



Appendix 12

Visual Impact Assessment

South East Open Cut Project
&
Modification to the
Existing ACP Consent

ASHTON COAL SOUTH EAST OPEN CUT PROJECT



VISUAL & LIGHTING IMPACT ASSESSMENT

***Prepared for
ASHTON COAL OPERATIONS PTY LTD***

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Appendix A:

The following drawings prepared by O'Hanlon Design Pty. Ltd. are appended as referenced in the body of the report.

- Drawing 828-01-B Study Area
- Drawing 828-02-B Significant Water and Vegetation Analysis
- Drawing 828-03-B Slope Analysis
- Drawing 828-04-B Scenic Quality Areas
- Drawing 828-05-B Location of Viewpoints
- Drawing 828-06-B Landscape Management Zones

Appendix B:

- Ashton Coal Land Ownership Drawings – Figures 1.2 and 1.3, (Plans 2 and 3 respectively)
- The drawings of the Proposed South East Ashton Mine Plans for Years 1, 3, 5 and 7 (Plans 7, 8, 9, 10)

Appendix C:

- South East Open Cut Project, Existing & Proposed Electrical and Utility Easement Figure 4.17 (Plan 20)

1.1 Objectives

The objectives of this Visual Impact Assessment report are:

- To analyse the visual character of the regional and local landscape with reference to the Study Area; and
- To assess the visual and operational lighting impacts of the proposed Ashton Coal - South East Open Cut (SEOC) and the proposed ameliorative measures.

1.2 Methodology

This visual impact assessment has been divided into five sections:

1. Introduction
2. Landscape Assessment
3. Scenic Quality Assessment
4. Relevant Aspects of the Proposed Development
5. Visual Impact Assessment

The methodology outlined in **Figure 1.1** is based on the model developed by the Forest Commission of Victoria and the landscape assessment techniques of the U.S. Department of Agriculture (USDA), and has been adapted for the purpose of this project.

The method of assessment of visual impact has been the subject of professional discussion and analysis since the early 1970's. Much of the work on visual impact has been carried out by the United States Department of Agriculture (USDA) Forest Service. The USDA Forest Service has issued the following documents amongst others to describe an appropriate method of impact assessment:

- "Forest Landscape Description and Inventories. A basis for Land Planning and Design" USDA Forest Service Research Paper PSW-49 R. Burton Litton Jr;
- National Forest Landscape Management Handbook No. 434 February 1973;
- USDA Forest Service, Agricultural Handbook No. 462, "National Forest Landscape Management" Volume 2 Chapter 1 The Visual Management system - April 1974;
- "National Forest Landscape Management" Volume 2 Chapter 2 Utilities, USDA Forest Service - July 1975; and
- USDA Forest Service "National Forest Landscape Management" Recreation Volume 2 Chapter 8, Forest Service Agricultural Handbook No. 666 - December, 1987.

The scenic assessment method used by the USDA Forest Services is a systematic approach to visual assessment using quantitative measures. It assesses the influence of landform, vegetation, water and other landscape factors on scenic quality with refinement applied for the sensitivity levels of the viewers from various selected viewpoints.

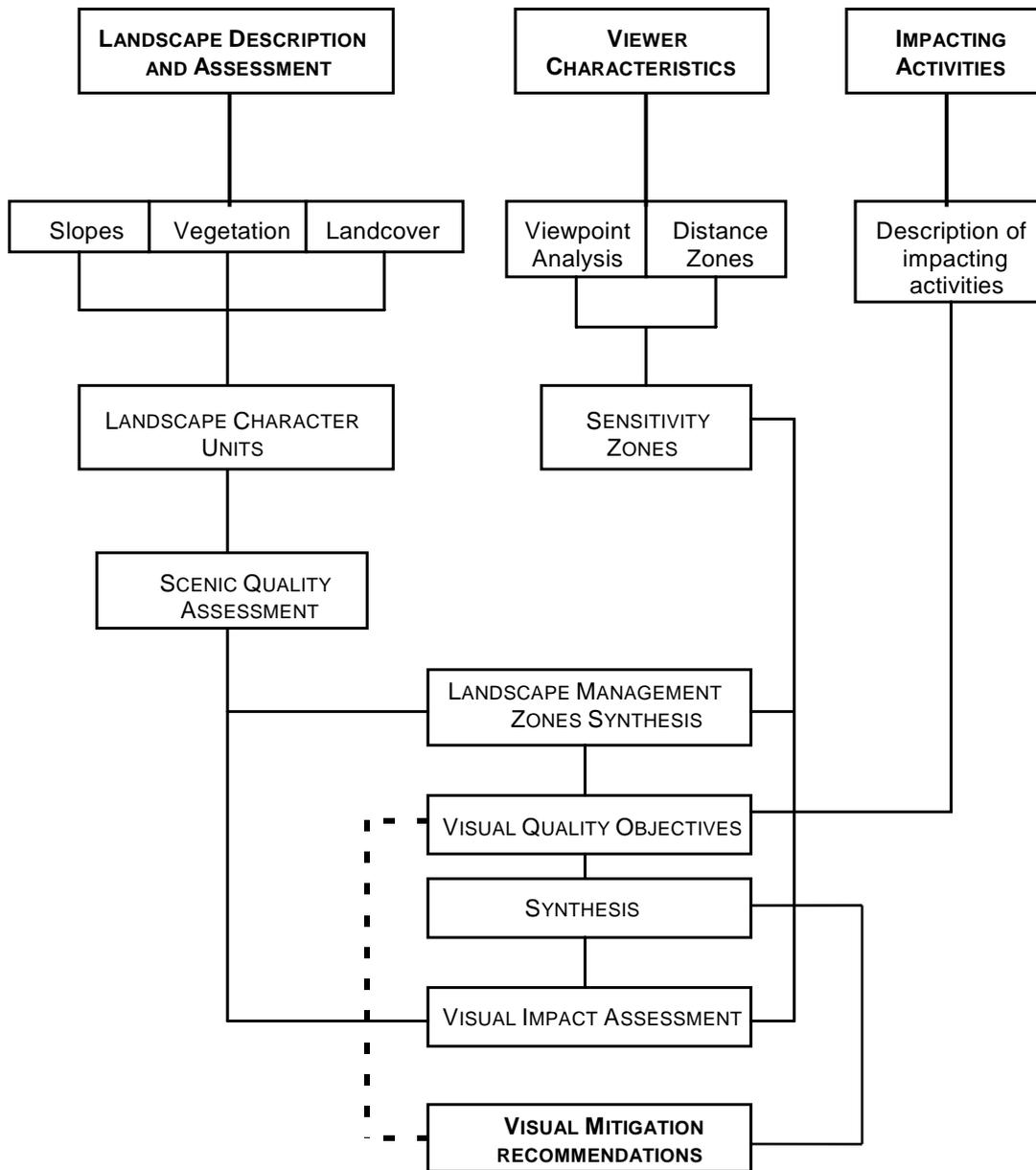
Early attempts to assess visual impact contained a very high level of subjectivity. The search for a qualitative assessment of visual impact seeks a higher level of objectivity in determining visual impact of any particular project or development. The USDA Forest Service system has become a benchmark for the qualitative measurement and assessment of the visual impact. Adaptations and derivations of this method have been in use in Australia by a variety of consultants for over two decades.

The Forest Commission of Victoria (The Commission) has also developed a programme of scenic management policies and guidelines. As an initial basis for assessment The Commission has adapted descriptive criteria used by the USDA Forest Service. This approach is described in the article entitled "Scenic Perceptions of Australian Landscapes" by Dennis Williamson in Landscape

Australia published April, 1979. For the purpose of this study O'Hanlon Design Pty Ltd has adapted the study technique to suit the topography, likely viewer characteristics and suitable distance zones.

Figure 1.1

Visual Impact Assessment Methodology



2.1 The Project

The South East Open Cut (SEOC) Project is located approximately 13km north west of Singleton adjacent to the New England Highway and the village of Camberwell.

Ashton Coal seeks to extract coal from a site area of approximately 283ha south of the New England Highway and just east of Glennies Creek. The project is an open cut extraction over a proposed mine life of 7 years. To ameliorate potential impacts Ashton Coal propose to establish a 53ha visual and acoustic environmental bund to the north east and east of the proposed SEOC. Further east of the environmental bund an access road and water storage dam will be created. The proposed road will access a new complex of surface facilities to service the SEOC located to the south east of the proposed open cut area (OCA). The construction of the environmental bund and overburden emplacement will be followed by progressive rehabilitation of the final landforms.

Coal handling infrastructure for the project will supplement the existing infrastructure adjacent to the Ashton North East Open Cut. A new ROM dump station is proposed west of the SEOC adjacent to Glennies Creek. From the dump station a conveyor will run north crossing Glennies Creek following the topography uphill toward the road cutting of the New England Highway. The conveyor will cross the New England Highway above the road cutting and run parallel to the highway to the north-west, terminating at the existing Ashton Coal Handling and Preparation Plant (CHPP). See **Drawing 828-01-B** in Appendix A and the South East Ashton mine plans in Appendix B for locations of the proposed SEOC and the associated infrastructure.

Construction of the environmental bund, the overburden emplacement from SEOC, progressive rehabilitation, the ROM facility, the water storage, conveyor and associated surface facilities will be visible to viewers along the New England Highway, Camberwell Common and from the village of Camberwell.

2.2 The Existing Environment

2.2.1 Regional Landscape Character

The regional landscape character of the upper Hunter Valley has several consistent elements. The uplift of the Great Dividing Range and the Hunter River are the unifying elements that develop consistency in the landscape. The Great Dividing Range forms a continuous backdrop to the west visible from large areas of the region. The character of the landscape varies greatly from east to west as the escarpments soften, the foothills reduce in elevation and the dominance of the flood plain increases. The common thread to the landform is the influence of the Hunter River. The Hunter River and its tributaries have carved the landscape creating the foothills, undulations and folds that are the predominant features of the landscape. The resultant landforms reflect the speed and nature of the river as it meanders through the foothills gathering volume to eventually flow south east to the coast.

To the west of the region are the various elements of the Great Dividing Range, mountainous terrain covered with remnant natural vegetation. The topography generally is therefore steep and rugged on the western edge and the visual catchment of the region is bounded to the west by rocky escarpments and dense vegetation. These areas are situated away from the main urban and transport corridors of the Hunter Valley. Despite the influence of the rugged, heavily vegetated slopes of the Great Dividing Range that form a backdrop at the western edge, the landscape character of the region is however predominantly rural.

Toward the east, the terrain transforms into foothills, the predominantly rural countryside and the undulating areas of the Hunter Valley. At the western edges the foothills are often steep and highly undulating. To the east the foothills are flatter and with less physical relief. Originally these slopes and foothill areas were closed eucalypt forest however most areas have now been substantially cleared for rural development with remnant pockets of the forest remaining in some locations.

The dominant rural activity in the region is dry land grazing however on the floodplain and more fertile areas, cropping and its variety of textures and colours is a significant visual element. Both of these activities have different visual properties. The unirrigated grazing areas are consistent in

colour and are covered in a mosaic of fencing and pasture grass patterns following the subdivision lines of the property or the local topographical features of the countryside. On the other hand the fertile floodplain areas have a more variable visual quality. The colour and texture of the floodplain areas varies strongly with the seasons of the year as crop rotation and ploughing vary the texture and colours of the landscape. For the casual observer this creates diversity and visual interest with a seasonal quality.

Smaller areas, within the west of the region, with suitable soil profiles are also under cultivation as vineyards for grape production. Where they occur, vineyards have a more structured appearance. Dotted within the grazing lands, often on hillsides that are steep and difficult to graze, vineyards create a contrast of visual elements in the agricultural zones where they are grown. The line and form created by the trellises following the local landforms provides visual diversity. Similar to cropping, the vines themselves can create visual interest due to the changes in colour and density of vegetation visible in different seasons.

Another consistently strong visual element within the regional character is open cut coal mining. Often screened from main travel routes or hidden from view in remote locations, the region is home to a large number of open cut coal mines and their associated infrastructure. Commencing near Maitland to the north west of Lake Macquarie and extending north to beyond Muswellbrook, the central plains and western edges of the Hunter Valley are dotted with numerous open cut coal mining projects. Mining operations are visible along New England and Golden Highways as well as many secondary and rural roads. The open cut areas are not always identifiable as visibility depends on screening and the relevant stage of cut and rehabilitation for individual mines. Viewing opportunities vary as mines open and close areas for extraction and rehabilitation. Many of the associated infrastructural elements, including coal handling facilities and coal preparation plants are also visible within the region.

The coal industry was formerly concentrated in the lower Hunter Valley areas. In the last 50 years it has moved north gradually identifying resources and opening mines throughout the upper regions of the Hunter Valley following the underlying geological deposits. Mines have become larger and infrastructure generally is clustered close to the rail transport corridor. In more recent years, approval of open cut mines at the Integra Mine (Glennies Creek), Ravensworth East-Narama, Camberwell, Rixs Creek, Bengalla and Mount Arthur North have resulted in open cuts and infrastructure around Singleton and to the north of the region, within the upper Hunter Valley.

Further east the landscape becomes softer and less heavily dissected by waterways. The Hunter Valley dominates the topography and the surrounding land is predominantly flood plain and low foothills. These areas are less diverse in natural visual quality and more heavily modified by human intrusion at a local scale. The towns and urban infrastructure are denser in the eastern areas of the valley, concentrated around the rivers and following the historical transport corridors. This area has a variety of agricultural uses. Agricultural infrastructure of low to moderate scale is sprinkled throughout the region and creates a unifying theme that complements the rural visual quality.

