DARTBROOK MINE

LANDSCAPE & LIGHTING MANAGEMENT PLAN

for Dartbrook Operations Pty Ltd

22 February 2024

DOCUMENT CONTROL

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1. INTRODUCTION

1.1 BACKGROUND

Dartbrook Mine is owned by an unincorporated Joint Venture (Dartbrook Joint Venture) between Australian Pacific Coal (AQC) and Tetra Resources Pty Ltd (Tetra). Dartbrook Operations Pty Ltd (Dartbrook Operations) is the appointed operating management company and the Mine Operator under Section 5 of the *Work Health and Safety (Mines and Petroleum Sites) Regulation 2022*. The Dartbrook Joint Venture will acquire AQC Dartbrook Management Pty Ltd (ABN 62 007 377 577) which is the holder of the Development Consent and Environment Protection Licence), and AQC Dartbrook Pty Ltd (ABN 46 000 012 813) which is the holder of the relevant mining and coal authorities.

Dartbrook Mine is located approximately 10 km north-west of Muswellbrook and 4.5 km south-west of the village of Aberdeen in New South Wales (see **Figure 1**). Dartbrook Mine operated as an underground longwall coal mine from 1993 until December 2006, when it was placed in care and maintenance by the previous owner, Anglo Coal (Dartbrook Management) Pty Ltd (ACDM). The mine was acquired by AQC in 2017 and remained in care and maintenance throughout AQC's period of ownership.

Dartbrook Mine is authorised by Development Consent DA 231-07-2000 granted under the *Environmental Planning and Assessment Act 1979*. DA 231-07-2000 was granted on 28 August 2001 and has been modified on seven occasions (as summarised in **Table 1**). DA 231-07-2000 enables mining operations to be carried out until 5 December 2027.

Dartbrook Operations is preparing to recommence mining activities in 2024, thereby transitioning Dartbrook Mine from care and maintenance back to an operational phase.

Table 1 Modifications to DA 231-07-2000

Modification	Approval Date	Activities
MOD 1	19 June 2002	MOD1 was an administrative modification to DA 231-07-2000 that altered the conditions regarding blasting notifications and structural inspections.
MOD 2	16 June 2003	MOD2 approved the construction and operation of an additional emergency tailings storage cell at the Coal Handling and Processing Plant (CHPP).
MOD 3	4 November 2003	MOD3 proposed the following changes to the site access arrangements: • Continued use of Dartbrook Road to provide access to the West Site; and • Use of local public roads by traffic associated with Dartbrook Mine. Prior to construction of the Kayuga Mine Access Road, access to the West Site was via Dartbrook Road. It was envisaged that Kayuga Mine Access Road would replace Dartbrook Mine as the primary access to the West Site. However, the Kayuga Mine Access Road was being used by trucks to haul coal to the CHPP. To avoid interactions between haul trucks and private vehicles, MOD3 proposed that Dartbrook Road should continue to be used as the primary access road for mine personnel. MOD3 also sought approval for locally based employees to access the West Site via local roads (Kayuga Road, Dartbrook Road and Blairmore Lane). For employees residing in the surrounding areas, these local roads provide more convenient access than the Western Access Road.
MOD 4	30 March 2004	DA 231-07-2000 allowed for truck haulage of coal to the CHPP over an 18-month period. Truck haulage was to be discontinued upon completion of the conveyor system for the Kayuga Seam, which would enable coal to be transferred to the

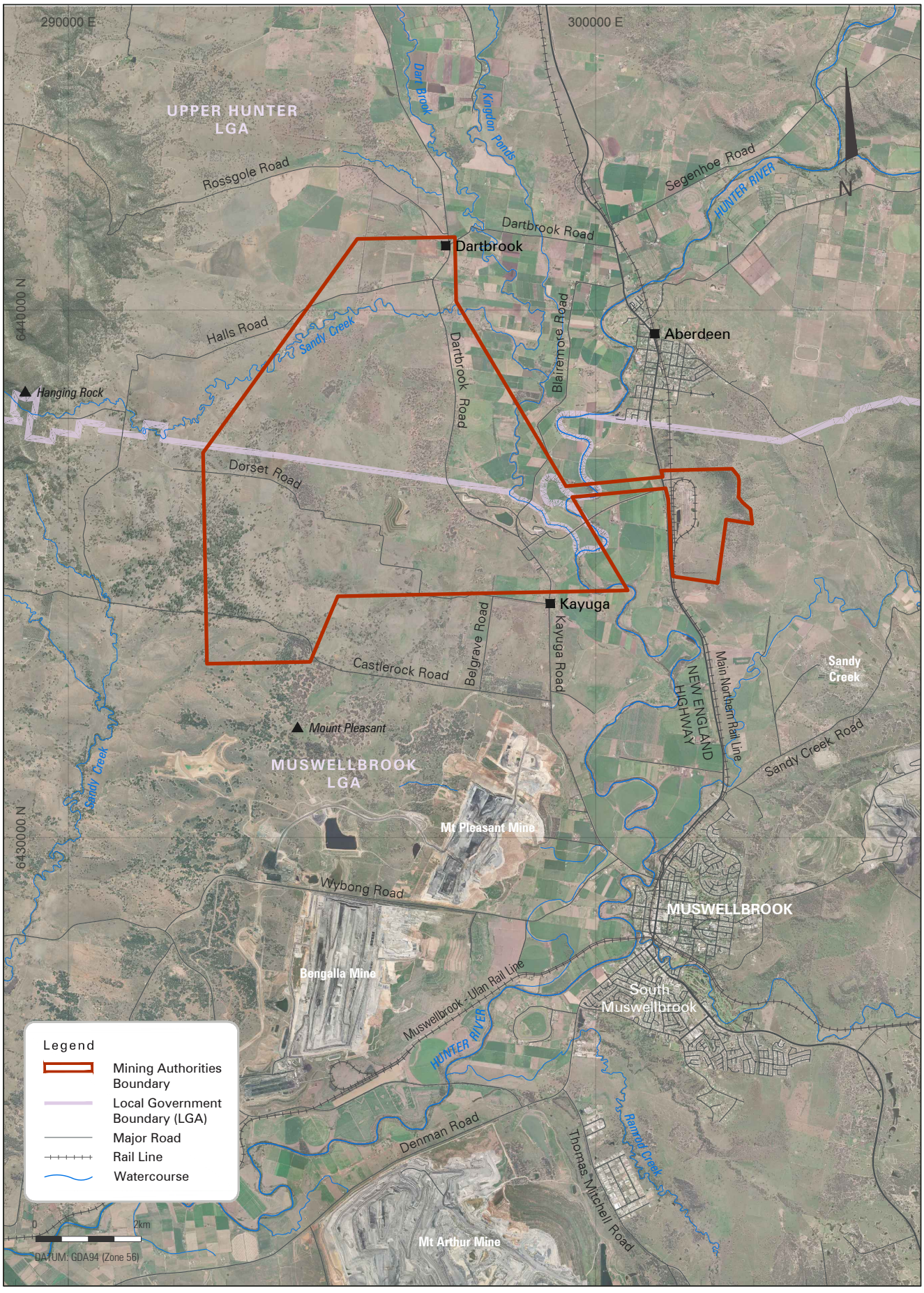
Modification	Approval Date	Activities
		CHPP via the Hunter Tunnel. MOD 4 extended the duration of truck haulage by 3 months to allow for haulage to continue until the completion of the Kayuga Seam conveyor system.
MOD 5	4 May 2005	MOD 5 facilitated changes to the rejects disposal system at Dartbrook Mine. The approved rejects disposal system involved the commissioning of a pipeline and pumping system for the transportation and disposal of reject materials. Engineering studies indicated that this method would pose significant technical risks due to the variability in relative quantities of coarse and fine rejects produced by the CHPP. MOD5 obtained approval for rejects to be transported to the Rejects Emplacement Area (REA) using trucks.
MOD 6	16 November 2005	MOD 6 provided approval for the following activities: • Establishment of four new Run of Mine (ROM) coal stockpiles and expansion of the existing emergency ROM coal stockpile at the CHPP; • Disposal of tailings within the Wynn Seam goaf; and • Operation of a Nitrogen Injection Plant to prevent the oxidation of coal.
MOD 7	11 March 2022	MOD 7 was determined by the NSW Independent Planning Commission (IPCN) on 9 August 2019. The IPCN approved the alternate mining method (bord and pillar mining) but not the proposed five-year extension to the duration of mining operations. Without the extension to operate under DA 231-07-2000 for a further five years, it was impractical to recommence mining at Dartbrook. In November 2019, an appeal was lodged against the IPCN's determination in the NSW Land and Environment Court. The court proceedings were resolved on 11 March 2022, with the proposed five-year extension of mining being approved. As a result, DA 231-07-2000 currently enables mining operations to be undertaken until 5 December 2027.

1.2 SITE LAYOUT

Dartbrook generally consists of the following main components:

- West Site surface facilities including workshop and maintenance facilities, administration building, Staged Discharge Dam and the underground mine portals; the Kayuga Entry and Wynn Seam Portal;
- East Site surface facilities including the Coal Handling and Preparation Plant CHPP, rail loop, train loading facilities and Rejects Emplacement Area (REA);
- Wynn Seam underground mine workings which are decommissioned and are used for tailings disposal and mine water storage;
- Kayuga Seam underground mine workings, which will be an active mining domain upon recommencement; and
- Hunter Tunnel which connects the underground mine workings to the East Site surface facilities.

Figure 2 and **Figure 3** shows the location of these features of the Dartbrook. The location of nearby Visual Receptors in relation to Dartbrook is illustrated on **Figure 4**.



JBA 2188 DAR - F 01 SITE LOCALITY (14/03/2022)

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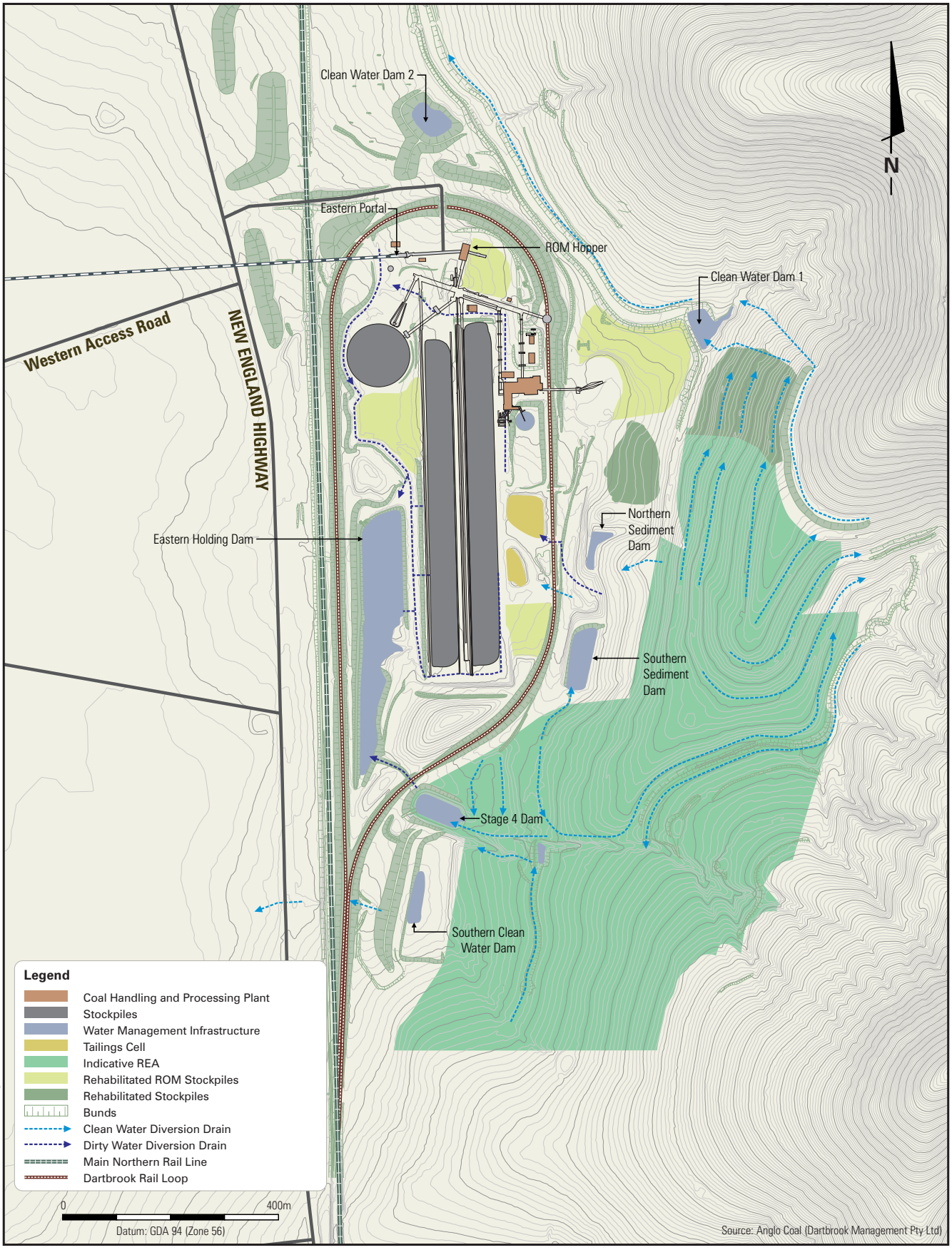
Environmental and Planning Consultants

