emplacement and to match vegetation patterns found in the area.

## REVEGETATION METHODOLOGY

Topsoil removed from the excavated areas will be immediately respread onto recontoured areas or stockpiled. Following the recontouring of overburden dumps, topsoil will be spread to a depth of approximately 100mm. The revegetation program will follow topsoiling and will include groundcover species to control initial soil erosion and native trees and shrubs.

Revegetation methods will comprise:

- Deep ripping to remove any compacted surface layers.
- Topsoil spread evenly over the surface to a minimum depth of 300mm.
- Seeding of pasture grasses, tree and shrub species.

Revegetated areas will be monitored regularly. Maintenance will be carried out to promote acceptable cover or to repair failed areas. Tube-stock planting will be carried out for species difficult to germinate and in areas requiring control over the final location of tree species

The overburden emplacement revegetated with trees and grass will help restore the visual character of the area. The form of the emplacements when compared to the original landform will be larger. Variations, specifically in the location of trees, will help visually integrate the emplacement as a permanent landform element.

Planting trees in clumps will achieve a pattern of vegetation cover that is in keeping with the surrounding landscape character. Clump tree planting on the top sections of the environmental bund will also break up silhouettes of the emplacement against the skyline. Understorey planting between clumps will create a continuous habitat corridors across the ridge.

### **6.3 Off-site treatments**

The two areas where the emplacement will be most visually prominent is south of the site along the New England Highway and from within the village of Camberwell.

Additional tree planting along the upper slopes of the ridge south of Glennies Creek Road and within the road reserve it self will provide additional screening and further visual integration of the emplacement. This planting will also complement the proposed planting of the environmental bund, providing a continuous swathe of vegetation over the ridge.

Additional tree planting is proposed for the floodplain area, north of the site and following Bowmans Creek. This would eventually screen any potential

views of the emplacement for motorists travelling southbound from Muswellbrook to Singleton.

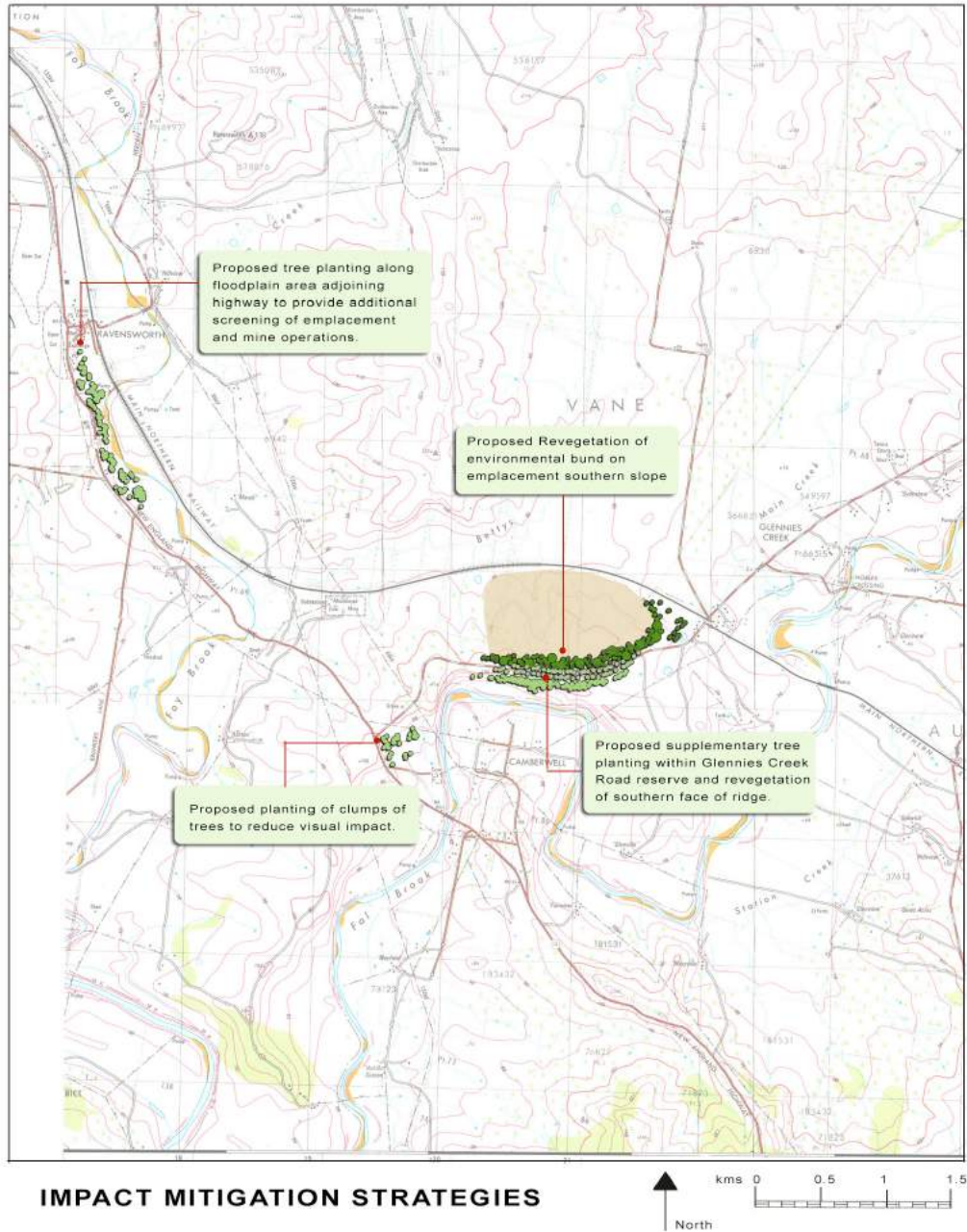


Figure 3 – Impact Mitigation Strategies

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