Major cultural modifications to the existing landscape in the region include:

- Towns and villages: Singleton, Muswellbrook and a variety of smaller towns and villages;
- The widespread transformation of open eucalypt forest into grazing and farming pasture lands and crop production;
- The New England Highway and a range of local road infrastructure;
- The Main Northern Railway line ;
- A series of power generating facilities (Liddell, Bayswater and Redbank);
- A number of man made lakes and water storage facilities;
- A range of open cut and underground coal mining facilities in various stages of development and rehabilitation;
- The horizontal lines of coal conveyors and the vertical lines of a series of hoppers, loaders and coal preparation plants associated with each mine;
- A variety of power transmission lines criss-crossing the landscape; and
- A sprinkling of smaller communities and rural residential properties.

2.2.2 Local Landscape Character



PHOTOGRAPH 1 *Typical local landscape character*

Similarly to the regional character, the local landscape character is heavily influenced by the topography, drainage lines and the underlying geology of the Study Area. For the local landscape around the Ashton SEOC Study Area one of the key elements is the influence of the waterways: the Hunter River to the south of the Study Area, Glennies Creek and Bowman's Creek, winding through the Study Area and a wide range of intermittent creeks and tributaries dissecting the landform, creating the drainage patterns and topographical changes that have moulded the local landscape. The landscape is representative of areas midway between the Great Dividing Range and the floodplain. The dominant form is the undulating slopes and foothills. The foothills vary in elevation gradually reducing in elevation to the east. Cultural modification has occurred where the foothills are suitable to allow clearing for agricultural purposes. Remnant pockets of vegetation occur, particularly on steeper slopes, creating some diversity of colour, line and form. In keeping with the rural landscape the foothills are traversed by a myriad of fence lines and a variety of coloured patterns formed by the changes in the fenced vegetation.

The alignment of the New England Highway generally follows the ridges and significantly influences the scenic quality for the majority of viewers. From the elevated ridges the landscape opens and closes revealing a mixture of distant vistas and enclosed valleys. Many of these are rural, some are dissected by operational open cut mines and others have the harder edges of recently re-vegetated and rehabilitated landforms.

Major cultural modifications in the local visual landscape include:

- The New England Highway;
- Camberwell village;
- A range of local road infrastructure;
- A variety of power transmission lines;
- The Main Northern Railway line: north of the Ashton north east open cut; and
- The existing Ashton north east open cut and associated infrastructure;
- The Ravensworth –East Narama open cut and associated infrastructure;
- Glennies Creek open cut and associated infrastructure;
- Camberwell open cut and associated infrastructure;
- Rixs Creek open cut and associated infrastructure;
- Maison Dieu and rural residential properties.

2.3 The Study Area



PHOTOGRAPH 2 Site of the Ashton South East Open Cut project

The Study Area is identified on **Drawing 828-01-B** in Appendix A and can be primarily defined as the visual catchment surrounding the SEOC. Areas within the visual catchment more than 6500m to the west of the SEOC and up into the edge of the ranges have been excluded from the Study Area as potential viewing locations are relatively inaccessible and the visual impact of the SEOC will be minimal due to distance. The remaining catchment is confined due to the surrounding topography.

To the north the remodelled landform of the Ashton North East Open Cut (NEOC) with ridge heights of approximately 135 AHD forms a visual boundary. Views of the SEOC are not possible along Glennies Creek Road after it turns north to cross the Main Northern Rail line.

To the east the line of the New England Highway follows an elevated ridge that forms a high level viewing location and a natural visual boundary to the Study Area. To the south east a heavily wooded ridgeline incorporating a high point at the survey mark identified as Cauter (171 AHD) forms a visual barrier approximately 500 metres beyond the proposed surface facilities.

To the south and south west topography undulates gently up to the line of Maison Dieu Road and the small settlement of Maison Dieu approximately 5800 metres from the south edge of the SEOC. The visual catchment to the south extends a significant distance to the edge of the Dividing Range however for the purpose of this study is best defined as approximately 6000 metres south of the SEOC along Maison Dieu Road.

To the west the topography undulates gently over Glennies Creek and Bowman's Creek and on toward the Ravensworth-East/Narama mine approximately 2200 meters further west. The visual catchment to the west is however determined by the height of the ridgeline varying up to 104 AHD between Glennies Creek and Bowman's Creek approximately 900 metres west of the site of the SEOC.

2.4 Landscape Description and Visual Character of the Study Area

The Study Area can be broken into broad homogenous landscape units of slope, vegetation type and landscape cover. The landscape units are described below in terms of their visual components of form, line, colour, texture and cultural modifications. Cultural modifications are assessed to ascertain the degree of change that has occurred to the predominant character of the area. See **Drawing 828-02-B and 03-B** in Appendix A for a vegetation, water body and slope analysis of the Study Area.

2.4.1 Ridgeline and Upper Wooded Slopes

The bulk of this landscape unit forms a distant backdrop to the west beyond the boundary of the Study Area. Slopes range from 20 to 40 %. Within the Study Area some small and isolated pockets of steep slopes occur adjacent to the edges of Glennies Creek. These isolated areas are relatively insignificant in the overall character of the Study Area.

Form: The steep slopes, rock outcrops and high elevation form the dominant visual element in this landscape unit, to the west an escarpment is visible.

- Line: Line is a strong visual element for this unit, when viewed from within the Study Area as the ridgelines form the silhouettes against the skyline.
- Colour & Texture: The dense vegetation particularly on and adjacent to the ridgelines results in a dark undulating edge silhouette and provides a contrast in colour and texture to the foreground cleared areas. There is also a strong colour and textural contrast at the horizon line.
- Cultural: The natural character is dominant. The existing cultural changes and elements are insignificant in this unit.

2.4.2 Undulating Foothills (Vegetated and Cleared)

Undulating foothills are the predominant unit visible within and outside the Study Area. Consequently this unit contributes significantly to the overall character of the Study Area. This unit is comprised of slopes in the range of 10 to 20%.

- Form: The form of cleared undulating slopes and foothills is very strong within the Study Area. The foothills fold and wrap smoothly around each other forming a series of gentle modulations in the landscape.
- Line: The line of undulations is variable and relatively soft and appears well worn. The transition elements are more even and cascade toward the creek lines in a series of overlapping interfolds.
- Colour & Texture: There is a moderate diversity of colour and texture within the unit. The diversity is created by the juxtaposition of the cleared agricultural land and the remnant pockets of open canopy eucalypt forest. When travelling through the landscape by car this diversity creates interesting vistas and variety of scenic opportunities.
- Cultural Changes: All the significant cultural modifications are located within this unit. The locations and working faces of several of the open cut mines appear in the lower sections of the foothills. These are highly dominant, incompatible forms within the general landscape. The contrast of line, form and colour creates eye catching elements that are severe impacts within the predominantly rural landscape.

2.4.3 Valleys and Floodplain Areas (slopes less than 10%)

The valleys and creek floodplain areas are the other significant unit visible within the Study Area. The main body of this unit is located throughout the centre of the Study Area. They include the catchments of Glennies Creek and Bowman's Creek and several other un-named creeks.

- Form: The form is relatively unimposing and due to the horizontal line of the landform, any vertical elements situated on this landform gain high visual prominence in the landscape due to contrast with the flat floodplain and alluvial landforms.
- Line: The horizontal plane of the landform makes line a strong visual element in this landscape unit.
- Colour & Texture: Colour is a distinctive visual element in this landscaped unit. The contrasting dark trees of the surrounding ridges and creek lines with light green grasses create clear distinctions of vegetation. Significant parts of the unit along the creek lines have interspersed vegetation cover. These contrasts create visual variety in the Glennies Creek area.

Cultural Changes: The appearance of the creeks has been altered by clearing of the banks and in some locations significant soil erosion. They form a strong element in the remaining landscape where vegetation remains in its original form. Bridges and the associated hard edges for strong linear elements for viewers along the fringes of the road network.

2.4.4 Water Bodies

The main water body within the Study Area is Glennies Creek meandering through the centre of the Study Area. The small creeks and tributaries to Glennies Creek are less significant items. Many only flow intermittently and are not easily visible from public locations.

Line: The meandering courses of the creek and its small size result in line being a moderate level visual element in this landscape unit. These linear elements are accentuated by vegetation, especially the verticality of the trees along the water course.

Form, Colour & Texture: The form, colour and texture of the creeks themselves are relatively insignificant to the viewer in these units. At the New England Highway crossing of Glennies Creek, the creek and tributaries are observable and would be significant only in periods of high flow.

Cultural Changes: The only significant water based cultural modifications are the many small dams that are dotted throughout the Study Area. These are located on the drainage lines and are an interesting repetitive element when rainfall has been sufficient to fill the dams. During drought conditions they have negligible scenic value.

Other than the Hunter River and Glennies Creek, the water bodies themselves are of little visual significance however the line and colour of the associated vegetation adds significantly to the visual amenity.

2.4.5 Cultural Elements

Significant cultural elements such as villages and infrastructure are represented in or adjacent to the Study Area by;

- The New England Highway with associated road cuttings and bridges,
- Camberwell village,
- The 132kVa transmission line crossing the site of the SEOC from north west to south east and the 66kVa transmission line running parallel and to the north of the New England Highway; and
- The Main Northern Rail line adjacent and to the north of the Study Area.
- Existing coal mining infrastructure and extraction areas within the Study area are,
- The Ashton Coal Project:

The underground and open cut areas of the Ashton Coal operation and the associated infrastructure north of the Study Area, with parts of the infrastructure areas visible from the New England Highway.

Significant coal mining infrastructure and extraction areas in the local landscape or adjacent to the Study area are,

- The Ravensworth East-Narama Coal Infrastructure:

The elements of the Ravensworth East-Narama Mine include coal stockpiles, coal handling preparation plant (CHPP), rail loop and associated infrastructure. The

infrastructural elements are visible from the New England Highway just west of the Study Area, and

- The Rixs Creek Coal Infrastructure:

Elements of the Rixs Creek Open Cut east of the Study Area, and

- The Integra-Glennies Creek and Camberwell Open Cuts:

The open cut areas of Glennies Creek and Camberwell mines and the associated infrastructure east of the Study Area. These open cut areas are visible from the New England Highway east of the Study Area.

These elements set a pattern of open cut coal mining and infrastructural development that is complimentary to the proposed SEOC development.

2.5 Existing Nightscape

The assessment of the existing nightscape was made from local travel routes and various locations in and around the Study Area. Background light levels, brightness and glare were considered and compared to the background lighting environment, with the source viewed from varying distances.

The basic assumption of the nightscape assessment is that the night lighting impacts of the Ashton SEOC can be assessed in relation to the overall character of this section of the Study Area. The nightscape character of the local landscape is perceived as being rural/industrial in character, with industrial quality lighting around the significant coal infrastructure, concentrations of light at Camberwell village and scattered groups of residences and very small concentrations of light at individual homesteads. The lighting of the existing Ashton mine infrastructure and working areas stand out as discordant elements in the existing nightscape.

The assessment of the existing nightscape and night lighting effects is broken into several assessment units to reflect the differences in the impacts. The assessment is shown in **Table 2.1** below.

Table 2.1

Visual Impact of Lighting in Existing Nightscape

ASSESSMENT OF EXISTING STUDY AREA					
Nightscape Unit	Foreground <400/800m	Close Middle ground 400m/800m - 2/3km	Distant Middle ground 2/3km - 5/8km	Background 5/8km - infinity	Overall Rating
Upper ridges	N/A	N/A	N/A	Nil	Nil
Foothills with Rural residences along local roads	Low	Low	Low	Nil	Low
Mine Infrastructure and working areas	High	High	Moderate	Moderate	High/Moderate
Camberwell village	Moderate	Low	Low	Low	Low

3.1 Assessment Criteria

The basic premise of visual quality assessment is that all landscapes have some value, but those with the highest diversity have the greatest potential for high scenic quality.

Scenic quality is the combination of elements used to identify the importance of the proposed development to potential viewers. The assessment of scenic quality is performed by assessing the landscape character units into scenic quality classes e.g.: high, moderate, low or on scales between these ratings. These classes are based on the diversity of form, line, colour and texture, prominence of landform, prominence of vegetation and geology, and water forms.

The impact of cultural elements and modifications to the landscape can often detract from the scenic value if the modifications are discordant with the surroundings.

3.2 Scenic Quality Assessment

Based on the description of the landscape units in Section 2 and assessing proportional prominence of each element of the scenic quality criteria, the assessment of Scenic Quality into various classes within the Study Area is summarised in **Table 3.1**

Table 3.1

Scenic Quality Assessment:

Landscape Rating Unit	SCENIC QUALITY CRITERIA				Scenic Quality Classes
	Proportional Prominence of				
	Diversity of Landscape Elements	Landform	Vegetation	Water	Result
Ridgeline and upper wooded slopes	Low	Moderate	Moderate	-	MODERATE/ LOW
Undulating foothills	Moderate	High	Low	-	MODERATE
Valleys and floodplains	Moderate	Moderate	Moderate	Low	MODERATE
Water bodies and associated vegetation	High	Moderate	Moderate	Low	MODERATE/HIGH
Impact of cultural elements	Moderate	Low	Moderate	-	MODERATE/LOW

The scenic resource values are based on Williamson’s (1979) findings for landscape dimension scenic quality relationships that are based on earlier research studies.

Those studies identify that scenic quality increases as:

- Topographic ruggedness and relative relief increase;
- Presence of water forms, water edge, and water areas increase;
- Patterns of grasslands and forest become more diverse;
- Natural and agricultural landscapes increase and man-made landscapes decrease; and
- Land use compatibility increases and land use edge diversity decreases

Refer **Drawing 828-04-B** in Appendix A for a diagrammatic representation of the scenic quality assessment of the Study Area.

3.3 Viewer Characteristics

Viewer characteristics of the landscape are specific to the Ashton SEOC project and are determined by individual viewing points, distance to the object and sensitivity of the viewer.

Visibility of individual landscape elements and visual prominence of items in the landscape is determined by the individual viewing points selected within the Study Area. Note that the impact can change with only slight modification to the viewing points. Locations have been selected from which the major views of the open cut area, surface facilities and the emplacement area will be prominent. The selected locations are considered representative of a general location or group of locations and are grouped according to relative distance.