Regional Locality

FIGURE 1



HB DARTBROOK Surface Water Management Plan HB1804 F1 East Site Infrastructure 17 07 2020

DARTBROOK MINE

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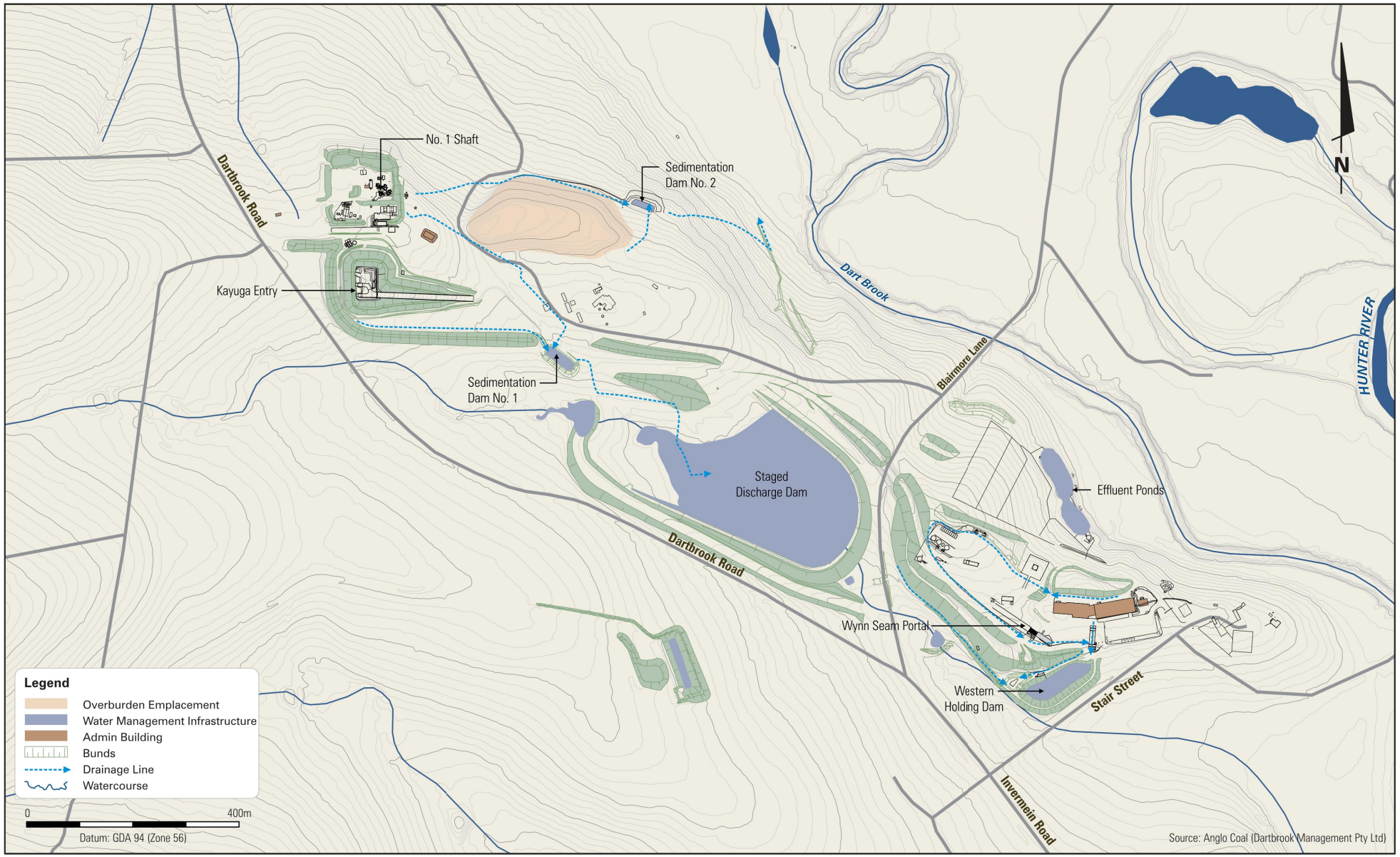
Dartbrook Mine Layout - East Site

FIGURE 2



JBA 2188 DAR - F 03 EXISTING SITE LAYOUT (WEST) (25/02/2022)

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Dartbrook Mine Layout - West Site

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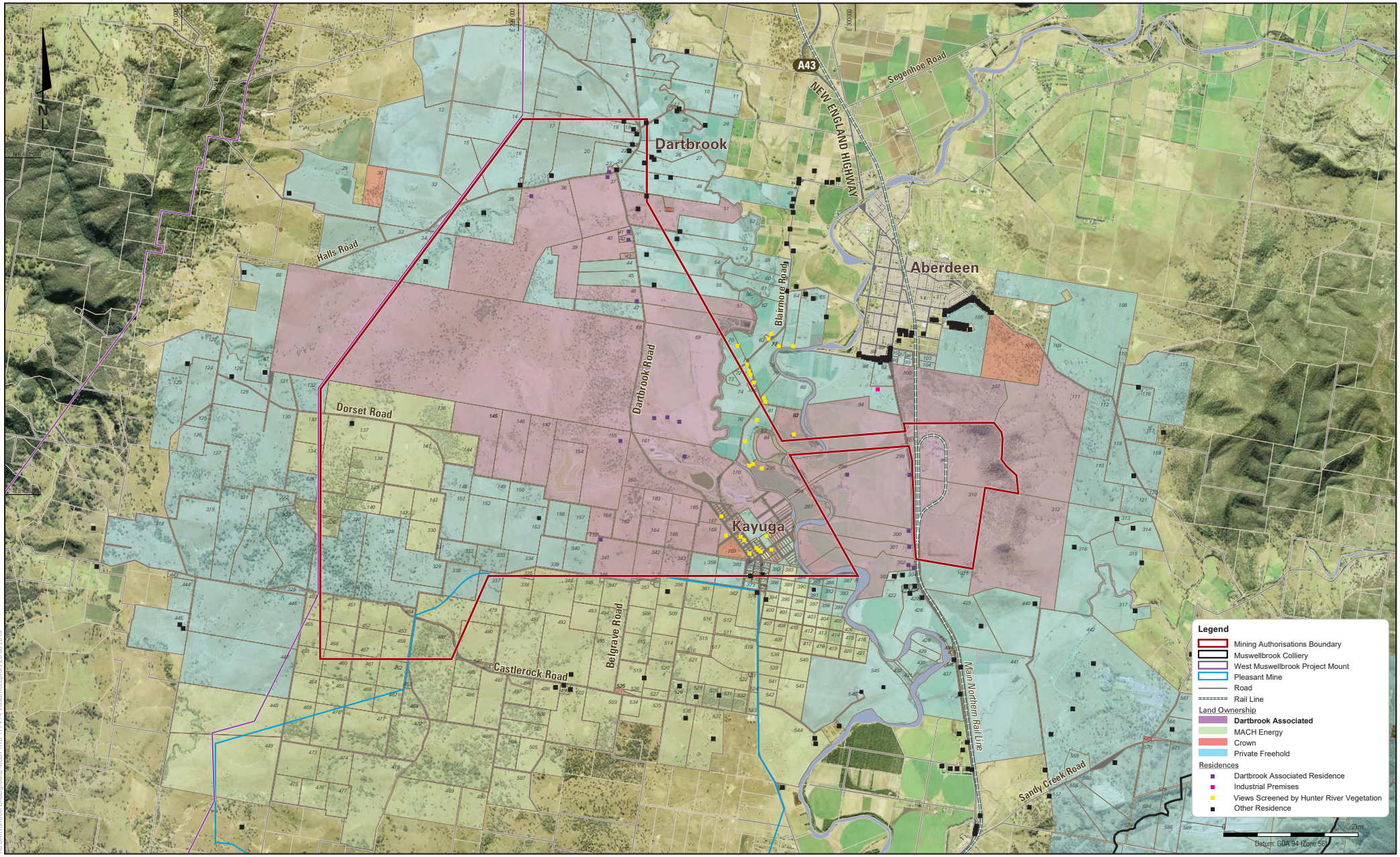
FIGURE 3



DARTBROOK MINE

Visual Receptors

FIGURE 4

DARTBROOK

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Environmental and Planning Consultants

1.3 PURPOSE

The Landscape and Lighting Management Plan (LLMP) documents the management strategies designed to protect the scenic values of area surrounding the mining operations. The protection of scenic values will be met through the implementation of the management strategies specified in **Section 3**.

1.4 MANAGEMENT PLAN REQUIREMENTS

The specific requirements of the LLMP are contained in Development Consent conditions 3.8 (a) and 6.5 (a). These requirements are listed in **Table 2** with a reference to where each specific requirement is addressed in the LLMP.

Table 2 Landscape and Lighting Management Plan Requirements

Development Consent Condition			Status / Section of Document
3.8	**Visual Amenity and Landscaping**		
(a)	A Landscape Management Plan must be prepared by the Applicant and approved by the Secretary prior to recommencement of construction. The Plan must be prepared in consultation with Resources Regulator, Muswellbrook Shire Council (MSC) and Upper Hunter Shire Council (UHSC). In preparation of the plan, regard must be given to the Aberdeen Sheet of the Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley of NSW. The Landscape Management Plan must be appended to the Mining Operations Plan (Condition 2.1) and must include, but not be limited to, the following:		This Plan. Stakeholder Consultation is included in **Appendix A**. The plan has been prepared with regard to the Department of Mineral Resources Synoptic Plan. However, the plan does not include any significant rehabilitation or revegetation works other than tree screens for visual impact mitigation.
	(i)	An on-site landscaping strategy detailing design and proposed planting of trees and shrubs and/or the construction of mounding or bunding:	-
		1) Adjacent to the Dam and Ventilation Shaft No.1 where screening of new infrastructure is required from Dartbrook Road.	**Section 3.4** No new infrastructure is proposed under MOD7
		2) Screening of new infrastructure, where required, from other public roads including Kayuga, and Dartbrook and Coal Creek Roads;	**Section 3.2** No new infrastructure is proposed under MOD7
		3) Around the Kayuga Entry to reduce lighting effects;	**Section 3.2** and **3.6**
		4) In areas of the eastern facilities site where replanting of existing screening is required. This must include, where necessary, the construction of a suitably screened bund wall on the northern and southern ends of the CHPP to reduce visual effects on nearby residences at Aberdeen and nearby rural properties;	**Section 3.3**
		5) As part of the rehabilitation of the Rejects Emplacement Area;	**Section 3.5**
		6) Along sections of the new access road to the mine site;	**Section 3.2**

Development Consent Condition		Status / Section of Document
	7) Along sections of the New England Highway; and	**Section 3.3**
	8) At any other areas identified as necessary by MSC or UHSC for the maintenance of satisfactory visual amenity, and as agreed by the Secretary.	**Appendix A**
(ii)	Appropriate erosion control and sediment control practices for earthworks associated with the landscaping.	These are addressed separately in the Erosion and Sediment Control Plan.
(iii)	Details of visual appearance of new buildings, structures, facilities or works (including paint colours, screenings and specifications). New buildings and structures (including the Nitrogen Injection Plant) must be designed and constructed so as to present a neat and orderly appearance and to blend as far as practicable with the surrounding landscape.	**Sections 3.4**
(iv)	Details, specifications and staged work programs to be undertaken, maintenance and monitoring of all landscape works and maintenance of building materials and cladding.	**Section 4**
(v)	Details of a monitoring program to assess the effectiveness of visual impact mitigation measures. The program will be developed in consultation with MSC and UHSC and be prepared to the satisfaction of the Secretary;	**Sections 4** and **5**
(vi)	Reporting of monitoring results in the Annual Review and to MSC, UHSC and the CCC. Monitoring results would specifically identify any remedial works required;	**Section 6**
(vii)	Details of contingency measures to be applied in the case that proposed visual mitigation measures are not successful;	**Sections 4** and **5**
(viii)	The process of incorporating vegetation screening and fauna protection corridors into the proposed visual and landscaping works, where practicable;	Due to the relatively limited extent of vegetation screening necessary and the lack of any significant habitat areas in the immediate vicinity of these works, incorporation of flora & fauna protection corridors is not practicable. Flora & Fauna management is addressed separately in the Flora & Fauna Management Plan.
(ix)	Use of indigenous species;	**Section 3.5** and **Appendix B**
(x)	Details of predicted visual impacts from the proposed rejects emplacement area on residences not owned by the Applicant, UHSC land and Aberdeen. The predicted visual impacts must be in the form of a montage and transects showing clear sightlines from the viewer to the proposed rejects emplacement area;	**Section 3.5**

Development Consent Condition		Status / Section of Document
(xi)	Details of an off-site landscape strategy which will detail proposed off-site mitigation measures and include the:	-
1)	Identification of those properties to be offered off-site visual enhancement works, in accordance with predicted adverse visual impacts;	**Section 3.5**
2)	Details of consultation with the relevant landowners; and	**Section 3.5**
3)	Details of the procedure to be followed to design and implement appropriate off-site vegetation screening if requested by landowners identified under 1 above; and	**Section 3.5**
xii)	Consideration of the visual impact and adequacy of associated mitigating measures on the Aberdeen property of SCC, with recommendations for any additional measures including consideration of buffer land, as applicable. This consideration must be undertaken by an independent qualified person(s) appointed by the Secretary, in consultation with SCC and Applicant, and paid for by the Applicant.	**Section 3.5**
(b)	In the event that a landowner other than those identified in subclause (a)(xi) above, considers that his/her residence is visually impacted by the proposal, greater than predicted in the Landscape Management Plan once the proposal is operational, the Applicant must, upon the receipt of a written request, consult the landowner, discuss their concerns and, if necessary, possible mitigation.	**Section 5**
(c)	Should the Applicant and/or landowner dispute the level of adverse impact or any proposed mitigation measures from subclause (a)(xi) or (b) above, then either party may refer the matter to the Secretary in consultation with MSC and/or UHSC.	**Section 5**
(d)	Notwithstanding subclauses (b) and (c) above, the Applicant must fund and undertake an independent review of the visual impact of the proposed rejects emplacement area on UHSC's land, every five years from the commencement of mining operations, unless otherwise agreed by the Secretary. The independent review must be undertaken by an independent Landscape Expert appointed by the Secretary in consultation with UHSC and the Applicant. The independent Landscape Expert must determine whether the actual visual impact of the rejects emplacement area on UHSC's land is greater than that predicted in the Landscape Management Plan. If the independent Landscape Expert determines that the impact on UHSC's land is greater than that predicted in the Landscape Management Plan, the independent Landscape Expert must make recommendations to mitigate the impact.	**Section 5**
(e)	If either party disputes the determination and recommendations of the independent Landscape Expert in subclause (d) above, either party may refer the matter to the Secretary for final determination.	**Section 5**

Development Consent Condition			Status / Section of Document
6.5	**Lighting Emissions**		
(a)	The Applicant must, prior to commencement of construction, prepare a Lighting Management Plan in consultation with MSC, UHSC and to the satisfaction of the Secretary. The Plan must include details of the implementation of visual controls to screen, direct or manage all on-site lighting from mine related activities in respect of residences and roadways. The Plan must include, but not be limited to:		This document is the Landscape and Lighting Management Plan. **Appendix A**
	i)	Details of the planting of vegetation screens along Dartbrook Road, to screen potential lighting impacts;	**Section 3.2**
	ii)	Details of the tree screen on the north side of the access road at the corner north of the Dam to screen potential lighting impacts;	**Section 3.2** and **3.6**
	iii)	Details of the tree and shrub screening around the Drift Access to reduce potential lighting impacts;	**Section 3.6**
	iv)	Details of technical measures and work practices necessary to minimise the spillage of light from areas to be illuminated, and to minimise the total night time glow from the mine;	**Section 3.6**
	v)	Details of the construction or placement of visual screens to screen lighting impacts;	**Section 3.6**
	vi)	Details of the proposed process and measures to address complaints that may be received from residents or road users impacted by lighting from the mine site; and	**Section 3.6**
	vii)	Details of any other effective operating practices to manage potential lighting impacts.	**Section 3.6**
(b)	The Applicant must report on the effectiveness of the lighting emission controls in the Annual Review.		**Section 6**
(c)	The Applicant must ensure that on-site lighting does not directly emit light into the line of sight of nearby dwellings. The light emitted from any direct flood lighting and any vehicle headlights must be directed away from dwellings and public roads.		**Section 3.6**
(d)	The Applicant must ensure that light emitted from locomotive headlights whilst a locomotive is on or moving off the rail loop must be screened from dwellings to the satisfaction of MSC or as otherwise agreed by the Secretary.		**Section 3.6**

1.5 UPDATES IN THIS VERSION

The original LLMP was developed following the grant of DA 231-07-2000 to mitigate the impacts of previous mining operations. Visual mitigation measures at Dartbrook Mine have remained relatively unchanged during care and maintenance, due to the limited scale of activities during this phase.

This version of the LLMP has been prepared for the anticipated recommencement of mining operations. The surface facilities required for future mining operations were already in place when the previous version of the LLMP was approved. As such, visual screening measures have already been implemented. Notwithstanding,

the effectiveness of these measures was evaluated during the preparation of this version and enhancements have been committed to (where warranted).

1.6 STAKEHOLDER ENGAGEMENT

Conditions 3.8 (a) and 6.5 (a) of the Development Consent require the LLMP be prepared to the satisfaction of the Secretary of the Department of Planning, Housing and Infrastructure (DPHI), in consultation with the Resources Regulator, MSC and the UHSC. The draft LLMP was provided to the Resources Regulator and MSC for comment (via the NSW Planning Portal) on 10 November 2022. The document was also provided to UHSC via direct correspondence.

MSC provided comments in a letter dated 9 December 2022. MSC's letter suggested enhancements to sections of tree screening at the site. These suggestions have been incorporated into the landscaping plan described in **Section 3**. The other minor clarifications requested by MSC have also been addressed in this version of the LLMP.

No feedback was received from the Resources Regulator or UHSC. Consultation records are included in **Appendix A**.

2. LANDSCAPE SETTING

2.1 REGIONAL LANDSCAPE SETTING

Since early settlement, much of the Upper Hunter has been cleared for grazing, agriculture and timber. Consequently the regional landscape includes cleared and lightly timbered undulating ridges and slopes. Coal mines, coal mining and transportation infrastructure, also form an integral part of the existing regional visual character.

2.2 LOCAL LANDSCAPE SETTING

The Dartbrook operation is located in the floodplain and lower slopes of the Hunter Valley north of Muswellbrook. The Hunter River meanders from north to south through the centre of the area.

The visual catchment of the Dartbrook operational site is determined by the surrounding topographical features which limit the extent of views. The boundaries are created by a series of rolling hills and mountain ranges, including the Hanging Rock district to the west and Browns Mountain to the east.

The Dartbrook operational site has been cleared for cultivation, grazing and settlement and is visually harmonious within its rural setting. The only significant discordant feature has been development along the New England Highway, including the Dartbrook CHPP. The ridges surrounding the area are scattered with eucalypt trees. The undulating foothills are lightly timbered, with the drainage lines more heavily timbered.

The upper slopes of Brown's Mountain are heavily timbered in contrast to the floodplain and foothills. This is complemented by the more heavily timbered ridges further west. Together these form a north-south corridor within which lies the Hunter River and associated foothills.

To the south of the Dartbrook CHPP, the railway embankments create a discordant element due to the scale, linear shape and steepness of the embankments.

The nightscape character of the local area has a rural and semi-rural character with small, scattered urban centres and some well-lit industrial complexes.

2.3 VISUAL RECEPTORS

Dartbrook Mine is divided into two distinct areas known as the East Site and the West Site. These two sites are approximately 3 km apart. The location of the Visual Receptors surrounding both the East and West Site are shown on **Figure 4**.

3. VISUAL MITIGATION MEASURES

3.1 INTRODUCTION

This section describes the measures to minimise and mitigate the potential visual impacts from Dartbrook. Key relevant components of the Dartbrook operations are:

- West Site Surface Facilities, including Dartbrook Mine Surface Facilities, Kayuga Entry and Kayuga Access Road;
- East Site CHPP Area;
- Ventilation shaft and other minor surface infrastructure areas; and
- REA.

Visual mitigation measures for each of the individual Mine domains are provided in **Sections 3.2** to **3.5**. Specific management measures for night lighting impacts are provided in **Section 3.6**.

3.2 WEST SITE SURFACE FACILITIES

The West Site Surface Facilities include the Dartbrook Mine Surface Facilities, the Kayuga Entry and the Kayuga Access Road.

The Dartbrook Mine Surface Facilities include the mine administration building, bathhouse, workshop, store yard lay-down area, diesel fuelling bay, wash-down area, Staged Discharge Dam and the Western Holding Dam (**Figure 3**). These facilities were constructed in 1992 and were approved under the original Dartbrook Development Consent. These facilities do not give rise to any adverse visual impacts on any sensitive receptors.

Visual impact mitigation measures, including visual bunds and tree screens, were incorporated in the design and construction of the Kayuga Entry and the Kayuga Access Road in accordance with the approved Construction Landscape and Lighting Management Plan (**Figure 5**). **Table 3** describes the key landscaping works that were installed during their construction.

Table 3 West Site Surface Facilities Landscaping Works

Description of Landscaping Element	Aim of Landscaping Element
Vegetation screens to the north of the Kayuga Access Road, on either side of Blairmore Lane.	Block views of the Kayuga Access Road from Blairmore Lane to the north.
Tree screen along the northern side of Dartbrook Road west of the Staged Discharge Dam.	Provide screening of the Kayuga Access Road from Dartbrook Road to the south.
2 to 3 metre high planted earth bund along the western edge of the access slot and along the southern edge of the adjacent coal stockpile area.	Screen views from Dartbrook Road of the Kayuga Entry and the vehicles entering and leaving the Kayuga Entry.
Vegetation screen at the intersection of Dartbrook Road and the access road to Ventilation Shaft No. 1.	Screen views of the Kayuga Entry from Dartbrook Road to the north-west.

These mitigation measures limit the visual impact of the Kayuga Entry and Kayuga Access Road on sensitive receptors in the surrounding area. Maintenance of the landscaping works will be conducted in accordance with the procedures specified in **Section 4**.

Vegetation screens have been established with a mixture of local native tree and shrub species, including low branching and quick growth species to create a dense vegetation screen. In January 2011, a six row tree and stock shelter screen was planted adjacent to, and west of, the New England Highway (see **Figure 6**). Maintenance planting of this screen has been undertaken periodically since initial plantings.