3.4 Viewpoints

The selection of viewpoints is specific to the Ashton SEOC project and is determined by the angle and elevation of the view and distance to the object. Distance definitions have been determined from those listed in **Table 3.2**. These distance zones are used throughout to group viewpoints or frequently travelled viewing corridors allowing more clarity in assessment.

Table 3.2

Distance Definitions for Landscape Assessment

	Foreground (Fg)	Close Middle ground (CMg)	Distant Middle ground (DMg)	Background (Bg)
Distance	0-400/800m	400/800m-2/3km	2/3km - 5/8km	5/8km- infinity
Viewing capacity	detailed	detail and general	general	general - no detail
Object viewed	rock outcrop	hill or small valley	entire ridge	ridge system
Visual characteristics	species of individual plants	textures (palms and hardwoods)	course textures (grass to tree cover)	patterns (light and dark)

Source: Forest Commission, Victoria, 1981 - Visual Absorption Capability in the Blue Range Study Area. Definitions have been adapted by O'Hanlon Design Pty. Ltd. (1997) to suit the Kayuga Coal and subsequent studies.

THE VIEWPOINTS

The selected viewpoints for the Ashton SEOC are identified below. For locations of the selected viewpoints refer **Drawing 828-05-B** 'Viewpoints' in Appendix A and the Ashton Coal Land Ownership drawings for property references. The viewpoints and the approximate Australian height datum for each location selected for this project area are:

VP 1 New England Highway, east end of the road cutting: 100 AHD



PHOTOGRAPH 3 View South-east from VP 1

VP 2 Glennies Creek Road: 110 AHD.



PHOTOGRAPH 4 *View South-east at VP 2*

VP 3 Camberwell Village, McInerney Road: 95 AHD



PHOTOGRAPH 5 *View South at VP 3*

VP 4 New England Highway, west of the Ernst property (ref 120): 90 AHD



PHOTOGRAPH 6 *View South-west at VP 4*

VP 5 New England Highway, adjacent to the Burgess property (ref 121) 100 AHD



PHOTOGRAPH 7 *View South-west at VP 5*

VP 6 Maison Dieu Road, north-east of the substation: 100 AHD



PHOTOGRAPH 8 *View North at VP 6*

VP 7 Maison Dieu Road, on the crest south of the Granbalang: 140 AHD



PHOTOGRAPH 9 *View North at VP 7*

VP 8 New England Highway, adjacent to the Burgess Property (ref 121) access intersection: 110AHD



PHOTOGRAPH 10 *View South-west at VP 8*

3.5 Sensitivity Levels

Sensitivity levels are a measure of people’s concern for the scenic quality of an existing environment. They are based upon the scenic quality of the landscape unit, distance, zone and type of travel routes or location of viewpoints, and the number and type of potential viewers.

Major roads and primary use areas carry a higher number of viewers than secondary roads and use areas. Generally, tourists and residents have a higher concern for visual quality than commuters. Residents have a high concern for the scenic quality of their visual catchment if it is threatened by perceived detrimental changes. Residents are generally more concerned with foreground and middle ground impacts. Commuters are generally most concerned with foreground elements.

Sensitivity levels are affected by the duration of the exposure to a view. Static viewers are often most sensitive to foreground and close middle ground elements. Viewers in vehicles and trains are often travelling sufficiently quickly for foreground elements to be blurred or missed, whereas the distance and duration of exposure to middle ground elements allows time for recognition and assessment of the elements.

Very little valid research has been carried out in Australia to determine the public sensitivity to visual impacts generally or to the visual impact of coal mines specifically. These assessments are based on research used for the U.S.D.A assessment system, our perceptions and anecdotal evidence. We have assessed public sensitivity level against the criteria shown in **Table 3.3**, our estimate of viewer numbers and our assessment of level of concern generally demonstrated in similar communities.

Table 3.3
Sensitivity Levels - General Criteria

	Sensitivity Level		
Use/viewer numbers	1 High sensitivity	2 Moderate sensitivity	3 Low Sensitive
Primary Travel Routes, Camberwell village	At least 25% of users have MAJOR concern for scenic qualities of the area	Less than 25% of users have MAJOR concern for scenic qualities of the area	
Secondary Travel Routes, Maison Dieu and useable Water Bodies	At least 75% of users have MAJOR concern for scenic qualities of the area	At least 50% and not more than 75 % of users have MAJOR concern for scenic qualities of the area	Less than 50% of users have MAJOR concern for scenic qualities of the area
Rural Roads and Outlying Individual Property Areas		At least 75% of users MAJOR concern for scenic qualities of the area	Less than 75% of users have MAJOR concern for scenic qualities of the area

Given the locations and our assessment of the type of viewers, we have concluded that the sensitivity of each viewpoint is set out in **Table 3.4** below.

Table 3.4
Sensitivity Levels - Travel Routes & Urban Areas

Level 1	VP1, VP3, VP4, VP5 and VP8
Level 2	VP2, VP6 and VP7
Level 3	Nil

3.6 Landscape Management Zones

The assessment of the degree of visual impact of the proposed SEOC, out of pit emplacement and the addition of new infrastructure facilities adjacent to and crossing the New England Highway is based on the perceived severity of the developments within the landscape from selected viewpoints, the number of viewers expected to experience the changes and the capacity of the landscape to absorb the proposed changes. In order to determine the absorption capacity of the landscape the areas affected have been divided into Landscape Management Zones (LMZ). The LMZ as shown in **Table 3.5** below are derived from the information provided in Tables 3.1 and 3.2 and the landscape management zone assessments are an indication of the perceived ability of the area to absorb visual change.

Table 3.5 Landscape Management Zones

Adapted for the project by O’Hanlon Design Pty Ltd 2008 (Ashton Coal South East Open Cut)

LANDSCAPE MANAGEMENT ZONES										
		<i>Sensitivity Level/Distance Zones (combining tables 3.2 and 3.3)</i>								
		<i>1/Fg</i>	<i>1/CMg</i>	<i>1/DMg</i>	<i>1/Bg</i>	<i>2/Fg</i>	<i>2/CMg</i>	<i>2/DMg</i>	<i>2/Bg</i>	<i>3</i>
Scenic Quality Classes (See Table 3.1)	Mod/High	A	A	A	A	A	A	B	B	B
	Moderate	A	B	B	B	B	B	C	C	C
	Mod/Low	A	B	C	C	B	C	C	C	C

The Landscape Management Zones (LMZ) as noted in the preceding table are described as follows and are diagrammatically shown on **Drawing 828-06-B** in Appendix A.

ZONE A - High concern for visual resources

In this zone the ability to absorb change without significant effect is low. If possible mitigation methods should be used to significantly reduce the impact of any change. This zone is primarily the foreground and middle ground areas adjacent to the New England Highway and the foreground and middle ground views from within and around Camberwell Village.

ZONE B - Moderate concern for visual resource

In this management zone the ability to absorb the change is moderate. Therefore greater levels of modification are possible before the new elements become intrusive. This zone comprises a large proportion of the viewing areas around the South East Open Cut area including secondary roads and rural residences and the locations around the southern areas of the SEOC.

ZONE C - Low concern for visual resource

In this zone the ability to absorb the proposed change is high, due to the lower number of viewers and/or their locations and the under laying topography. For the South East Open Cut project the viewer locations, sensitivity levels and scenic quality classes combined do not create any areas of low concern (within the Study Area) as the zones of Sensitivity Level 2 in the close and distant middle ground when viewed from Maison Dieu Road are also background areas when viewed from the New England Highway and have a higher landscape management zone assessment from that aspect.

No zones within the Study Area are in Land Management Zone C when viewed from the New England Highway and parts of Camberwell Village.

SECTION 4 Relevant Aspects of the Proposed Development

4.0 General

This section describes the various visible elements of the Ashton South East Open Cut that will affect visual quality and visibility. The proposed method and timing of mine and out of pit emplacements is co-dependant and affects the duration and severity of visual impacts.

4.1 Mining Operations

4.1.1 Open Cut Operation

The proposed South East Open Cut Area (OCA) is a progressive mining area of approximately 2000m in length and 1000m in width. At the north-eastern corner the work is located approximately 250m from the New England Highway and screened by a proposed out of pit emplacement to be constructed as part of the initial site works. Mining will be by truck and shovel methods. Mining commences in the north of the pit and works to the south over a 7 year period as demonstrated on the Year 1, Year 3, Year 5 and Year 7 staging plans illustrated in Appendix B. Mining will operate 24 hours a day, 7 days per week.

The initial topsoil stripped and overburden removed will be used to create the out of pit emplacement/environmental bund. This emplacement will commence at the initiation of the project and continue for 2-3 years within distances of 80 - 120m from the New England Highway. Little existing vegetation to buffer visual impact for viewers on the New England Highway exists on the eastern edge of the emplacement. Ashton Coal have pre-planted a group of eucalypts along the eastern edge of the emplacement however the planting is unlikely to be sufficiently mature to significantly reduce visual impact prior to commencement of the pre stripping work in that area.

On the northern edge, mine planning has been adjusted to leave intact some of the remnant vegetation facing Camberwell village. This remnant vegetation and the vegetation on the north side of the New England Highway facing Camberwell village which is located at a variable distance to residences commencing at approximately 250m provides a partial screen for the environmental emplacement, initial haul road and the OCA.

Rehabilitation will be progressive with initial emphasis on the out of pit emplacement. Given the relatively short extraction and mine life the rehabilitation will provide little screening of visual value until after completion of the works. The final landform incorporates drainage lines and modelled slopes to allow revegetation of a range of vegetation communities within open woodland and pasture visual setting complimentary to the existing visual environment.

4.1.2 Out of Pit Emplacements

The out of pit emplacement is located south west of the New England Highway at distances varying between 80 and 120m from the carriageway to the toe of the emplacement. The emplacement will form a visual and acoustic bund for viewers in Camberwell Village and travellers on the New England Highway. The emplacement is approximately 1500m in length facing the highway and has a return to the west at each end of approximately 750m in length. The highest point is approximately 115 AHD. The work will be constructed in a series of stages and lifts from mining commencement. Each lift of around 5 metres in height will be divided into a series of stages for placement, contouring, rehabilitation and planting. Progressive rehabilitation and planting of each lift will result in completion of the full working face within 2-3 years. The short project lead time and mine life does not allow sufficient time for any significant vegetative screening to occur. It is proposed to model the emplacement to reduce the dominant engineering appearance in the landscape.

A staged levee will be constructed between Glennies Creek, the ROM Coal facility and the open pit area. The levee wall will have a crest at 64 AHD and faces engineered at 1:3. The face is proposed to be grassed. It is proposed to integrate the levee wall into the final landform and rehabilitated surfaces.

4.1.3 Final Void

The final void will be located in the south of the OCA with a depth of approximately 80. The void will be partially utilized for deposition of tailings. The void will have a rehabilitated faces on the north and east edges with un-rehabilitated high wall faces on the south and west. These faces allow for continuation of the OCA south subject to future mining grants and approvals. The north face of the void when viewed from the south is a relatively regular cut edge below the natural ground level.

4.2 **Infrastructure Elements**

4.2.1 Office and Workshop Facilities

The office and workshop facilities are located South / South-East of the out of pit emplacement at approx 91-92 AHD at a distance of approximately 400m from the New England highway. To the West the New England highway is flanked on the South edge by significant stands of vegetation at the possible viewing locations that will significantly reduce viewing opportunities of these elements. To the East round VP8, the New England Highway is elevated above the landscape to the South. The roadside vegetation is sparse and falls away following the topography and does not become dense until approximately 230m from the New England Highway. The ground levels at this area of thicker vegetation area approximately 100-106 AHD. The vegetation is relatively dense and mature trees vary between 10 and 15m in height. The Main Infrastructure Area comprises offices, bath house, parking, fuel stores and associated facilities. The overall height of the largest elements will not exceed 11m. This results in a maximum built height of approximately 103 AHD. Facilities will be removed at completion of the SEOC project.

4.2.2 Conveyor and pipelines

The conveyor network from the ROM facility to the existing coal handling plant runs north from the ROM facility toward the New England Highway, crossing Glennies Creek. The conveyor network is elevated above 62AHD for approximately 700m in the low lying areas around Glennies Creek. These elements are viewed at a distance of approximately 800m for viewers on the New England Highway. The ground conveyors are elevated on filled berms as the conveyor run moves closer to the highway over a distance of approximately 1000m. The conveyor system crosses the New England Highway at a height of 5.4m above the road below. The elevated sections of the conveyor system are completely enclosed. The conveyor route then runs west, parallel to the highway, at a distance of approximately 80m to the existing CHPP and rail loading facilities.

Four transfer stations of approximately 9m in height are located on the conveyor run with two either side of the New England Highway offset approximately 75m from the highway offset on the crest of the ridge at the road cutting. All transfer stations and conveyors are proposed to be enclosed in coloured corrugated metal sheeting.

4.2.3 ROM Coal Facility

Coal mined in the SEOC will be transferred to the ROM Coal Facility located west of the proposed OCA. The ROM facility has a base level of 65 AHD with a footprint approximately 250m wide and 500m long at variable distances exceeding 1000m to the New England Highway. The ROM facility is elevated above the surrounding topography and protected by the levee walls. The area will be a working, coal handling industrial zone with stockpiling, preliminary processing hopper and a dozer operating pad.

4.2.4 Access Road

A new intersection will be constructed on the New England Highway 450m east of the McInerney Road intersection. The road runs south east between the out of pit emplacement and the New England Highway. The road gradient requires sections of up to 3m of cut and 2.5m of fill. The cut sections are predominant and will visually screen most of the road alignment. A section of the access road 100m in length and a further section approximately 250m in length at the water storage dam wall will be filled and visible from the highway. Vehicle movement on the road will be over the full 24 hours and will be most prominent at night with headlights moving parallel to the highway in and out of the cuttings.

4.2.5 Water Storage Dam

The water storage dam is located east of the out of pit emplacement, approximately 200m from the New England Highway and running parallel to the Highway for 450m. Maximum width of the water surface is at the dam wall of approximately 150m. The dam is located in an area of existing vegetation within the valley of an existing creek. The dam will be the largest body of water within the Study Area.

4.3 Design Considerations

The underlying philosophy of any visual mitigation strategy is to create the conditions for minimising impact during the mining activity. The identification of existing vegetation capable of providing a fully-grown screen is considered a significant tool. Where possible the existing vegetation should be carefully protected during construction. Even small stands of existing vegetation can contribute to a reduction of impacts by creating visual diversity. The designers of the landforms and associated facilities should strive to protect existing vegetation where possible.

Re-vegetation should reflect the existing density and character of the adjacent landscape. It would be appropriate for re-vegetation to be designed using aerial photo mapping to allow replication of location and density on completion. The re-vegetation strategy needs to compliment the future use of the mine area after mine completion.

4.4 Night Lighting Considerations

The proposed night lighting will be primarily concentrated on the infrastructure area, conveyor system, working areas of the pit, and access roads. Lighting is anticipated to be locally concentrated within the pit at reduced heights due to the truck and shovel nature of the operations. Truck movement at night with associated headlight and warning lights are likely to be significant impacts as the light source may be flashing or moving. This will be particularly important on the access roads around the periphery of the work areas.

The glow in the sky on overcast nights, commonly referred to as sky glow, is a significant element in the night environment at other local mines.

Based on inspections of other mines the lighting elements that are likely to cause impacts are listed below:

- Direct views of High Pressure Sodium (HPS) floodlights on electric drills;
- Direct views of HPS safety lighting in the infrastructure areas;
- Views of lights moving on the working faces;
- Direct views HPS and Metal Halide (MH) floodlights on skid mounted lighting plant;
- Direct views of headlights on vehicles as they move up sloping mine roads, along level mine roads, and as they turn bends; and
- Direct views of lighting adjacent to, or part of conveyors and loading / surge bins.

The type of lighting described above is typical for open cut mines. Due to the nature of open cut mining there is limited scope to reduce the dynamic impacts of moving lights from vehicles or the conveyor run lighting, as these are required for Occupational Health and Safety reasons.

4.5 Power Transmission Line Easement Options

Construction of the South East Open Cut will require relocation of transmission lines that cross the proposed Open Cut Area. At present a series of 132 kV power lines cross the site in the south east corner of the SEOC pit shell. The Lines split and diversify across the pit shell area and leave the area in the north-west corner. The Lines then continue up the slope toward the existing office / workshop complex and the New England Highway. Once they reach the Highway the Lines continue to the north-west parallel to the New England Highway. Refer **Appendix C – Ashton Coal “Existing and proposed Electrical and Utility Easements”**.

Two options are proposed for relocation of the affected lines.



Photograph 11 *Powerlines adjacent to New England Highway*

Option 1 diverts the Lines to the west across Glennies Creek then north until they reach the existing lines at the New England Highway. Option 1 runs through the lower levels of the Glennies Creek Valley across the proposed conservation area and along a small ridge toward the Highway. Creation of the easement would require some vegetation removal in the Conservation Area. The total length of the diversion is around 3600m.

Option 2 diverts the lines to the east around the south and east edges of the pit, past the SEOC infrastructure area, then proposes the line run between the New England Highway and the out of pit emplacement for a distance of approximately 1500m. In this section the Line would be around 80 to 100m from the Highway at the base of the emplacement. The Line then follows the edge of the emplacement west and north-west across Glennies Creek then meets the original line at the New England Highway. In this section the Line varies between 200 and 500m from the Highway. Clearing of the easement for Option 2 would require removal of a small portion of the existing vegetation just north of Perry St, Camberwell that will provide a visual screen to the southern viewers from Camberwell and may reduce the efficiency of the screen.

5.1 General

The assessment of the degree of visual impact of the proposed open cut areas, the infrastructure and emplacements is based on the perceived severity of the works and facilities within the landscape from selected viewpoints and the number of viewers expected to experience the visual changes.

The sequential nature of the mining emplacement, rehabilitation process and the location of the emplacement areas and associated infrastructure require these to be individually assessed throughout the mine life.

Factors included in the assessment are as follows:

- (a) Selection of viewpoints, which offer prominent views from the north, south and east of the Study Area. These viewpoints do not represent all possible views attainable from each direction; hence the visual impact would vary according to the stage of operation, viewing position and specific site conditions.
- (b) Consideration of the various landscape components in relation to the visual impact.

Visual impact ratings are ranked in decreasing order of severity on a scale between 8 and 0 as follows: Severe, High, Moderate, Low and Nil.

5.2 Open Cut Area

The open cut area (OCA) is the most complex of the mine elements to assess due to its sequential dynamic nature. This is reflected in the impact ratings for each viewpoint that may decrease or increase over time due to the directional shift of an open cut area and/or the proposed emplacement, revegetation strategies and topographical changes, which will vary or impede views of the open cut area at different times.

In order to assess the impact of the open cut area we have assessed the impact in relation to the key parameters used in **Section 2.4** to assess the visual characteristics of the Study Area. The assessment of the visual landscape components is shown below in **Table 5.2**.

Table 5.2

Description of Landscape Components for the South East Open Cut Area

LANDSCAPE COMPONENTS	GENERAL DESCRIPTION OF IMPACT
Form	Major changes to topography - extensive excavation and construction of landscape at varying times.
Line	The edge of the worked surfaces roads and conveyor runs would provide strongly contrasting elements to the surrounding landform.
Colour	Exposure of coal seams, associated geological strata and spoil emplacement, would provide a severe contrast to adjacent pastoral grasslands and vegetated areas during construction. The rehabilitated surfaces will show varying colour until the new vegetation reaches semi-maturity. This is particularly evident from the north and south.
Scale Contrast	The OCA and the out of pit emplacements are significant elements and have a significant contrast in scale to other landscape features during construction of the pit and emplacement.
Spatial Dominance	The open cut would be perceived as a prominent spatial element of the local landscape particularly when viewed from elevated locations or from foreground locations. The spatial dominance of the new work in the visual catchment will be high.

	The size, scale and colour of the overburden emplacements will vary with time in the landscape. The result is a form, which will be spatially dominant to its surroundings.
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5.3 Out of Pit Emplacement Areas

The out of pit emplacement work will become a significant permanent element in the landscape. The analysis of the visual impact of the out of pit emplacement areas is shown below in Table 5.3 and assessed against the same visual landscape components as the OCA.

Table 5.3

Description of Landscape Components for the Out of Pit Emplacement Area

LANDSCAPE COMPONENTS	GENERAL DESCRIPTION OF IMPACT
Form	The forms are engineered but proposed to be softened, lineal and smooth faced. This is a contrast in form to the surrounding edge of the ridgelines and upper wooded slopes. The existing edges are more dissected and natural. This may produce a variety of shadow and lighting effects that contrast with those of the smooth faced emplacements.
Line	A significant visual element. The out of pit emplacement will form a new horizon line south west of the New England Highway. The levee areas have a contrasting line when viewed from the Camberwell Common.
Colour	Proposed progressive rehabilitation measures will reduce potential impacts.
Scale Contrast	The scale will be compatible with other adjacent topographical elements however the faces are likely to be less detailed with natural sculpturing and more machine made.
Spatial Dominance	The main elements are highly dominant when viewed from the New England Highway.

5.4 Assessment of Visual Impacts

Visual impacts for each of the viewpoints are considered in **Sections 5.4.1 to 5.4.8** inclusive and are summarised in tabulated form in **Figure 5.4** "Degree of visual impact of the Ashton South East Open Cut". Each viewpoint has been ranked on a scale nil, low, moderate to high. In **Figure 5.4** the impacts are adjusted to demonstrate the changing nature of the impacts due to time and movement of the Open Cut Area.

5.4.1 VP 1 New England Highway, east end of road cutting: 100AHD

Viewers travelling east after passing through the road cutting on the New England Highway will have views of the OCA western side, and the ROM transfer area from an elevated location at close middle ground distances of between 600 and 1000m. The duration of the views will be relatively short lasting no more than 60 seconds until the viewer passes over the Glennies Creek Bridge. The OCA rear face and ROM transfer area will be relatively unrehabilitated for the first 3-4 years of the project. Viewers will also have a clear view of the conveyor system as a strong lineal element leading into the ROM transfer area. This diminishing lineal element will strongly direct views toward the ROM transfer and working faces, highlighting the working surfaces. Similar views of these visual components as foreground elements will be possible from Camberwell Common at slightly reduced viewer elevations.

As viewers are elevated, careful selection of colour for the conveyor to match the landscape could slightly reduce impacts. The infrastructure area will be visible as an industrial styled element at a distance of approximately 2500m southeast of the viewer for at least 2 to 3 years until the in pit emplacement rises beyond 100 AHD and closes the view beyond the OCA to the south east.

The OCA working areas, the emplacement and rehabilitation works will be visible throughout the mine lift initially moving west then south. Impacts will reduce toward the end of Year 3 with a lesser

impact until Year 7. The levee system will be visible when travelling to the east and from Camberwell Common as a foreground element. The base of the levee system will be a significant discordant element due to its lineal form and consistency of the battered 3:1 slope.

Viewers travelling west on the New England Highway will view the conveyor system as an enlarging element running parallel to the viewer for a duration of approximately 50 seconds. This linearity will focus views toward Transfer Station No.2 at the crest of the road cutting and subsequently on the overhead conveyor system crossing the road at the cutting. Both elements will be silhouetted for a short viewing period, especially evident in the late afternoon as the sun drops toward the horizon behind the elements.

5.4.2 VP 2 Glennies Creek Road 110 AHD

The Glennies Creek Road access has a significantly lower traffic volume than the New England Highway. Viewers travelling north-east will not view any elements of the Ashton South East Open Cut. Viewers travelling south-west will have elevated views of the OCA, conveyor system and ROM transfer at variable distances between 2200 m and 3200 m. Views of the OCA and the environmental emplacement will be prominent for approximately 2-3 years. Following rehabilitation at that time the impacts will reduce significantly.

The conveyor system will be visible as a middle ground element highlighted by the lineal shape at variable distances around 1500m. Views down onto the platform of the ROM facility will be possible from some locations at the west end of Glennies Creek Road of the duration of the project.

5.4.3 VP 3 Camberwell Village: McInerney Road 95 AHD

Some viewers in Camberwell Village will have views of the out of pit emplacement construction and the ROM transfer area during the initial years of the OCA works at distances between 400 and 1500 m. The highest impacts will be in the early years of the project. Once the out of pit emplacement reaches 100 AHD the views will become restricted. The initial works will be viewed as foreground elements from residences and streets on the south side of the high point on McInerney Road.

The working faces and rehabilitation of the out of pit emplacement and the OCA will be elevated to the south forming a new horizon line particularly from slightly lower viewer elevations on the south side of the high point on McInerney Road and along the west end of Alpha Street. Views of the conveyor system and the transfer stations will be visible at variable distances up to 1000m. Elements of the infrastructure area are unlikely to be visible once rehabilitation commences. For more detailed assessment of impacts on residences refer to Section 5.5.

5.4.4 VP 4 New England Highway: Adjacent to the Ernst property 90 AHD

Viewers in the vicinity of VP4 are likely to be travelling east/west on the New England Highway. Work on the out of pit emplacement and the access road works will be the earliest works of the project. Over a construction period of 18 months the overburden material will be relocated to form a new landform 1500m long at variable distances approximately 80-100m from the south edge of the New England Highway. The emplacement will rise approximately 25m in height creating a new horizon line and a significant change to the outlook from the road.

The existing landscape is a very lightly wooded downhill slope to the south offering an open vista. The new landform will enclose the south side of the New England Highway with very little remnant vegetation for visual screening between the New England Highway and the out of pit environmental emplacement.

The proposed modelling of the face of the out of pit environmental emplacement is critical to the long term impact of the work. Softened and appropriately manipulated with naturally shaped watercourses and randomly rounded topographic features, the face of the environmental emplacement could be revegetated to successfully blend into the existing landscape. Travellers will view the element as a close foreground element with opportunity to consider the detail. If the detail is highly engineered, straight and not natural in appearance the work will not easily blend into the landscape and will be left as an indicator of the mining works beyond for posterity. An existing

example is north of Glennies Creek Road. Care for this detail and the revegetation works are the two items that have the greatest potential to reduce long term visual impacts of the SEOC.

5.4.5 VP 5 New England Highway: West of the Burgess property 100 AHD

VP5 is relatively close to VP4 and the impacts of the creation of the OCA and the out of pit emplacement will be similar, particularly as viewers approach from the east. From the west however viewers will approach and pass the east edge of the out of pit emplacement and a different vista will emerge.

For viewers at VP5 looking south the access road and the dam wall will be visible as lineal elements viewed along their length. The water would be an attractive feature and create diversity in the landscape. Careful treatment of the edges and dam wall to soften the engineering will reduce visual impact and improve visual quality. The Infrastructure Area will be visible beyond the dam at a distance of approximately 400m.

Viewers approaching VP5 from the east will travel along the ridge with open woodland to the south. The transition of topography from open woodland to screened water feature and then into access road and out of pit emplacement will be in the direct line of vision of drivers travelling west. The change of topography and variation to the landscape will be highlighted. Opportunities exist to reduce potential impacts by transition of surfaces that avoid a hard engineered appearance, placement, density and location of revegetation materials. Retention of existing vegetation between the south edge of the dam proposed water level and the Infrastructure Area will reduce the visibility of the Infrastructure Area facilities from the New England Highway.

The Burgess residence is located approximately 15m above the highway and is likely to have higher impacts depending on the vegetation immediately adjacent to the residence and the individual aspect of rooms and windows.