The Kayuga Entry excavation spoil stockpile, topsoil stockpiles and screening bund have been revegetated with grass so that they blend in with the existing landscape. All areas disturbed by previous construction activities, including road embankments and excavation batters, have been topsoiled and revegetated with native species to mitigate any long term visual impact.

A tree screen was established along Dartbrook Road to minimise motorists' views of the West Site. The original intention of this tree screen was to limit views of the unsealed Kayuga Access Road. Following a site inspection on 7 December 2022, MSC suggested that this screen should be enhanced to reduce the visibility of the Staged Discharge Dam (as well as the Kayuga Access Road).

The proposed enhancements to the visual treatments at the West Site are shown on **Figure 5**.

3.3 CHPP AREA

The CHPP Area includes:

- The Coal Preparation Plant;
- Coal stockpiles;
- Rail loop; and
- The Eastern Holding Dam (**Figure 2**).

A detailed visual assessment of the CHPP and REA was conducted by JVP Visual Planning and Design in conjunction with Hansen Consulting in 2004 '*Dartbrook Mine Rejects Emplacement Area Visual Impact Assessment Report*' (JVP Visual Planning and Design, 2004) (2004 REA Visual Assessment). A further visual assessment was carried out in December 2010 '*Dartbrook Mine Review of Visual Mitigation Strategies, Visual Assessment*' (JVP Visual Planning and Design, 2011) (2011 Visual Assessment).

The 2004 REA Visual Assessment:

- Described the visual setting of the CHPP in relation to the visual character of the surrounding area;
- Identified the key visual receptors and their sensitivity;
- Assessed the effectiveness of existing CHPP visual screening; and
- Provided recommendations for additional screening.

Recommended landscaping works designed to screen views of the CHPP, as far as practicable, from neighbouring residences, Aberdeen and the New England Highway have been completed. **Figure 6** shows the extent of screening works.

A substantial tree screen has been established along the eastern flank of the New England Highway to minimise views of the East Site. MSC recommended that enhancements may be required in the southern extent of this tree screen.

The visual effect of MOD7 was considered in the *Environmental Assessment, Kayuga Seam Bord and Pillar Mining Operations* (Hansen Bailey, 2018) completed for the Modification. Additional landscaping was recommended for the proposed shaft site and hopper that was initially included in MOD7. The shaft and hopper were not

approved under MOD7 and will not be constructed. Therefore, no additional landscaping works are required as part of MOD7.

3.4 VENTILATION SHAFTS AND OTHER MINOR SURFACE INFRASTRUCTURE

Only two of the proposed five ventilation shafts had been constructed with only one currently operational. The upcast shafts consist of a vent opening, ventilation fan and ducting up to 14 metres high. Each shaft has a relatively small surface footprint of approximately 15 m x 15 m with the area enclosed by a security fence.

Other minor surface infrastructure, such as gas drainage pipelines, mine dewatering boreholes and dropholes and a Nitrogen Injection Plant had been constructed over the life of the mine with the majority having already been removed.

The design of any visual mitigation measures for this infrastructure was subject to the surrounding topography and the location of sensitive visual receptors. Visual screening in the form of tree screens or bunding was designed and constructed to provide visual screening from any sensitive receptors, where required.

3.5 REJECTS EMPLACEMENT AREA

3.5.1 Introduction

In 2004 a visual assessment of the REA were prepared by JVP Visual Planning and Design, in conjunction with Hansen Consulting '*Dartbrook Mine Rejects Emplacement Area Visual Impact Assessment Report'* (JVP Visual Planning and Design, 2004) (2004 REA Visual Assessment). This assessment was prepared for the Statement of Environmental Effects which supported a Development Consent modification application for the modified rejects disposal system.

The visual assessment satisfied Development Consent Condition 3.8(a) (x), which required an assessment of the predicted visual impacts of the REA on private residences, UHSC land (now termed 'Aberdeen East Residential Development Land') and Aberdeen. The visual assessment reviewed the visual impact of the REA on Aberdeen East Residential Development Land and was facilitated by Department of Industry and Environment (now DPHI) in accordance with Development Consent condition 3.8(xii).

A further visual assessment was carried out in December 2010 '*Dartbrook Mine Review of Visual Mitigation Strategies, Visual Assessment'* (JVP Visual Planning and Design, 2011) (2011 Visual Assessment). This assessment satisfied Development Condition 3.8(d) which required a follow up review of the REA every five years after commencement of construction. This review is included as **Appendix B**.

3.5.2 Description of REA

The Dartbrook REA was not extended (as proposed in the May 2005 DA modification) prior to Dartbrook going into the Care and Maintenance phase of its operations. The existing REA consists of a single central emplacement area as shown in **Figure 2** and has not yet reached capacity. The existing portion of the REA will be expanded to accommodate reject materials generated by future bord and pillar mining. The additional area of the REA will be progressively rehabilitated to restore the visual character of the area.

Historically the visual character of the REA was influenced by the appearance of the active emplacement area, rehabilitated REA slopes, and the REA development sequence.

3.5.3 Visual Assessments

The 2004 REA Visual Assessment and 2011 Visual Assessment were both based on a methodology that has been used successfully in the past for major projects with complex and significant visual impacts. The methodology involves determination of the level of visual impact on a receptor (neighbouring residences) by considering both the sensitivity of the receptor and the visual effect of the REA.

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land use areas. The sensitivity of the receptors ranged from high to low, depending on the viewing distance from the receptor to the visible areas of the REA, the use of the view, and screening effects of any intervening topography, buildings or vegetation. Visual receptors were grouped into sectors comprising groups of residences with similar views of the REA. Viewing sectors included Aberdeen East,

Aberdeen East Residential Development Land (a block of land owned by UHSC, which may be used for the future development of residential and rural residential properties), Aberdeen West, Blairmore Lane, Kayuga Village and residences to the south-west of the REA.

Visual effect is a measure of the level of visual integration of visible areas of the REA and the existing visual environment. The magnitude of the visual effect is determined based on:

- A balanced consideration of level of contrast between the REA and the landscape within which it is viewed;
- The proportion of the view occupied by the REA; and
- Screening by buildings and vegetation at the REA site.

The visual effect of the REA from representative viewing locations was assessed using accurate high quality photo montages of the REA at representative development stages.

The 2004 REA Visual Assessment concluded:

> *"some residential areas would experience moderate to high visual impacts for only limited periods of time. These will be generally in the initial construction phases of the Southern and Northern REAs (years 1-2 and 15-16) and for some residences to the north and north-west, during the early years of the southern REA (up to year 7). Following these periods the visual impact will reduce to low once the active emplacement areas are screened from view by the rehabilitated outer slopes of the REA. The long term (after year 20) visual impact of the REA will be low as the final rehabilitated REA will have similar scale, shape, colour and texture to the existing landscape setting."*

The primary visual impact mitigation strategy for the REA therefore involved the screening of views of the active emplacement areas with the rehabilitated outer slopes of the emplacement, as far as practicable. Consequently, the key management strategy was to ensure that the REA was constructed to plan as shown in Appendix A of the 2004 REA Visual Assessment.

The outer slopes of the REA were grassed as soon as possible after construction to enable screening of the active emplacement areas. Native grass species endemic to the local area were used in revegetation wherever possible.

Section 4 describes the monitoring program that was implemented to monitor the construction and rehabilitation sequencing; the establishment of revegetation; and the overall success of the screening strategy.

Essentially, the 2004 REA Visual Assessment proposed how Dartbrook's expanded operations could be successfully established with minimum offsite visual effects. The 2011 Visual Assessment was able to demonstrate the success of the mitigation techniques and REA rehabilitation in reducing the visual effects of the existing REA. The 2011 Visual Assessment concluded:

> *"In relation to the existing REA, rehabilitation has achieved the integration of the REA with the surrounding landscape settings reducing visual effects to low / very low, having a similar result on*

visual impacts. The mitigation measures have achieved the visual standards as stated and fulfil the standards sought by Condition 3.8d. Further these high standards of impact mitigation extend to other sensitive receptors around the REA."

MOD7 REA

Under MOD7, a small area of the central and southern area of the REA will become active again for the co-disposal of reject materials. The outer slopes will be rehabilitated with native grass species as soon as practical to assist in reducing visual impacts to the west and south.

3.5.4 Off-site Landscaping

During the Commission of Inquiry for the Dartbrook Extended Project, the O'Brien, Gordon and Day residences were identified as being entitled to off-site vegetation screens to screen views of the future REA. The O'Brien and Gordon properties were purchased by the previous mine owners (ACDM). If requested by the Day property owner, Tetra will:

- Arrange for a landscape architect to determine vegetation screening requirements at these residences to screen views of the future REA (in consultation with the property owner); or
- Arrange the installation of the vegetation screen and meet the costs of installation.

3.6 NIGHT LIGHTING

The visual mitigation measures described in preceding sections were also designed to mitigate lighting impacts of Dartbrook's active mining operations. Additional mitigation measures proposed to be used to further reduce the impact of night lighting are described below.

Facilities in the vicinity of the Kayuga Entry required permanent night lighting. However, lighting of the access slot is limited to the minimum necessary for safe operations. These lights are directed towards the ground and shielding fitted, as necessary, to minimise night glow. Floodlighting of the portal area at the base of the access slot is directed towards the ground, well below natural ground level and is shielded by the access slot excavation. As such, it is predicted that there will be no adverse direct lighting impacts on any privately owned residences from these facilities.

Direct lighting from the headlights of vehicles using the Kayuga Access Road could potentially cross Dartbrook Road and Blairmore Lane and may impact on road users. These direct lighting impacts have been mitigated by the screening described in **Table 3** and shown in **Figure 5**. Vehicles using the road are also required to keep lights on low beam.

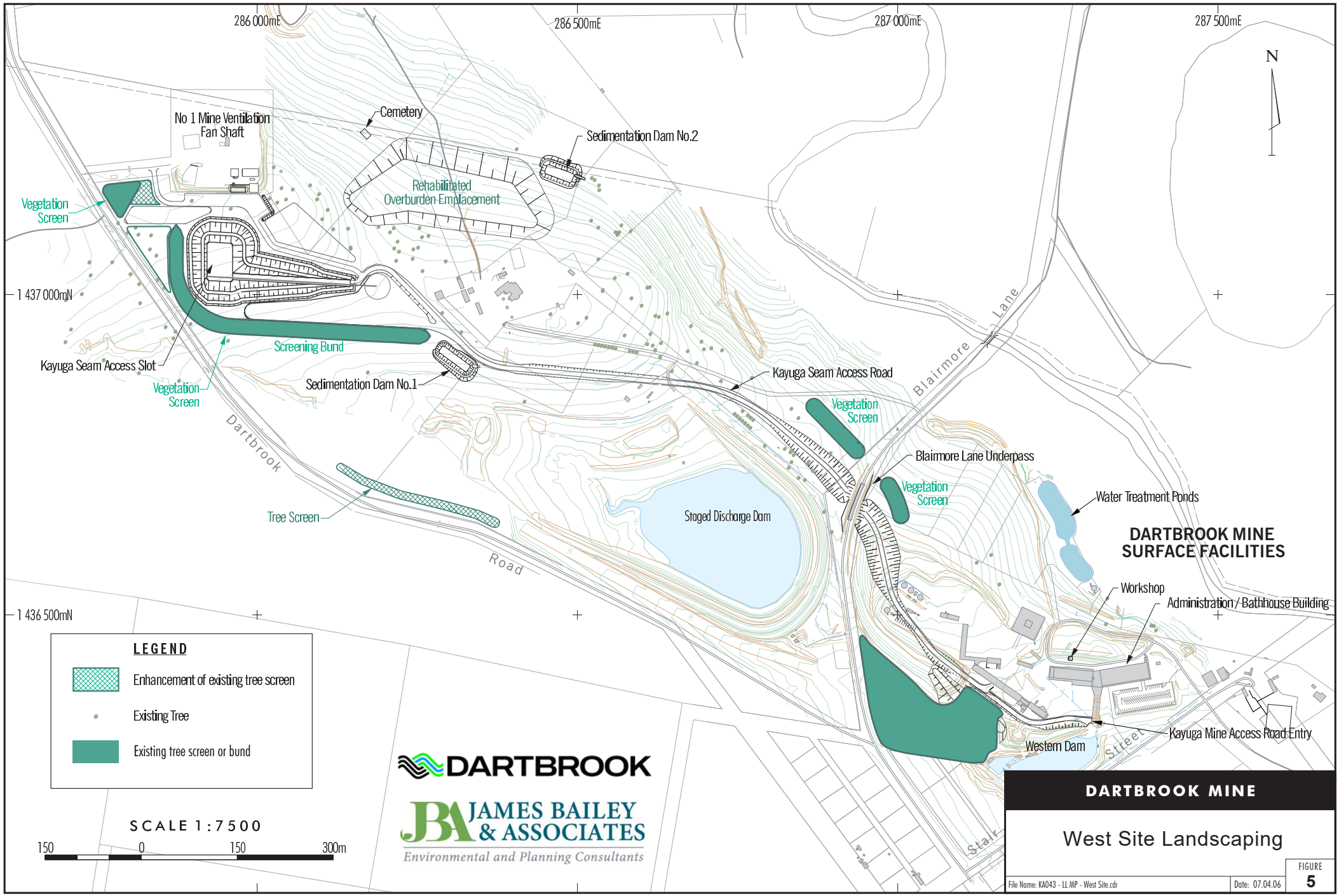
Currently there is no permanent lighting on the Kayuga Entry Access Road. Direct lighting from the headlights of vehicles using the road will not adversely impact on any privately owned residences.