5.4.6 VP 6 Maison Dieu Road north east of the substation at 100 AHD

Viewers in this location and houses adjacent to the west may have views to the north toward the OCA and emplacement areas. At a distance of 4000 to 6000 m the OCA is a possible background element heavily screened by intervening ridges and vegetation, whilst unrehabilitated colour and forms may highlight the works. Once rehabilitated and vegetated the work is unlikely to be discernable. The south face of the final landform may be discernable particularly in the morning in summer when it is not in shadow depending on the line and quality of the rehabilitation treatment of the north edge of the final void.

5.4.7 VP 7 Maison Dieu Road on the crest south of the Granbalang 140 AHD

Slight views of the south face of the out of pit emplacement and the OCA will be possible for static viewers at the ridge facing north on Maison Dieu Road at viewer elevations around 140 AHD. At a distance of 4000 to 6000 m the works will be background element in the total landscape and of very low impact. Once rehabilitated and vegetated the work is unlikely to be discernable.

5.4.8 VP 8 New England Highway: Adjacent to Burgess Property access entry 110 AHD

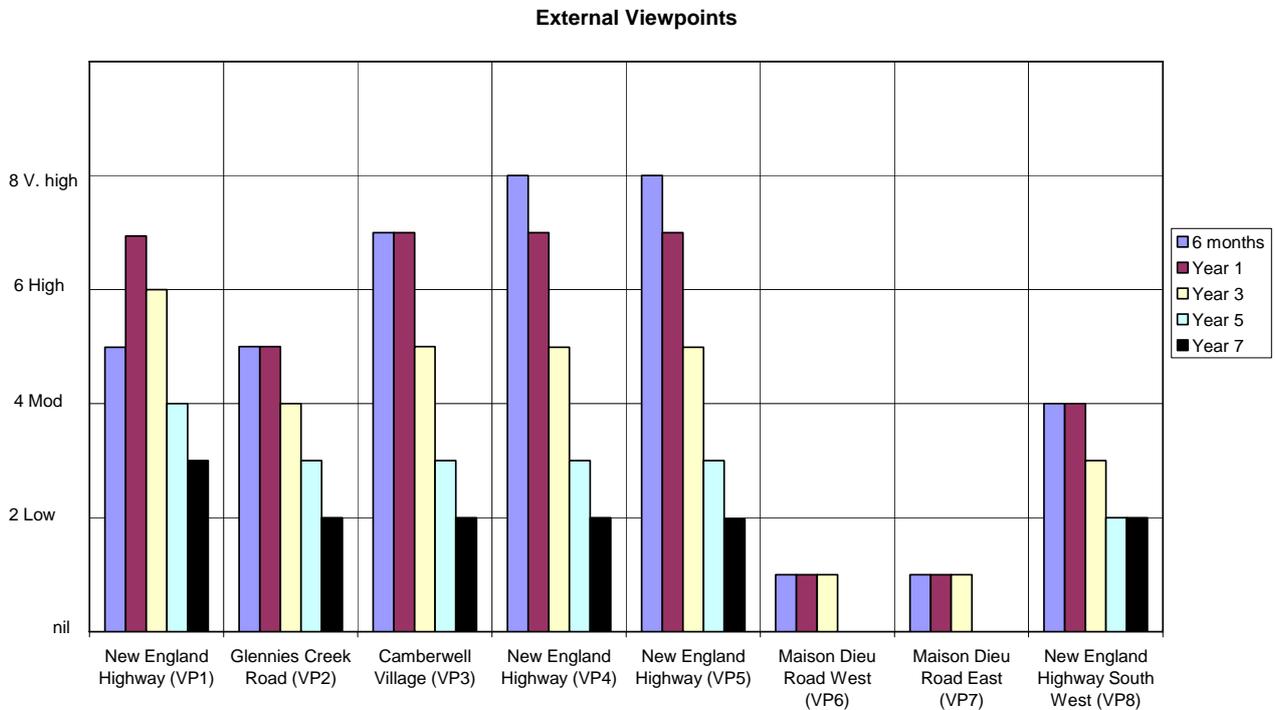
Viewers at VP8 will be approaching the Ashton SOEC on the New England Highway travelling to the west. The drop in topography to the south of the highway will allow views of the emplacement area as a foreground element in the direction of travel. The dam wall and the dam will also be highly visible foreground elements of interesting diversity for a short duration. The dense existing vegetation, approximately 200m south west of the New England Highway will significantly screen the Infrastructure Area and the lower southern sections of the out of pit emplacement, thereby reducing the impacts in the first 2-3 years of the mine life.

The main visual intrusion will be the out of pit emplacement. Short duration views of a 250m wide section of the emplacement will be possible down the length of the dam and over the dam wall from the initial stages of construction at a distance of approximately 500m. The bulk of the emplacement will be screened by intervening vegetation until it reaches a height around 95 AHD. Once the height exceeds 95 AHD, the emplacement is likely to become partially visible over and through the top of the intervening vegetation. The extent of visibility will be determined by the

amount of vegetation removal for the access road, dam and Infrastructure Area. Retention of significant existing vegetation around the dam and within the pondage area could reduce visual impacts significantly by leaving a partial vegetative screen.

Figure 5.4

Degree of visual impact of the Ashton South East Open Cut, emplacements and site infrastructure.



5.5 Camberwell Village

The potential visual impacts of the works on the most elevated sections of the Camberwell Village are identified in 5.4.3 at VP3 and diagrammatically illustrated on Figure 5.5. The village however is composed of a range of residences and allotments that encircle the crest of the ridge at McInerney Road. Generally residences along Alpha Street, McInerney Street, Lethbridge Street, Perry Street, Glennie Street and Dunn Close have potential views south matching the impacts noted at VP3.



Photograph 12 View from McInerney Road, Camberwell

Figure 5.5

Camberwell Village, Area of Properties potentially affected by Visual Impacts



Many of the residences in these streets have been acquired by Ashton Coal. Residences on properties 2 (Ninness), 8 (Chrisholm), 50 (Standing) and 51 (Bailey), as well as Property 46 (Nowland, Moore and Dunn) which is the site of the Camberwell Hall will have views of the emplacement and initial open cut works.

Properties 46, 50 and 51 are all south of the New England Highway and within 200m of the proposed open cut and out of pit emplacement. Some vegetation will remain between the properties and the emplacement however the mass and relative height of the emplacement within 200m of the viewers will create very high impacts. In addition, if Option 2 is selected for the transmission line easement additional impacts and some vegetation clearing will occur.

Properties 2 and 8 are located north of Alpha Street with outlooks south over the proposed open cut area and out of pit emplacement. The closest works are approximately 250m from the properties. Both properties are elevated above the works. Property 2 would obtain partial screening from the existing vegetation on Property 56-1. Property 8 would be potentially screened by vegetation on Property 47 and 188 north and west of the Camberwell Hall. The existing vegetation would partially screen the early works and initial open cut works, however once the emplacement works reach RL 80 the emplacement and rehabilitation works will be visible above the vegetation. Views of the conveyor system to the west will also be possible at distances of 1000m.

If selected, Transmission Line Option 2 would be visible as a horizontal line element approximately 250m from the properties at its closest point diminishing east and west.

South facing residences in Dyrning Street-east have potential views of the OCA and out of pit emplacement from the rear and/or south facing elements of the properties. A significant number of these affected properties are owned by Ashton Coal, (refer **Appendix B**, "Ashton Coal Land Ownership drawing). Once the topography flattens and commences falling to the north the visual impacts quickly reduce and allotments in Dulwich Place, Dawson Street, Powditch Street and the northern sections of Glennie Street and Lethbridge Street will not be visually affected.

Property 11 (Richards) will have views of the open cut and emplacement with the closest elements approximately 350 – 400m from the residence. Property 11 is slightly more elevated than those in Alpha Street and the potential views south are more extensive. Views of the open cut will be of longer duration and work on the out of pit emplacement will also be more visible due to the elevation of the viewer. The transmission easement proposed for Option 2 would be visible at a distance of 300 – 400m. Option 1 would be visible at a distance of approximately 800m.

Once the out of pit emplacement is completed and rehabilitated the impacts will be significantly reduced. The long term change in the topography will have minimal visual impact if the faces of the emplacement are softened and revegetated. The decision by Ashton Coal to maintain part of the significant stand of existing vegetation around and just north of Perry Street reduces visual impacts on Camberwell Village in both the short and longer terms.

Views of the infrastructure area and the ROM transfer areas will not be visible once the out of pit environmental emplacement is completed.

Views of the conveyor and transfer station system will be possible from streets and allotments on the south side of the crest of the ridge as a close middle ground element at a distance of around 1000m. The contrast of the lineal form in the landscape and the associated night lighting will make this a significant element that detracts from the rural setting.

5.6 Outlying Residences

Several residences on outlying properties will be subject to visual impacts that differ from those experienced in Camberwell. These residences have been assessed by topographical map and aerial photograph analysis. The visual assessments assume that vegetation adjacent does not limit views of the proposed project and residences have habitable rooms or outdoor areas facing the proposed project.

PROPERTY	OWNER	APPROX. ELEVATION	POTENTIAL IMPACTS
119	Beasley	RL 85	Views of the initial open cut out of pit emplacement are possible from the residence, entry drive and surrounds. Impacts will be very high in the initial year up to Year 5. Impacts are similar to VP3 from a distance of 400m. Option 2 transmission lines if selected would feature in the foreground views.
120	Ernst	RL 75	The residence is located approx. 300m from the edge of the emplacement and 15m below the road level. Therefore initial works will not be visible from the residence. Works will be visible from the entry and driveway area. Impacts will be very high until around Year 3. Once the out of pit emplacement west edge is completed and rehabilitated impacts will reduce. Impacts will be generally slightly lower than VP4 due to the reduced height of the residence. Option 2 transmission lines if selected would feature in the foreground views.
121	Burgess	RL 115	The residence, located at RL115, provides elevated views to the west of the early works and construction of the out of pit emplacement. From this elevated location views into the out of pit dump, the upper levels of the pit and rehabilitation areas will be visible to the west and south-west until the completion of the project. Impacts will remain very high throughout the project. Option 2 transmission lines if selected would feature in the foreground views.
130	Bowman	RL 90	Initial cuts will be visible at distances around 2000m. The out of pit emplacement, pit areas and rear of the rehabilitated emplacement will be visible throughout the mine life. After initial emplacements the mine and out of pit dump will move south toward property 130, with the eastern edge closing to 1000m distance in the later years of the project. Impacts will increase from high to very high in the early years of the project and continue as very high till termination. The final void and benching will be visible from Property 130. Option 1 transmission lines if selected would feature in the foreground views.

5.7 Transmission Line Easement Option Impacts

Both the proposed options for relocation of the transmission lines will have visual impacts that differ from the existing impacts.

Option 1 would relocate the lines to the west, closer to the residence on property 130 (Bowman). The Line would run approximately 200m to the north east of the property along the line of Glennies Creek. An assessment of aspect and topography indicates that the Line would cut through the preferred outlook of the residence to the north east.

Limited views of the Line would be possible from the west edge of Camberwell at a distance of around 500m. **Option 1** would be visible from the New England Highway to travellers in both directions. Travellers to the east would view the Line diminishing down the valley to the south. The impact would be limited to around a 300m viewing length due to road orientation and the topography. Travellers to the west would view the Line at distances between 80 and 500m over a length of approximately 600 – 700m duration. The visual impacts of Option 1 would be low due to the angle of view to the lines and the limited exposure of viewers.

Due to its proposed relocation to the west **Option 2** would be visible to all properties along the New England Highway and in Camberwell south of the knoll at the town centre. Impacts are described in the Camberwell impacts; refer point 5.5 of this report. Travellers in both directions on the New England Highway would view the easement and relocated transmission lines running parallel to the New England Highway at distances between 80 and 200m from the viewers over an exposure distance of approximately 1500m. Along the section of the Highway adjacent to the bridge over Glennies Creek, travellers would view the Lines at a distance of around 400 – 500m when crossing Glennies Creek. The Lines then run north-west up the slope toward the existing lines.

Option 2 would also be visible from residence 121 (Burgess). As the residence is located at around RL 115 above the Highway at RL 100 the visual impact of the transmission lines would depend on the height of the towers. The Lines and towers would be foreground elements at varying distances between 120 and 500m.

5.8 Mitigation Measures

The following measures if implemented will reduce the overall impacts of the open cut mining area, the out of pit emplacement works and the infrastructural elements from various viewpoints as described:

- Soften the engineered faces of the out of pit emplacement with naturally meandering creek lines and modulation of the ridges and faces.
- Modulate the base of the levee and if possible reduce man made piling elements.
- Remove redundant infrastructure elements and conveyors on completion.
- Implement a revegetation strategy for each rehabilitation area to mirror the existing vegetation removed from the areas to be rehabilitated;
- Retain existing vegetation around the new infrastructure areas and on the road fringes to the highway wherever possible.
- Select colours for the conveyor and transfer station to reduce bulk and scale
- Maintain, protect and supplement the existing vegetation between Perry Street and the New England Highway to provide a screen to Camberwell and the Highway
- Select Option 1 for relocation of transmission lines and easements

5.9 Night Lighting Impacts

The night lighting impacts for the Ashton South East Open Cut Project fall into two parts

- Direct lighting effects; and
- Sky glow

The impacts of night lighting are often perceived as more significant than the visual impacts during the day due to the potential high contrast to the background lighting levels and the sensitivity of viewers to intrusive light spill and moving lights in the landscape at night.

5.9.1 Direct Lighting Effects

The potential direct lighting impacts from the pit and pre-stripping would be visible from all seven viewing points and a wide area facing the New England Highway at various times during the works.

Viewpoints and surrounding areas that will be impacted by direct lighting effects at various stages of the life of the open cut areas are assessed in **Figure 5.7** below. Generally the impacts will reduce with distance from the viewer. However the contrast of even the lowest intensity light with the dark rural background will be marked. The use of shielded low brightness lights that have horizontal floodlight bodies with sharp cut off angles can reduce stray direct light along the conveyor line and in the infrastructure area.

Generally areas that can view the open cut works will be affected by direct lighting at various stages of the work. The direct lighting impacts of the ROM infrastructure and the conveyor system will be visible from the New England Highway, Camberwell Common and Camberwell Village.

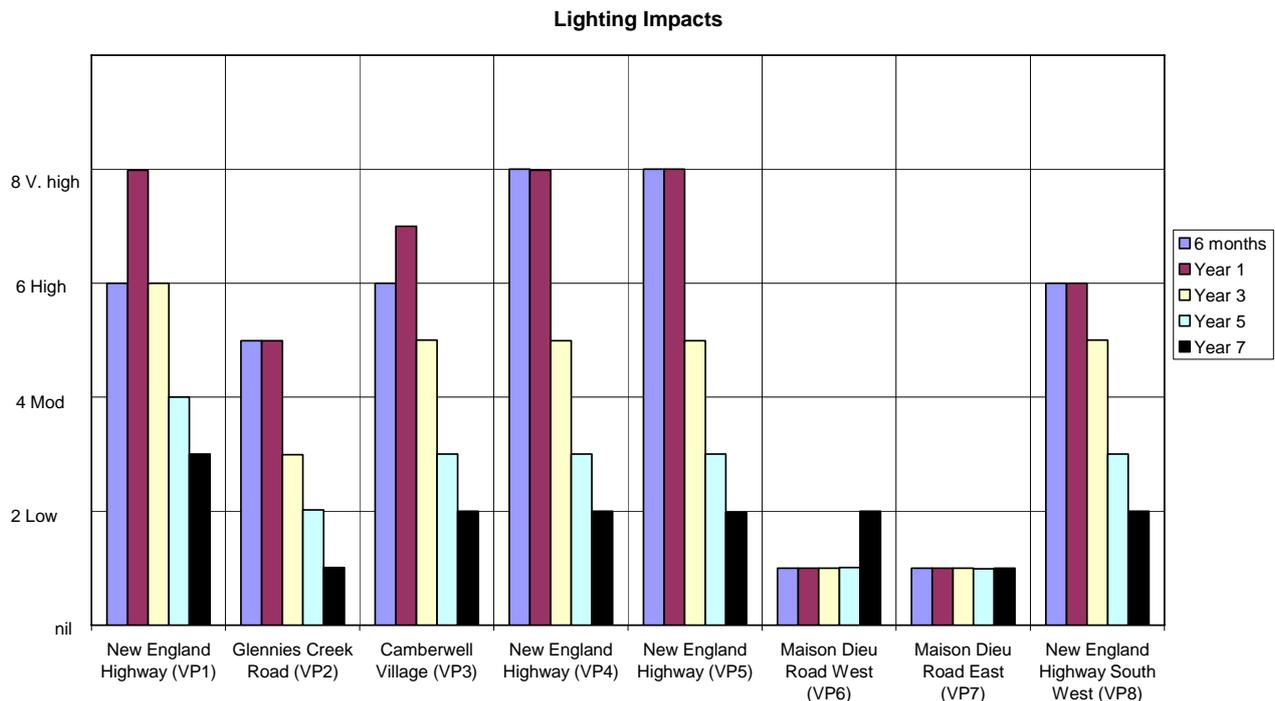
The likely effects of these impacts are shown by VP3 in **Figure 5.7** below. The impact will vary in intensity depending on positions and working level within the open cut pit. A more constant effect will be created by the lighting of the infrastructure, conveyors and coal handling areas.

The impacts will vary greatly with time depending on the working sequences and emplacement locations. Impacts are likely to be progressive across the landscape following the working areas. The highest impacts will be at VP1, VP3, VP4 and VP5 as shown on **Drawing 828-05-B** in **Appendix A**. These impacts will occur during the first 18 months of the project. Most impacts will be intermittent in duration. For example, emplacement may occur in an area for 1-2 months each night depending on weather conditions and then move on to another adjacent location. The degree of impact will vary depending on screening, elevation and distance from each potential viewer.

The impact of moving flashing lights and vehicle headlights will be a significant component of the overall impacts. These lights will be visible from most viewpoints at varying times during the 7 years of construction. When the impacts are foreground elements they can be particularly intrusive. Some lighting effects such as flashing or working lighting entering rooms and reflecting off internal surfaces will occur within residences facing south on the south of the crest of the ridge within Camberwell Village, particularly during construction of the out of pit emplacement in the first 1-2 years of the project.

After the initial 18 months the direct lighting impacts of the Ashton South East Open Cut are relatively minimal.

Figure 5.8
Night Lighting Impacts



5.9.2 Sky Glow

The sky glow component of the night lighting impact is most severe when there is a solid low cloud cover. At that time light reflects off the clouds creating the sky glow effect. Shielding lighting with hoods and louvres would significantly reduce direct sky glow. Because of the location of the mine relative to the viewers and the dark background levels of luminance it will be impossible to completely reduce the sky glow impacts.

On a cloudy night the sky above the infrastructure area and open cut working areas will glow with a soft reflected light.

The lighting effects extend and spread the overall lighting changes over a wider area and therefore increase the cumulative effect of lighting on the rural landscape. Added to the sky glow from adjacent mining operations, the potential sky glow effects may extend for many kilometres. Thus for a number of years the night environment will be significantly altered by the cumulative effects of all the various coal mining works.

5.10 Mitigation Measures (Night Lighting)

The measures that could be taken by Ashton Coal to mitigate adverse night lighting impacts are as follows:

- Within the infrastructure areas use approximately 15 metre high light columns and low brightness floodlights with the floodlight body horizontal and the floodlight reflector designed to provide sharp cut-off and restrict stray light;
- After initial stripping and bund formation, program works on the north faces of the out of pit emplacement to be carried out during daylight hours and work behind the emplacement during the evenings and night;
- Use wall mounted lights with horizontal bodies and low brightness design to light areas around the offices, ROM facilities, workshop to 50 lux and adjacent portions of the hard stand area to 10 lux or the minimum allowable to meet current OH and S requirements;
- Shield all floodlights in the open cut area to the maximum extent practicable;
- Shield lights on the conveyor system and reduce brightness to 10 lux or the minimum allowable to meet current OH and S requirements;
- Where safe to do so, trucks on access roads should make use of portable visual edge markers to increase drivers' visibility of road edges when driving with dipped headlamps; and
- Task and general lighting should be screened from viewers where possible but lighting levels must always be selected to meet safe working practices.

5.11 Summary

A review of the visual impacts of the project reveals that viewpoints around the open cut and the out of pit emplacement area are significantly impacted throughout the 7 year life of the mine. The selected viewpoints will all be affected by the open cut works and the creation of the environmental bund to varying degrees dependant on distance from the works. Our report provides recommendations to ameliorate these impacts. The greatest visual impacts will occur within the first 18 months and reduce significantly after that period.

Lighting impacts will be high for the early period of mine operation in viewing locations around Camberwell and along the New England Highway.

A key point of difference to other proposed coal mining operations assessed by our company is the shorter proposed mine operating period for the open cut of only 7 years, with progressive rehabilitation. This depends on weather, market factors and extraction sequences but the shorter proposed mine life assists in limiting the duration of impacts of the open cut and emplacement areas and is a significantly shorter mine life than other mines currently in operation in the region along the passenger rail line, New England and Golden Highway travel routes. This feature will assist to some degree in reducing overall viewer sensitivity to the extraction works as the impacts are relatively short in duration.

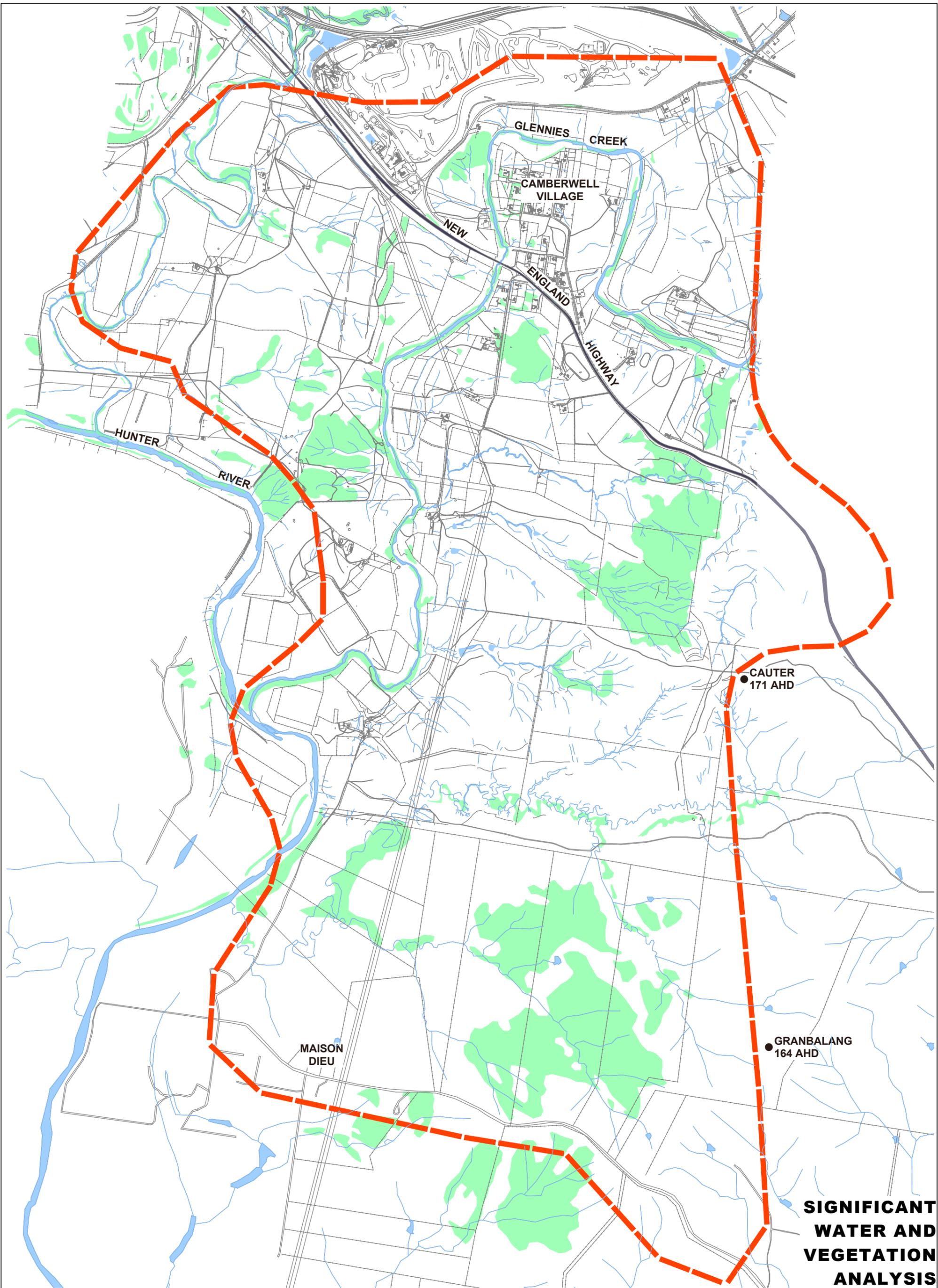
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- “Forest Landscape Description and Inventories A basis for Land Planning and Design” USDA Forest Service Research Paper PSW-49 R. Burton Litton Jr;
- National Forest Landscape Management Handbook No. 434 February 1973;
- Forest Service U.S. Department of Agriculture, Agricultural Handbook No. 462, “National Forest Landscape Management” Volume 2 Chapter1 The Visual Management system - April 1974;
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- Williamson, Dennis. Scenic perceptions of Australian Landscapes, Landscape Australia, 1979 vol. 2
- Forest Commission, Victoria, 1981 - Visual Absorption Capability in the Blue Range Study Area.
- 1:25000 topographical map “Singleton 9132-4N 2nd edition ” IPI NSW land and property information
- 1:25000 topographical map “Camberwell 9133-3S 2nd edition ” IPI NSW land and property information
- Google Earth 2009 Cnes/spot image: Mapdata Sciences Pty Ltd, PSMA

Assessment Documents

The attached assessment is based on the following documents provided by Ashton Coal Pty Ltd.