There is minimal lighting at Dartbrook Mine Surface Facilities at the West Site and no complaints having been received from neighbours in relation to lighting at this area.

Lighting at the CHPP is the minimum necessary for safe operations. The CHPP landscaping works (**Section 3.3**) have further reduced the potential for lighting impact from the CHPP.

There is an existing screen fence at the southern end of the Dartbrook rail loop to screen train headlights from the New England Highway and private residences to the south-west (**Figure 6**).

Previously, skyglow effects from Dartbrook mine infrastructure were expected to be minimal. The visual bund and tree screens around the Kayuga Entry reduced any skyglow effects from the Kayuga Entry lighting (**Figure 5**) The landscaping works for the CHPP (**Section 3.3**) further reduce any skyglow impact of this area.


286 000mE
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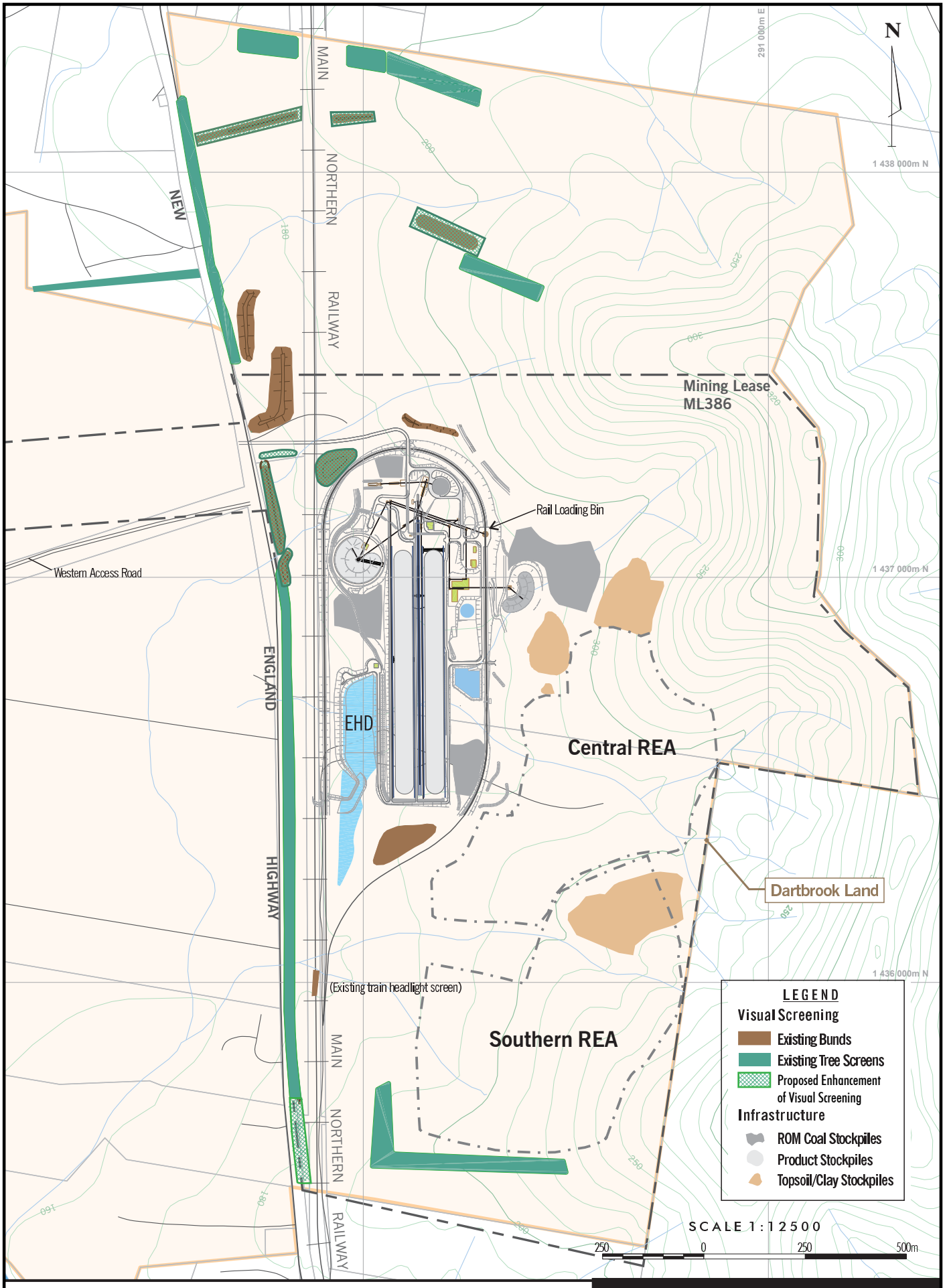
N
No 1 Mine Ventilation Fan Shaft
Cemetery
Sedimentation Dam No.2
Rehabilitated Overburden Emplacement
Vegetation Screen
1 437 000mN
Screening Bund
Kayuga Seam Access Slot
Vegetation Screen
Sedimentation Dam No.1
Kayuga Seam Access Road
Blairmore Lane
Dartbrook
Vegetation Screen
Blairmore Lane Underpass
Vegetation Screen
Water Treatment Ponds
Tree Screen
Staged Discharge Dam
DARTBROOK MINE SURFACE FACILITIES
Workshop
Administration / Bathhouse Building
Road
1 436 500mN
Kayuga Mine Access Road Entry
Western Dam
Street
Stark
LEGEND
Enhancement of existing tree screen
Existing Tree
Existing tree screen or bund
SCALE 1:7500
150 0 150 300m
DARTBROOK
JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants
DARTBROOK MINE
West Site Landscaping
File Name: KA043 - LL MP - West Site.cdr
Date: 07.04.06
FIGURE 5



DARTBROOK

JAMES BAILEY & ASSOCIATES
Environmental and Planning Consultants

DARTBROOK MINE

East Site Visual Screening

File Name: KA043 - LL MP - Visual Screening.cdr

Date : 07.04.06

FIGURE 6

4. MONITORING & MAINTENANCE

Monitoring and maintenance will be conducted to ensure that all of the established vegetation screens are maintained to achieve their intended purpose. This will be undertaken:

4.1 ESTABLISHED PLANTINGS

1. Inspections will be completed annually, preferably in early September.
2. Inspections will assess factors such as general health, height, and maintenance requirements including watering, weed control, fertilising, pest control and replanting. Inspections will also confirm that plantings continue to achieve their prescribed screening objectives and will evaluate the need for further planting to maintain screen density and vigour.
3. Based on monitoring results, maintenance will be undertaken where necessary and may include replanting, insect management, weed management and watering in drought periods.

4.2 BUILDINGS

Buildings that form part of Dartbrook operations will continue to be maintained in accordance with the Dartbrook building maintenance program. This will ensure that the appearance of the buildings does not deteriorate to the point that they create an adverse visual effect.

4.3 REA

Monitoring of rehabilitated areas on the REA will be conducted on a regular basis to ensure that the rehabilitation objectives are achieved, and particularly that the revegetation is self-sustaining and rehabilitation will achieve long term stability. Rehabilitation monitoring will include regular checks of the following aspects:

- Soil conditions and erosion;
- Drainage and sediment control structures;
- Runoff water quality;
- Revegetation germination rates;
- Plant health; and
- Weed infestation.

Monitoring results will be assessed and utilised in the continual improvement and refinement of rehabilitation techniques. Where necessary, monitoring will trigger maintenance of rehabilitation areas. Such maintenance may include:

- Re-seeding or re-planting;
- Weed control;
- Application of fertilizer;
- Repair of drainage channels and desilting of sediment dams; and
- Regrading of eroded areas and replacement of topdressing material.

4.4 OTHER

In addition, Dartbrook Operations will continue to undertake independent reviews every five years for the visual impact of the REA on the Aberdeen East Residential Development Land as required by Development Consent Condition 3.8 (d). The requirement for an independent visual review will be reassessed every five years, in consultation with DPHI, based on whether the REA is visible from the Aberdeen East Residential Development Land.

Any adverse visual or night lighting impact observed by mine personnel or a related community complaint will activate the response procedures specified in **Section 5**.

5. RESPONSE PROCEDURES

The following response procedures will be activated by a community complaint or an adverse visual or night lighting impact observed by mine personnel.

Dartbrook maintains a 24-hour response line where community complaints are recorded and responded to. A record of complaints is kept and used in the preparation of regular reports including the complaints report and the Annual Review.

In situations where the visual or night lighting impacts are perceived by a community member or site personnel to be a problem, the following procedures will be undertaken:

1. Management and/or the Environmental Officer to confirm the successful remediation of the impact;
   - If the source is fixed or mobile night lighting, the lighting will be redirected, relocated or shielded; and
   - If the source is insufficient visual screening, vegetation screens will be enhanced or extended, and/or additional visual screening or bunding will be installed.
2. Any corrective action will be recorded and reported to the Environmental Officer who will keep a record of all significant proactive and reactive actions;
3. The Environmental Officer will be informed of any complaint and details will be recorded in the complaint register; and
4. The Environmental Officer will notify the complainant of the results of the complaint investigation, and consult with the complainant in relation to any proposed visual mitigation measures and monitoring results.

6. REPORTING

6.1 ANNUAL REVIEW

In accordance with Condition 9.2 of the Development Consent, an Annual Review will be prepared by the end of March, each year and submitted to the Secretary. This review will:

(i) Describe the development (including any rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;

(ii) Include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, including a comparison of these results against the:

- *Relevant statutory requirements, limits or performance measures/criteria;*
- *Requirements of any plan or program required under the Development Consent;*
- *Monitoring results of previous years; and*
- *Relevant predictions in the documents referred to in Condition 1.1(a) of the Development Consent;*

(iii) Identify any non-compliance or incident which occurred in the previous calendar year, and describe what actions were (or are being) taken to rectify the non-compliance or incident and avoid reoccurrence;

(iv) Evaluate and report on:

- *The effectiveness of the noise and air quality management systems;*
- *Socio-economic impact of the development including the workforce characteristics of the previous calendar year; and*
- *The surveillance of any prescribed dam on the site to the satisfaction of the DSC;*
- *The outcome of the water budget for the year, the quantity of water used from water storages and details of discharge of any water from the site; and*
- *Compliance with the performance measures, criteria and operating conditions in this consent;*

(v) Identify any trends in the monitoring data over the life of the development;

(vi) Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and

(vii) Describe what measures will be implemented over the next calendar year to improve the environmental performance of the development.

Specific to landscaping and lighting, the Annual Review will include:

- Results of the vegetation screen monitoring program;
- Results of the rehabilitation monitoring program;

- A review of the effectiveness of visual impact mitigation measures and any necessary remedial works. The review will include monitoring to confirm that the mitigation strategy of screening the active emplacement area of the REA with the rehabilitated outer face is being successfully implemented;
- Confirmation, on a five yearly basis, of whether the REA is visible from the Aberdeen East Residential Development Land and whether an independent assessment of the visual impact of the REA is required; and
- A summary of any complaints from the public relating to visual or night lighting impacts.

Copies of the Annual Review will be submitted to DPHI, MSC, UHSC and made available to the Community Consultative Committee and any interested person upon request.

The Annual Review will also be made publicly available on the Dartbrook Website, in accordance with Condition 13 of Development Consent.

6.2 INCIDENT AND NON-COMPLIANCE REPORTING

In the event that an incident occurs, Dartbrook will immediately notify DPHI and other relevant authorities of the incident in accordance with Condition 9.3 (a) of the Development Consent. An 'incident' is defined as:

> "*an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance*".

In the event that a non-compliance occurs, Dartbrook will notify DPHI in accordance with Condition 9.3 (b) of the Development Consent.

7. RESPONSIBILITIES

The key personnel with responsibility for environmental management on the mine site will be the Environment Officer. The Environment Officer will be responsible for ensuring that the requirements of this management plan are implemented.

7.1 ENVIRONMENT OFFICER

Specific responsibilities of the Environment Officer will include:

- Ensuring that the landscaping works specified in this plan are installed;
- Conducting monitoring and maintenance of vegetation screens and rehabilitation of the REA (**Section 4**); and
- In the event of a complaint, implementing the response procedures specified in **Section 5**.

8. REVIEW REQUIREMENTS

Condition 3.2(f)(viii) of the Development Consent requires that all management plans include a protocol for periodic review of the plan. Further to this, Condition 3.2 (k) requires:

> *…the suitability of existing strategies, plans and programs be reviewed within three months of:*
>
> - *The notification of an incident under Condition 9.3 (a);*
> - *The submission of an Annual Review under Condition 9.2 (a);*
> - *The submission of an Independent Environmental Audit under Condition 8.1 (a); or*
> - *The approval of any modification of the conditions of this consent (unless the condition specifies otherwise), the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.*

Condition 3.2 (l) of the Development Consent, also states:

> *… if necessary, to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Secretary. Where revisions are required, the revised document must be submitted to the Secretary for approval within six weeks of the completion of the review on Condition 3.2 (j).*
>
> *This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.*

In addition, Tetra will undertake an independent review of the visual impact of the REA on Aberdeen East Residential Development Land every five years as required by Development Consent Condition 3.8 (d).

REFERENCES

- Hansen Bailey (2018). *Environmental Assessment, Modification 7, Kayuga Seam Bord and Pillar Mining Operations (MOD7).*
- Hansen Bailey (2021). *Modification 7 Updated Response to Contentions*.
- HLA-Envirosciences (2000). *Dartbrook Extended Environmental Impact Statement.*
- JVP Visual Planning and Design (2004). *Dartbrook Mine Rejects Emplacement Area Visual Impact Assessment Report.*
- JVP Visual Planning and Design (2011). *Dartbrook Mine Review of Visual Mitigation Strategies, Visual Assessment.*

ABBREVIATIONS

Abbreviation	Meaning
ACDM	Anglo Coal (Dartbrook Management) Pty Ltd
AQC	Australian Pacific Coal Ltd
CHPP	Coal Handling and Preparation Plant
DA	Development Application
Dartbrook Operations	Dartbrook Operations Pty Ltd
DPHI	Department of Planning, Housing and Infrastructure
IPCN	Independent Planning Commission NSW
LLMP	Landscape and Lighting Management Plan
m	metres
MSC	Muswellbrook Shire Council
REA	Rejects Emplacement Area
ROM	Run of Mine
Tetra	Tetra Resources Pty Ltd
UHSC	Upper Hunter Shire Council

APPENDIX A
STAKEHOLDER CONSULTATION

Department of Planning and Environment

Our ref: DA231-07-2000-PA-11

Jeff Beatty
General Manager
AQC Dartbrook Management Pty Ltd
6 Stair Street
Kayuga NSW 2333

30/01/2023

Subject: Approval of Landscape and Lighting Management Plan

Dear Mr Beatty

I refer to the Dartbrook Landscape and Lighting Management Plan (Version 9, dated December 2022), which has been prepared in accordance with condition 3.8 and 6.5 of DA231-07-2000.

The Department has carefully reviewed the Landscape and Lighting Management Plan and is satisfied that it addresses the relevant requirements of the development consent.

Accordingly, the Planning Secretary has approved the Landscape and Lighting Management Plan (Version 9, dated December 2022).

You are reminded that if there are any inconsistencies between the Landscape and Lighting Management Plan and the conditions of approval, the conditions prevail.

Please ensure you make the document publicly available on the project website at the earliest convenience.

If you wish to discuss the matter further, please contact Joe Fittell on 02 4908 6896.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

muswellbrook shire council

Enquiries
Please ask for Theresa Folpp
Direct 02 6549 3700
Our Ref Dartbrook Mine

09 December 2022

Dear David

Dartbrook Mine Landscape and Lighting Management Plan (LLMP)
Muswellbrook Shire Council comments on LLMP

Reference is made to the following:

- Dartbrook Mine Landscape and Lighting Management Plan (Oct 2022); and
- Request to provide advice on the VIMP submitted to Council via Major Projects Portal

The LLMP has been prepared to satisfy the requirements under Development Consent DA 231-7-2000 and specifically Condition 3.8 and 6.5.

The LLMP was first approved in 2002 and has been updated on a number of occasions to accommodate changes in the management of the rehabilitation emplacement area, run of mine coal stockpiles, disposal of tailings and nitrogen injection plant.

The most current version of the LLMP (dated Oct 2022) was updated in response to the approval of DA 231-7-2000 Modification 7 (MOD7) and the planned recommencement of mining operations at Dartbrook in 2023. It should be noted that Dartbrook has been in care and maintenance since 2006.

MOD7 amended the visual amenity and landscaping condition 3.8 of DA 231-7-2000 by introducing the requirement for a landscaping strategy around the Kayuga Entry to reduce lighting effects.

Council Officers undertook a site inspection of the Dartbrook Mine on 07 December 2022 to review the site against the LLMP and have provided comments in **Table 1**.

Council Officers appreciate the opportunity to comment and would be pleased to provide additional information if requested. Should you need to discuss the above, please contact the undersigned on 02 6549 3700 or email council@muswellbrook.nsw.gov.au.

Yours faithfully

J. Folpp

Theresa Folpp
Development Compliance Officer

Table 1: Dartbrook Mine Landscape and Lighting Management Plan - Matters raised by Muswellbrook Shire Council

Ref	Matter Detail
1	Section 1.1 states that 'operations at Dartbrook are proposed to commence from December 2022', although it is understood that recommencement is planned for mid-2023. Please update prior to finalisation of the report.
2	Please add a brief section that describes the history of the LLMP and how the 2022 version has changed from previous versions.
3	It is understood that the coal stockpile areas will be reduced to approximately half the existing size. Consider whether this change should be shown in the LLMP.
4	**Figure 5** • Please update the legend of Figure 5 to show existing bunds and existing tree screens • Recommend the tree screen shown adjacent to Dartbrook Road be enhanced to mitigate views toward the Staged Discharge Dam by motorists travelling south on Dartbrook Road
5	**Figure 6** • Is it assumed the hatched polygons show areas of enhancement and Council agrees with these works. Figure legend should be updated to reflect these polygons.
6	Consider plantings on the eastern side of the New England Highway to shield views for motorists heading north. Indicative location of recommended planting shown by white circle **Figure 1**.

Figure 1: Recommended areas for consideration of additional plantings

APPENDIX B

2011 REA VISUAL ASSESSMENT

Dartbrook Mine
Review of Visual Mitigation Strategies

Visual Assessment

March 2011

A report prepared by
JVP Visual Planning & Design

Reject Emplacement Area
Review of visual mitigation

Visual Assessment

March 2011

This report was prepared by:

JVP
Visual Planning & Design

20/8 Bunton Street
Scarborough QLD 4020
Phone: 07 3880 0847
Fax: 07 3880 1659
john@ilavp.com.au

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Glossary

Areas of Primary Visual Concern	Areas that have potential views to the Project based on a consideration of topography alone as a screening element
Visual Sensitivity	The degree to which a change to the landscape will be perceived in an adverse way
Visual Effect	A measure of the visual interaction between the Project and the landscape setting within which it is located
Visual Impact	A measure of a joint consideration of both visual sensitivity and visual effect that considered together determine the visual impact of a development
Contrast	The degree to which a development component differs visually from its landscape setting
Integration	The degree to which a development component can be blended into the existing landscape without necessarily being screened from view
Screen	The degree to which a development element is unseen due to intervening landscape elements such as topography or vegetation
VCU	Visual Character Unit. Areas of landscape that have similar topographic, vegetation and land use features that create areas of similar visual character

1. INTRODUCTION

1.1 Background

In 2004 JVP Visual Planning & Design completed a visual impact assessment of the proposed Dartbrook Mine Reject Emplacement Area (REA) as part of a Statement of Environmental Effects (Appendix 1 *Dartbrook Mine Rejects Emplacement Area Visual Impact Assessment Report, 2004*) (the VIA) that supported an application for Modification of the Dartbrook Extended Development Consent. Approval for the Modification was granted on 4 May 2005.

A Landscape and Lighting Management Plan has been developed as required by the 2004 conditions of consent. The VIA has been attached as an appendix to the Landscape and Lighting Management Plan to provide an assessment of the visual impacts of the REA. The VIA is also provided here (**Appendix 1**).

JVP Planning & Design were commissioned to prepare this report in October 2010 to provide an independent review of the visual impact of the proposed rejects emplacement area, as per Condition 3.8d of the 2004 Development Consent.

1.2 The Project

The Dartbrook Extended REA consisted of two separate emplacement areas: the Southern REA and the Northern REA, as shown on **Figure 1 and Figure 2.** The visual character of those REAs is influenced by two elements: the active emplacement area; and the rehabilitated slopes.

Prior to rehabilitation, the active emplacement areas would create high levels of contrast based on line and colour. The colour of stripped earth and of reject material contrasts with the colours of the surrounding land cover of grasslands and or scattered tree cover. Similarly the sharp lines of work areas contrast with the flowing lines of the receiving landscape.

The rehabilitated REA slopes reduce this contrast and essentially blend in with existing landscape colours and forms. Rehabilitated slopes aim to emulate the slopes of the surrounding topography. Revegetation should emulate the colours of surrounding grasslands and / or scattered trees in grassland.

As a result of the suspension of mining operations in 2006/07, a number of areas became available for rehabilitation, including the REA. In 2006, 15 ha of the REA were rehabilitated with the remaining 9 ha rehabilitated in early 2007. Photos of the REA in 2011 are shown in **Plates 1 and 2**.