- Ashton Coal Operations South East Open Cut Plan 4 “General Layout”
- Ashton Coal South East Open Cut Year 1 Mine Plan - “Plan 7”
- Ashton Coal South East Open Cut Year 3 Mine Plan - “Plan 8”
- Ashton Coal South East Open Cut Year 5 Mine Plan - “Plan 9”
- Ashton Coal South East Open Cut Year 7 Mine Plan - “Plan 10”
- Ashton Coal South East Open Cut Project - Pegasus Technical “ Land Ownership of the SEOC Project Area” Figure 1.2 “Plan 2 “
- Ashton Coal South East Open Cut Project - Pegasus Technical “ Land Ownership of the Camberwell Village” Figure 1.3 “Plan 3”
- Ashton Coal South East Open Cut Project - Pegasus Technical “Existing and Proposed Electrical and Utility Easement” Figure 4.17 “ Plan 20”



SIGNIFICANT WATER AND VEGETATION ANALYSIS

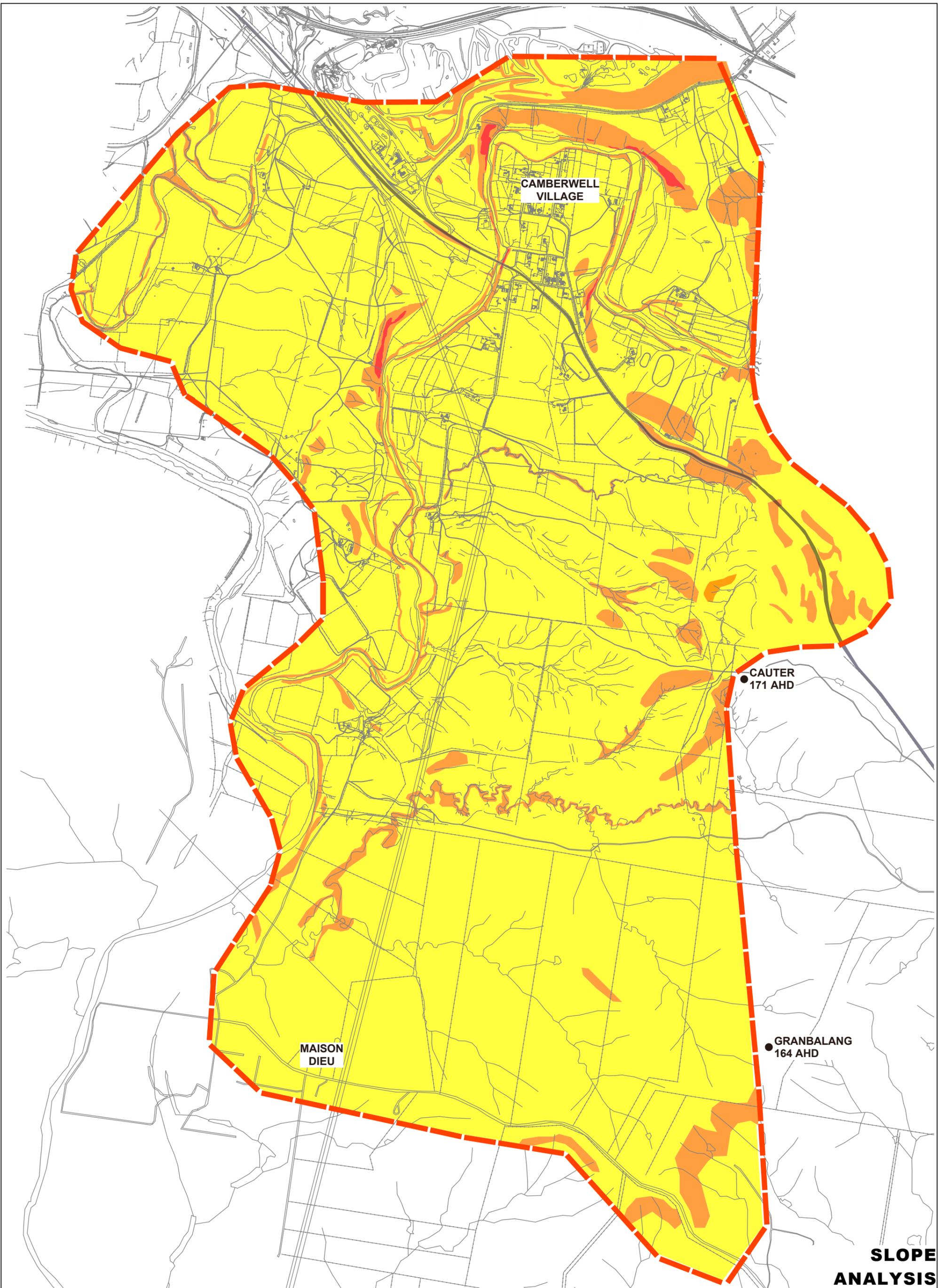
- - - STUDY AREA
- WATER BODIES
- SIGNIFICANT VEGETATION AREAS

ASHTON SOUTH EAST OPEN CUT
VISUAL IMPACT STUDY

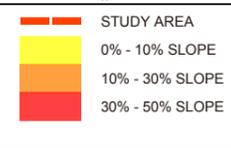


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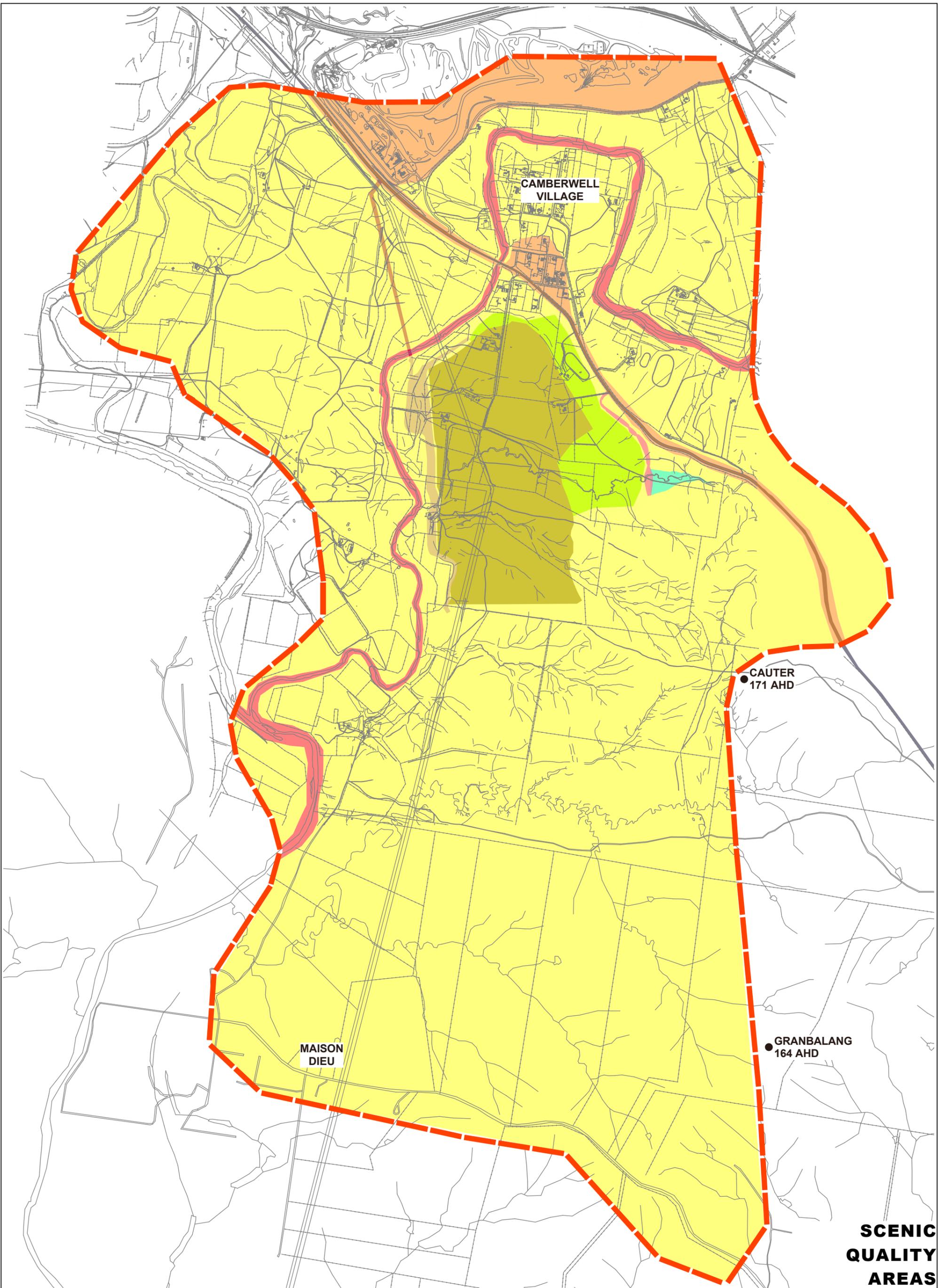
SLOPE ANALYSIS



ASHTON SOUTH EAST OPEN CUT VISUAL IMPACT STUDY



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			828	03	C
08/12/04	Final Report	08/12/04	08/12/04	08/12/04	08/12/04
09/02/04	Final Report	09/02/04	09/02/04	09/02/04	09/02/04
09/02/04	Final Report	09/02/04	09/02/04	09/02/04	09/02/04
DATE	REVISION				ISSUE



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AREAS**

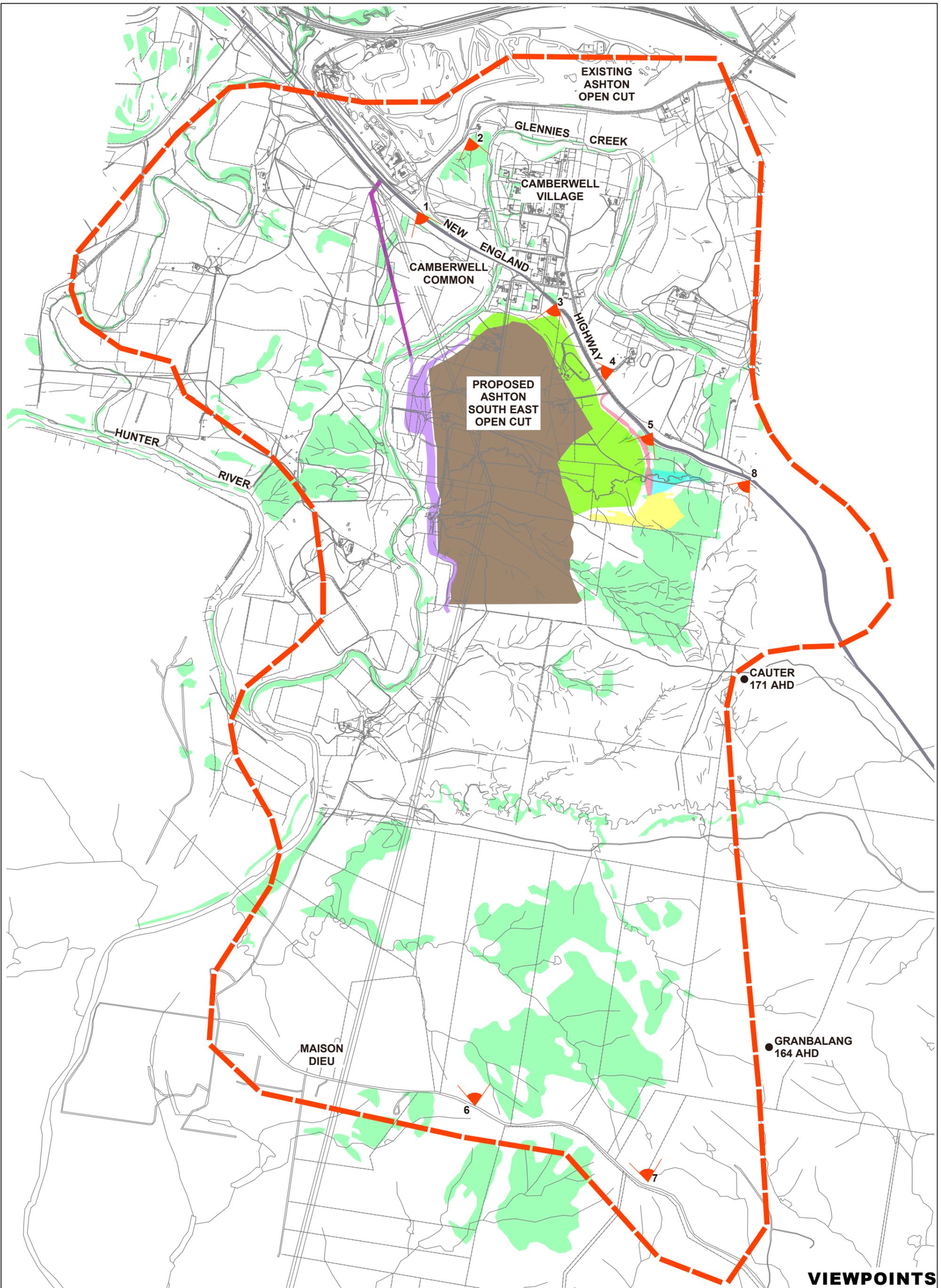
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-  AREAS OF LOW / MODERATE QUALITY
-  AREAS OF MODERATE QUALITY
-  AREAS OF MODERATE / HIGH QUALITY

**ASHTON SOUTH EAST OPEN CUT
VISUAL IMPACT STUDY**



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	STUDY AREA		CAMBERWELL COMMON
	ASSESSMENT LOCATION		PROPOSED OPEN CUT MINE
	EXISTING OPEN CUT MINE		PROPOSED ENVIRONMENTAL BUND
			PROPOSED SURFACE FACILITIES
			PROPOSED WATER STORAGE
			SIGNIFICANT VEGETATION AREAS