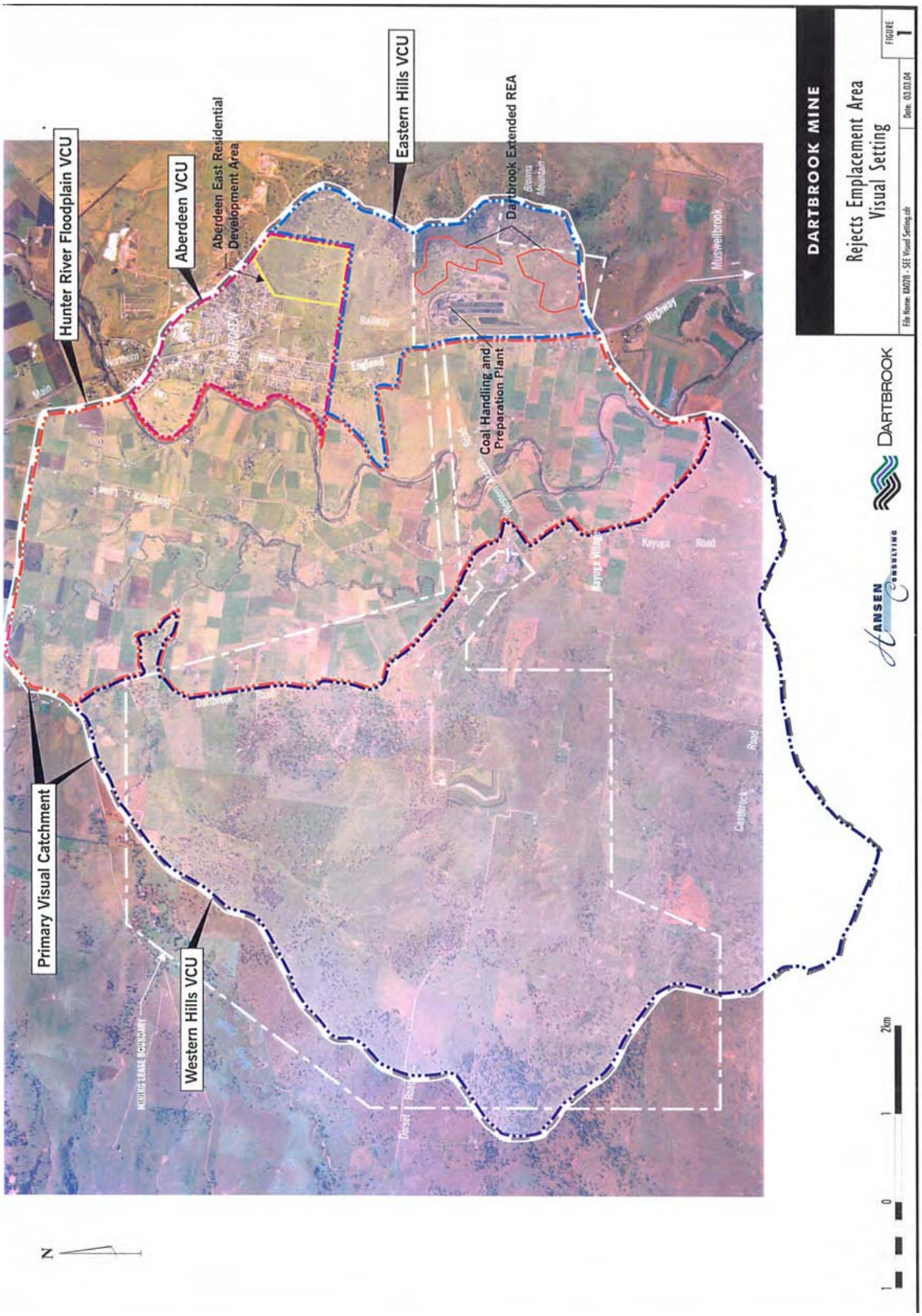

Figure 1 *(from 2004 VIA)*

Figure 2 *(from 2004 VIA)*

Plate 1 - REA rehabilitation 2010 - Western slope looking downhill to the southwest.

Plate 2 – REA rehabilitation 2010 - Western slope looking uphill to the northeast.

1.3 Visual Assessment Objectives

This review of visual mitigation practices is in direct response to condition 3.8d of the Department of Planning's Condition of Approval, which provides that:

"... the Applicant shall fund and undertake an independent review of the visual impact of the proposed rejects emplacement area on SSC's land, every five years from the commencement of mining operations, unless otherwise agreed by the Director-General. The independent review shall be undertaken by an independent Landscape Expert appointed by the Director-General in consultation with SSC and the Applicant. The independent Landscape Expert shall determine whether the actual visual impact of the rejects emplacement area on SSC's land is greater than that predicted in the Landscape Management Plan. If the independent Landscape Expert determines that the impact on SSC's land is greater than that predicted in the Landscape Management Plan, the independent Landscape Expert shall make recommendations to mitigate the impact."

This report exceeds the requirement of the above Condition as it assesses the current visual impact of the REA site on the total seen area and has not been limited to Scone Shire Council (SSC) land; now Upper Hunter Shire Council (UHSC).

This technical report provides a comparison of the predicted visual impacts associated with the REA with the REA rehabilitation works. The effectiveness of mitigation strategies implemented on visual impact is evaluated and defined.

1.4 Visual Impact Review Methodology

The review of visual mitigation strategies was completed by reviewing the parameters of the VIA and defining any changes to those parameters as a prelude to quantifying current visual impact levels. Special regard has been given to UHSC lands, but also consideration of impact levels on other lands has been defined. These impact levels will be considered against impacts predicted in the VIA.

1.4.1 Proposed & Actual REA Development Sequence

The proposed REA as outlined in the 2004 Modification to Dartbrook Extended Development Consent envisaged the development of a Southern and Northern REA. The sequence and rehabilitation schedule was designed, as far as practicable, to maximise screening of the active emplacement area with the rehabilitated outer slopes. The active emplacement area would have been visible from some locations; however, this was proposed to have only occurred for limited periods of time until the active area progresses and subsequent rehabilitation works establish screening. Progressive rehabilitation of the outer slopes of the REA was conducted as soon as practicable after the outer slope has been constructed or raised.

The Southern REA was to have been developed over the initial 15 years. The Northern REA was to have been developed over five years after the Southern REA was completed.

The initial active emplacement area of the Southern REA would have been visible for a period of up to two years until the outer face of the emplacement is constructed and rehabilitated. Similarly, the initial active emplacement area of the Northern REA would have been visible for up to two years (approximately years 15 to 16) until the outer face of the emplacement was constructed and rehabilitated.

The visual effect of the completed and rehabilitated REA is illustrated in **Figure 3a and 3b**. The photographs in Figure 3 were taken from Kayuga Road, directly to the west of the REA. This view is the most critical of all representing a totally open view onto the REA. This view is considerably more open a view than would be obtained from any UHSC lands to the north and north-west of the site.

It can be seen from the photographs that the REA is completely rehabilitated with slopes and topography emulating slopes that occur in the surrounding landscape. Further it can be seen that for the grass cover emulates the surrounding grassland on adjoining low lands.

In this way the REA emulates landform and vegetation and creates a low visual effect.

Figure 3a: The REA emulates the form and colour values of the existing landscape

Figure 3b: illustrates how well the rehabilitated REA integrates with the surrounding land forms and land cover.

2. RESIDENTIAL VIEWING SECTORS

For the purposes of the VIA completed in 2002-2004, the following residential viewing sectors were defined within the primary visual catchment (**Figure 2**):

- Aberdeen East – to the north and north-west of the REA;
- Aberdeen East Residential Development Land – to the north of the REA;
- Aberdeen West – to the north-west of the REA;
- Blairmore Lane – to the west and north-west of the REA;
- Kayuga – to the west and south-west of the REA; and
- South-West Residences – to the south-west of the REA.

The viewing sectors comprise groups of residences with similar views of the REA. Whilst there will be some variation in the impacts on specific individual residences within each viewing sector, an overall assessment of the visual impact on the sector will be representative for the majority of residences. The orientation of the developing REA in relation to these viewing sectors is shown in Figures 3 to 7 of **Appendix 1.** The assessment of the visual impact of the REA on each residential viewing sector is presented in the following sections.

2.1 Aberdeen East

2.1.1 VIA Predicted Visual Impacts

"Residences in the Aberdeen East viewing sector are generally assessed as having moderate to low sensitivity. Consequently the impact on the residences in the Aberdeen East viewing sector will initially be low, increasing to moderate during years 5-7 when the maximum extent of the active emplacement area is visible, and decreasing to low after year 7.

Any residences with a strong visual orientation and use of views to the REA, and consequently high sensitivity, will initially experience a moderate visual impact, increasing to a high visual impact during years 5-7 when the maximum extent of the active emplacement area is visible. The impact will be reduced to low once these areas are screened from view by the rehabilitated outer slope of the emplacement from year 7 onwards."

2.1.2 Existing Visual Impacts

The residences in the Aberdeen East viewing sector are located between 2.5 and 4 km from the Southern REA. Residences within the viewing sector are generally orientated towards the streets of Aberdeen, limiting the number of residences that are directly orientated towards the REA. Views from residences to the REA are totally screened by the topographic spur at the northern end of Browns Mountain.

As a result, there is no impact on the Aberdeen East viewing sector as there are no views to the REA.

2.2 Aberdeen East Residential Development land

2.2.1 VIA Predicted Visual Impact

"3D Models and montages indicate that both the Northern and Southern REAs are totally screened from view at both viewing locations by the northern spur of Browns Mountain…

…sight line transects indicate that total screening is provided by the northern spur of Browns Mountain and the existing tree screens at the northern end of the REA site, except for the western corner of the land. From this limited area, only the upper section of the Southern REA site will be visible. Any growth in the height of the tree screens at the northern end of the REA site will reduce the visible extent of the Southern REA.

The Northern REA will not be visible from any point in the Aberdeen East Residential Development Land. The upper section of the Southern REA will only be visible from a small area in the western corner of the land. Consequently, development of the REA will not result in any visual impact on the majority of the land.

Views from a relatively small area in the western corner of the land will be limited to the top section of the Southern REA. The visual effect and impact of the visible active emplacement on this area will be moderate when the emplacement is visible in the period up to approximately year seven. This is because the views will be restricted to a small strip of the active emplacement, occupying a small portion of the total view. The visual impact on this area will reduce to low after approximately year 7 once the active emplacement has been screened by the rehabilitated outer slope."

2.2.2 Existing Visual Impacts

The Aberdeen East Residential Development Land is located between 2 and 3 km from the REA. Sight line assessments conducted at the northern, western and southern corners of this estate confirm that total screening is provided by the northern spur of Browns Mountain and the existing tree screens.

In conclusion, the REA will not be visible from any point in the Aberdeen East Residential Development Land and therefore there is no impact.

2.3 Aberdeen West

2.3.1 VIA Predicted Visual Impacts

"The visual impact on the urban residences in the Aberdeen West viewing sector will be low for all but years 5 and 6, given that the residences are assessed as having low sensitivity and the visual effect ranges from moderate to very low. During years 5 and 6 the visual impact will be moderate because of the temporary high visual effect during the period when there is a direct view of the active emplacement at its largest visible extent.

The visual impact on the two rural residences in the Aberdeen West viewing sector with high sensitivity will initially be high, reducing to moderate during years 7 to 10. The impact will be low during the periods when the view is restricted to the rehabilitated outer slope (year 10 - 14 and year 17 onwards). The impact will increase to moderate during years 15 to 16 when sections of the active emplacement area of the Northern REA are visible."

2.3.2 Existing Visual Impacts

The residences in the Aberdeen West viewing sector are located between 1-3 km from the REA. Residences within the viewing sector are generally not orientated towards the REA.

Views to the REA are generally well screened by foreground vegetation and adjacent houses. The screening effect of vegetation and houses in this sector is significant as the gentle slopes in the sector limit the potential for views over foreground screening. The low elevation and gentle slopes also allow adjacent and intervening lands to create visual separation.

The isolated rural residences in the south of viewing sector do not experience the same degree of screening as the urban residences to the north. Urban residences in this viewing sector are generally assessed as having low sensitivity due to their lack of orientation towards the REA and the screening of views to the REA by foreground vegetation and adjacent houses.

In summary, the visual impacts on the urban residences that may have a view in the Aberdeen West viewing sector are low as was predicted because of the low visual effect of the rehabilitated REA. The expedient rehabilitation of the REA also reduced visual impacts to lower sooner than predicted.

2.4 Blairmore Lane

2.4.1 Predicted Visual Impacts

"The visual impact on the rural residences in the Blairmore Lane viewing sector will be low to moderate, given that the residences are assessed as having moderate to low sensitivity and the visual effect ranges from low to very low, with limited periods of moderate visual effect (approximately year 5). Any residences with a strong visual orientation and use of views to the REA, and consequently high sensitivity, will initially experience a moderate visual impact (approximately years 0 to 4), temporarily increasing to high visual impact during years 5 and 6. The impact would also be moderate during years 15 to 16 when the active emplacement area of the Northern REA is visible. At all other times the impact will be low once the active emplacement areas are screened from view by the rehabilitated outer slope of the emplacement (years 7 to 14 and year 17 onwards)."