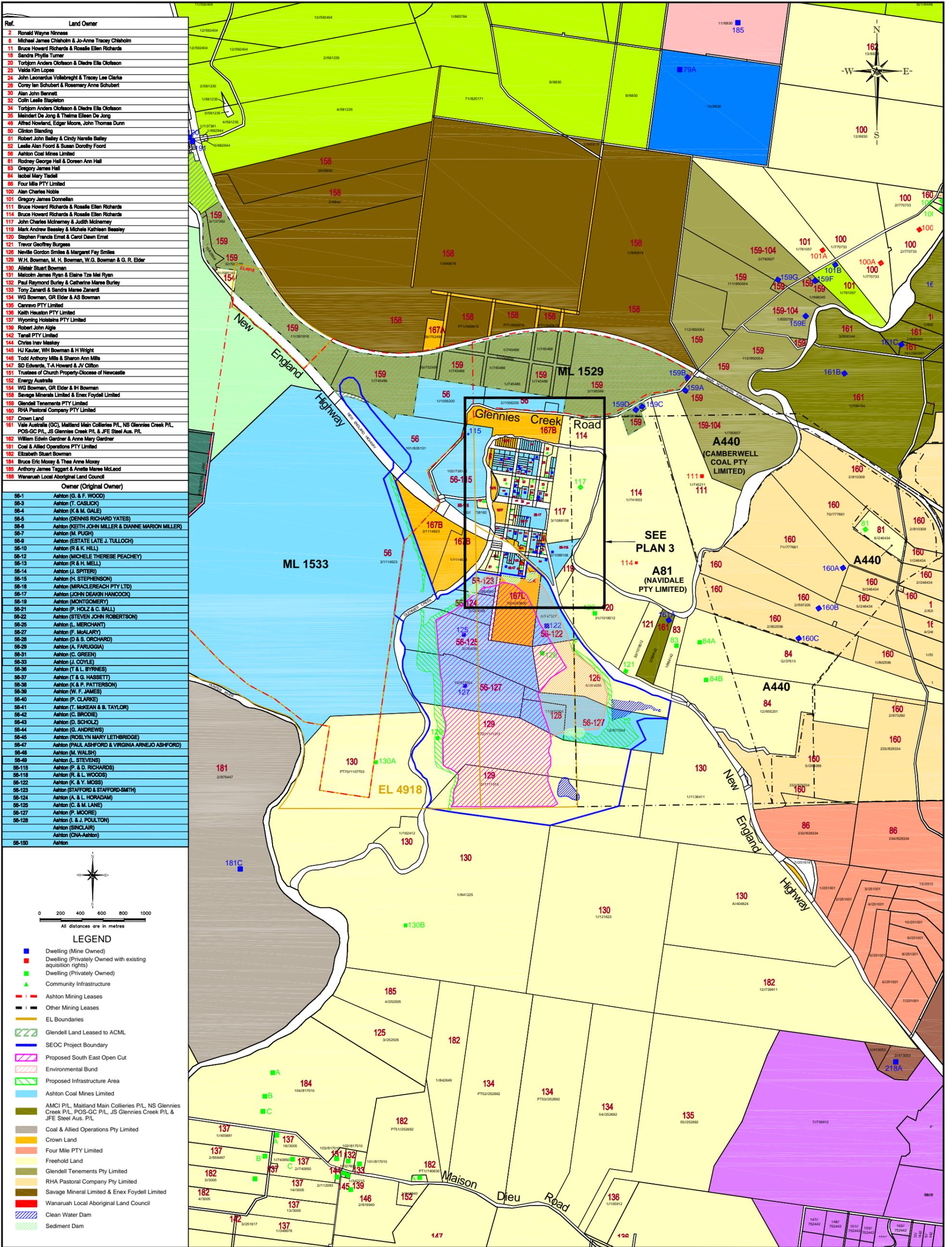
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VISUAL IMPACT STUDY

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DATE: 14/01/2016 REVISION:	REVISION:	REVISION:	REVISION:

VIEWPOINTS

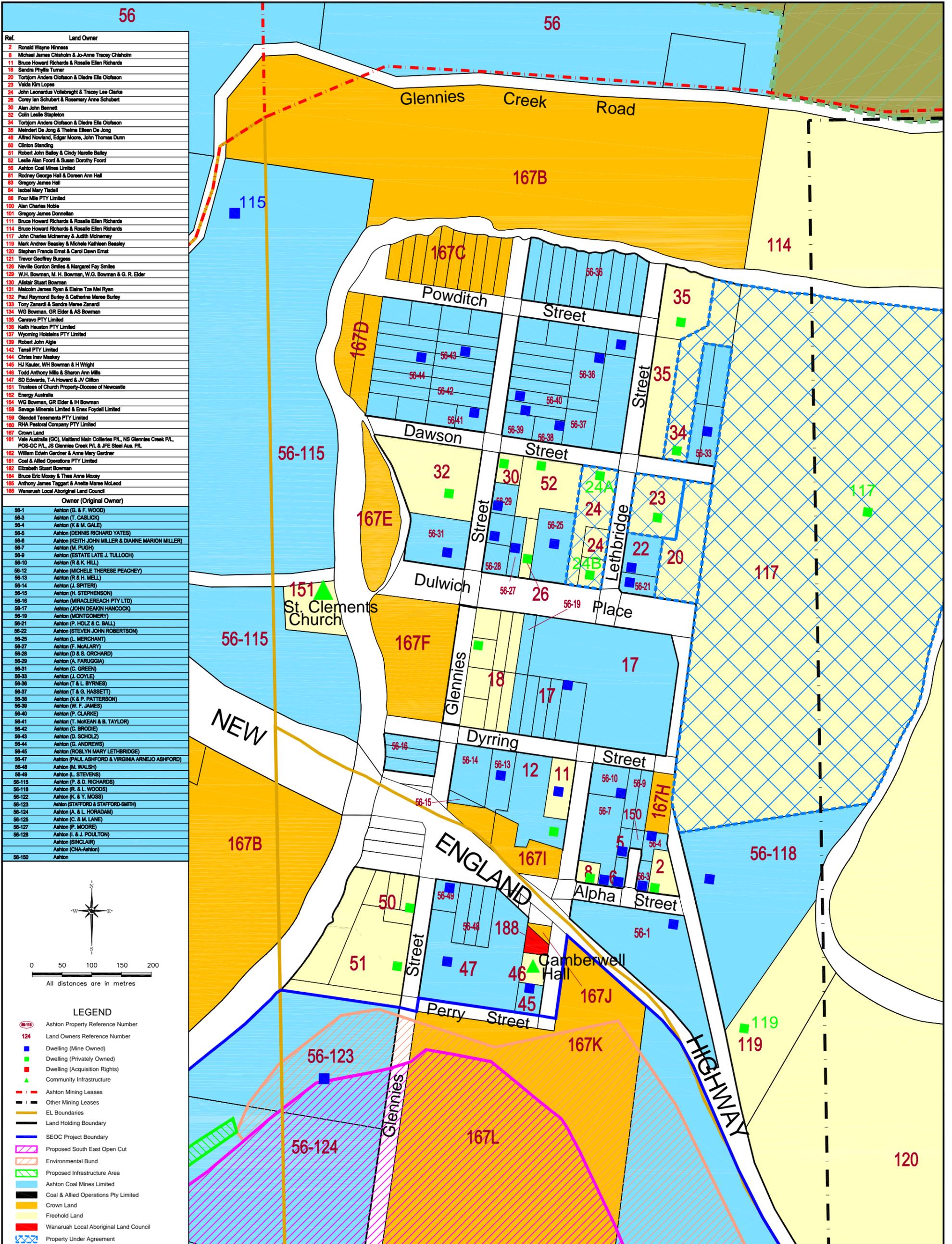


Ref.	Land Owner
2	Ronald Wayne Ninnes
8	Michael James Chisholm & Jo-Anne Tracey Chisholm
11	Bruce Howard Richards & Rosalie Ellen Richards
18	Sandra Phyllis Turner
20	Torbjorn Anders Olofsson & Diederik Olofsson
23	Valda Kim Lopes
24	John Leonardus Vollebreght & Tracey Lee Clarke
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129	W.H. Bowman, M. H. Bowman, W.G. Bowman & G. R. Elder
130	Alister Stuart Bowman
131	Malcolm James Ryan & Elaine Tze Mei Ryan
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136	Keith Heuston PTY Limited
137	Wyoming Holsteins PTY Limited
139	Robert John Algie
142	Tanah PTY Limited
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56-47	Ashton (PAUL ASHFORD & VIRGINIA ARNEJO ASHFORD)
56-48	Ashton (M. WALSH)
56-49	Ashton (L. STEVENS)
56-115	Ashton (P. & D. RICHARDS)
56-118	Ashton (R. & L. WOODS)
56-122	Ashton (K. & Y. MOSS)
56-123	Ashton (STAFFORD & STAFFORD-SMITH)
56-124	Ashton (A. & L. HORADAM)
56-125	Ashton (C. & M. LANE)
56-127	Ashton (P. MOORE)
56-128	Ashton (I. & J. POULTON)
56-129	Ashton (SINCLAIR)
56-130	Ashton (CNA-Ashton)
56-150	Ashton

0 200 400 600 800 1000
All distances are in metres

LEGEND

- Dwelling (Mine Owned)
- Dwelling (Privately Owned with existing acquisition rights)
- Dwelling (Privately Owned)
- ▲ Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Glendell Land Leased to ACML
- SEOC Project Boundary
- Proposed South East Open Cut
- Environmental Bund
- Proposed Infrastructure Area
- Ashton Coal Mines Limited
- AMCI P/L, Maitland Main Collieries P/L, NS Glennies Creek P/L, POS-GC P/L, JS Glennies Creek P/L & JFE Steel Aus. P/L
- Coal & Allied Operations Pty Limited
- Crown Land
- Four Mile PTY Limited
- Freehold Land
- Glendell Tenements Pty Limited
- RHA Pastoral Company Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Wanaruah Local Aboriginal Land Council
- Clean Water Dam
- Sediment Dam



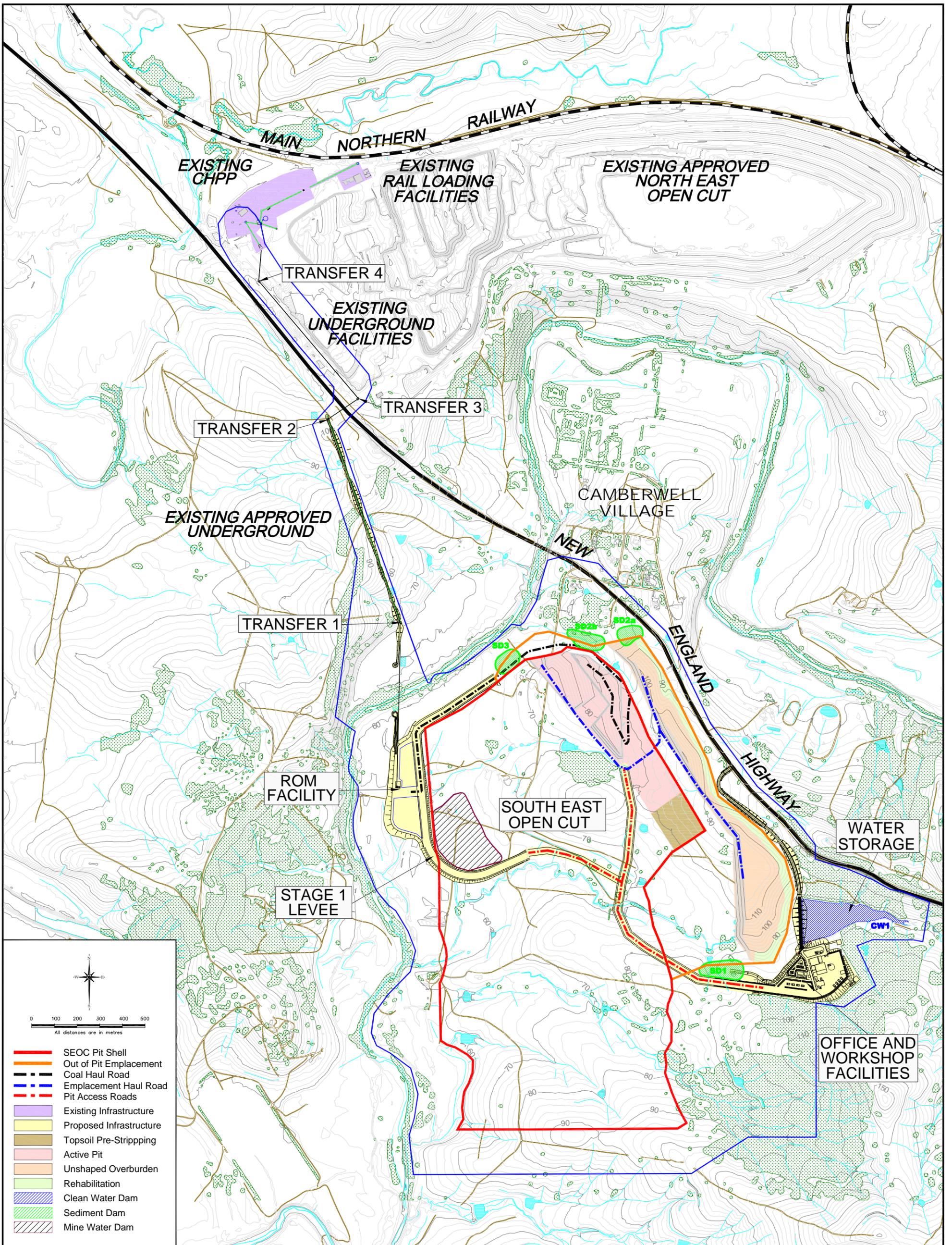
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66-44 Ashton (G. ANDREWS)
66-45 Ashton (ROSLYN MARY LETHBRIDGE)
66-47 Ashton (PAUL ASHFORD & VIRGINIA ARNEJO ASHFORD)
66-48 Ashton (M. WALSH)
66-49 Ashton (L. STEVENS)
66-115 Ashton (P. & D. RICHARDS)
66-118 Ashton (R. & L. WOODS)
66-122 Ashton (K. & Y. MOSS)
66-123 Ashton (STAFFORD & STAFFORD-SMITH)
66-124 Ashton (A. & L. HORADAM)
66-125 Ashton (C. & M. LANE)
66-127 Ashton (P. MOORE)
66-128 Ashton (I. & J. POULTON)
Ashton (SINCLAIR)
Ashton (CNA-Ashton)
66-150 Ashton

0 50 100 150 200
All distances are in metres

LEGEND

- Ashton Property Reference Number
- Land Owners Reference Number
- Dwelling (Mine Owned)
- Dwelling (Privately Owned)
- Dwelling (Acquisition Rights)
- Community Infrastructure
- Ashton Mining Leases
- Other Mining Leases
- EL Boundaries
- Land Holding Boundary
- SEOC Project Boundary
- Proposed South East Open Cut
- Environmental Bund
- Proposed Infrastructure Area
- Ashton Coal Mines Limited
- Coal & Allied Operations Pty Limited
- Crown Land
- Freehold Land
- Wanarua Local Aboriginal Land Council
- Property Under Agreement



South East Open Cut Project
Proposed Year 1 Mine Plan

Plan 7