2.4.2 Existing Visual Impacts

The rural residences in the Blairmore Lane viewing sector are located between 2.5 and 4.5 km from the REA. Residences are generally orientated towards Blairmore Lane. Views from residences to the REA have varying degrees of screening from foreground buildings and vegetation. Views from the northern end of Blairmore Lane to the REA site are partially screened by intervening topography.

The visual effect of the REA was predicted that "*rehabilitated areas of the REA will appear as grassy slopes which integrate well, both in terms of colour and form, with the lower slopes of the adjoining hills. The visual effect of the rehabilitated slopes is considered to be low to very low*".

These visual effect levels have been achieved in the rehabilitated REA as it currently exists. Therefore, the visual impact on this locality is currently assessed as low.

2.5 Kayuga

2.5.1 Predicted Visual Impacts

"Any residences with a strong visual orientation and use of views to the REA, and consequently high sensitivity, will experience a moderate visual impact during the periods when the active emplacement area is visible (years 0-5 and 15-19). The impact will reduce to low once these areas are screened from view by the rehabilitated outer slope of the emplacement. The visual impact on the rural residences in the Kayuga viewing sector that are orientated away from the REA will be low, given that the residences are assessed as having moderate sensitivity and the visual effect ranges from low to very low".

2.5.2 Existing Visual Impacts

The rural residences in the Kayuga viewing sector are located at least 2.5 km from the REA. This sector includes a range of orientations of residences, including residences orientated to the east with views to the REA across the Hunter River floodplain and residences orientated towards Kayuga Road, away from the REA. Views from residences to the REA have limited screening from buildings and vegetation, and no screening from intervening topography. Residences orientated away from the REA are assessed as having moderate to low sensitivity, whereas those with strong visual orientation and open views to the REA will have a high sensitivity.

The visual effect of the REA was predicted that "*rehabilitated areas of the REA will appear as grassy slopes which integrate well, both in terms of colour and form, with the slopes of the adjoining hills. The visual effect of the rehabilitated slopes is considered to be low to very low*".

These visual effect levels have been achieved in the rehabilitated REA as it currently exists. Therefore, the visual impact on this locality is currently assessed as low.

2.6 South-West Residences

2.6.1 Predicted Visual Impacts

"The visual impact of the Southern REA on the rural residences in the South-West viewing sector will be high during the first three years that it is being developed, given that the residences are assessed as having high to moderate sensitivity and the visual effect is high. The impact reduces to low once the active emplacement area is screened from view by the rehabilitated outer slope of the emplacement (year 4 onwards). The visual impact of the Northern REA is low to moderate given that the visual effect ranges from low to very low, and the residences have high to moderate sensitivity."

2.6.2 Existing Visual Impacts

The rural residences in this viewing sector are located between 500 and 800 m from the Southern REA. They are located approximately 2 km from the Northern REA. Residences are orientated towards the REA to varying degrees. Topography and vegetation screens views of a large proportion of the Southern REA in the southern and western areas of the viewing sector. Views from the Gordon residence (in the north-east) to the REA are currently screened by a hedge on the property boundary, adjacent to the New England Highway. Although residences in this sector are in close proximity to the REA, views from these residences to the REA are largely screened and consequently residences in this sector are assessed as having high to moderate sensitivity.

The relevant visual effects were predicted thus "*visual effect of the Northern REA is reduced by the limited scale of the visible active emplacement area relative to the dominant background landscape of Browns Mountain.*

The active emplacement area will also comprise a low proportion of the views from this sector, which serves to further lessen its visual effect. Viewed from this sector, the Northern REA is below the ridgeline of Browns Mountain, which provides backgrounding and visual integration, further reducing the visual effect. Based on a consideration of these factors, the visual effect of the Northern REA will be low during periods when the active working face is visible (years 15-19). This visual effect will be very low once the active working face is screened from view by the rehabilitated outer slope of the REA".

These visual effect levels have been achieved in the rehabilitated REA as it currently exists. Therefore, the visual impact on this locality is currently assessed as low.

3. CONCLUSION

The visual impact of the REA on surrounding sensitive receptors was described as *"development on surrounding residential areas is dependent on the sensitivity of residences and the visual effect of the REA from the residential viewing sectors. Dependent on the viewing distance, viewing angle and visible proportion, the active emplacement area will potentially have a high visual effect due to contrast of colour and shape with the surrounding landscape. The rehabilitated outer slopes of the REA will appear similar, both in terms of colour and form, to the slopes of the adjoining hills and will have a low to very low visual effect.*

The primary visual impact mitigation strategy for the REA therefore involves the screening of views of the active emplacement areas with the rehabilitated outer slope of the emplacement, as far as practicable. Achieving this objective was a key focus of the REA design process".

In relation to the existing REA, rehabilitation has achieved the integration of the REA with the surrounding landscape settings reducing visual effects to low / very low, having a similar result on visual impacts. The mitigation measures have achieved the visual standards as stated and fulfil the standards sought by Condition 3.8d. Further these high standards of impact mitigation extend to other sensitive receptors around the REA.

Appendix I:

Dartbrook Mine Rejects Emplacement Area Visual Impact Assessment Report, 2004

DARTBROOK COAL MINE

REJECTS EMPLACEMENT AREA VISUAL IMPACT ASSESSMENT REPORT

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DARTBROOK COAL MINE
REJECTS EMPLACEMENT AREA
VISUAL IMPACT ASSESSMENT REPORT

for
Anglo Coal (Dartbrook Management) Pty Ltd

1.0 INTRODUCTION

This visual impact assessment report has been prepared by JVP Visual Planning and Design, in conjunction with Hansen Consulting, for Anglo Coal (Dartbrook Management) Pty Ltd (ACDM). It has been prepared as part of the Statement of Environmental Effects (SEE) that will support an application for modification of the Dartbrook Extended Development Consent. The modification relates to changes to the future operation of the Dartbrook Extended Rejects Emplacement Area (REA).

The visual impact assessment presented in this report has been undertaken to assess the visual impact of the REA on surrounding residential areas. Construction of the Dartbrook Extended REA is scheduled to commence in the second quarter of 2004.

This visual impact assessment does not address the visual impacts of the Dartbrook Coal Handling and Preparation Plant (CHPP). These facilities are approved under the Dartbrook Mine and Dartbrook Extended Development Consents and their visual impacts are not altered by the proposed modification.

2.0 VISUAL CHARACTER SETTING

2.1 PRIMARY VISUAL CATCHMENT

The Dartbrook Extended REA is located 5 kilometres north of Muswellbrook, one kilometre south of the outskirts of Aberdeen and two kilometres from the more elevated urban areas of Aberdeen. The REA is to the east of, and immediately adjacent to, the New England Highway and the Main Northern Railway Line (Figure 1).

The primary visual catchment of the REA site is defined by topography and is shown in Figure 1. The primary visual catchment represents the area within which the majority of critical views of the REA site are obtained. There are some views of the REA from beyond the primary visual catchment, especially from distant elevated locations. However, the visual impact of the REA on these distant locations will be reduced by the viewing distance compared to locations within the primary visual catchment.

The visual character of the primary visual catchment of the REA site is best described by dividing the surrounding area into four distinct Visual Character Units (VCUs) (Figure 1). Each VCU has a different visual character and has a different visual relationship with the REA site. The VCUs are as follows:

- Western Hills;
- Hunter River Flood Plain;
- Eastern Hills; and
- Aberdeen.

2.1.1 Western Hills

The Western Hills VCU adjoins the western edge of the Hunter River flood plain (Figure 1). This area is characterised by gently undulating slopes. There has been extensive tree clearing in this area in the past and the majority of this VCU comprises open grassland with scattered trees. Tree retention has tended to occur along road easements, steeper or less fertile lands and along drainage lines. The area has a number of scattered farm houses and also contains the old Kayuga Village, which has 15-20 houses. The low density of development within the village area does not create a strong visual impression of a residential village. The overall visual impression of the Western Hills VCU is of undulating slopes with scattered tree cover.

The slightly elevated slopes, the easterly aspect and the location adjacent to the open Hunter River Flood Plain, provides some houses and roads in the VCU with clear views to the Dartbrook CHPP and REA site.

2.1.2 Hunter River Flood Plain

The Hunter River Flood Plain VCU includes the Hunter River and adjoining alluvial flats (Figure 1). It is characterized by the serpentine reaches of the Hunter River and Dart Brook. These irregular drainage lines contrast with, and cut across, the regular rectilinear patterns of the irrigated croplands and pastures that dominate the VCU.

Rural residences occur on slightly elevated positions and spurs within the VCU, such as those along Blairmore Lane. Rural residences are also found along the edge of the flood plain and adjacent to the New England Highway.

The open agricultural setting of the river flats allows for clear views to the Dartbrook CHPP and REA site from most areas within the VCU.

2.1.3 The Eastern Hills

The Eastern Hills VCU adjoins the eastern side of the Hunter River Flood Plain VCU and rises from approximately RL 170 m to RL 360 m in the south and RL 160 m to RL 340 m to the north (Figure 1). The southern area of the VCU is dominated by the steeper forested upper slopes of Browns Mountain. Lower slopes within the VCU are gentler and hence have been more heavily cleared of forest and woodland cover.

The Eastern Hills VCU contrasts markedly with the Hunter River Flood Plain VCU, both topographically and in terms of vegetation cover, land use and visual pattern.

The Dartbrook CHPP and REA site are located within this VCU. The eastern part of this VCU, which includes the ridgeline of Browns Mountain, screens views of the CHPP and REA site from the east. The topographic spurs and ridges of this VCU also provide partial screening of views of the REA site from the eastern parts of Aberdeen to the north and Muswellbrook (long distance views) to the south.

2.1.4 Aberdeen

The Aberdeen township VCU adjoins the northern section of the Eastern Hills VCU. Its strong village form contrasts with the rural lands of the Eastern Hills. The VCU has a true village character, with streets running in a rectilinear pattern. Some indigenous vegetation has been retained along the gully lines and outer town areas. Other vegetation in the VCU includes both native and exotic trees. The VCU also includes Scone Shire Council's (SSCs) Aberdeen East Residential Development Land that could potentially be developed in the future (Figure 1).

2.2 REA SITE

2.2.1 Physical Setting

The location of the Dartbrook REA site has some advantages from a visual perspective. The REA site is located immediately adjacent to Browns Mountain which is the largest topographic feature in the area (Figure 1). The mountain and its adjoining ridges rise to a height of RL 320–350 m, which is 130–140 m above the levels of the adjoining footslope areas.

The crest of the mountain to the east of the REA site provides total screening of views from areas to the east. The spurs and ridges from Browns Mountain to the north and south of the REA site also provide backgrounding and visual enclosure for the REA site. These features also provide some screening of views of the REA site from locations to the north and south.

Viewed from the west, Browns Mountain provides a strong and dominant natural landscape element that encloses and dominates the REA site.

2.2.2 Land Use

The REA site has a strong industrial visual character due to its established use for coal handling and preparation. This existing visual character has two components, namely the buildings and structures of the CHPP, and the existing Dartbrook REA to the east of the CHPP.

The CHPP is a large scale industrial facility that is large in both vertical and horizontal dimension. The facility is approximately 1 km in length and 500 m wide. The largest scale horizontal elements are the rail loop and the two rectangular coal stock piles. These stock piles are up to 500 m long and are black in colour.

The vertical elements of the plant are also significant as these can be seen, to varying degrees, from neighbouring areas. The major vertical elements include the wash plant building, the rail loading bin and various conveyors and bridges.

In addition to the existing industrial buildings, elements of the current Dartbrook REA, including areas stripped of clay and topsoil, reject emplacement areas, rehabilitated areas and stockpiles of topsoil and clay contribute to the visual character of the site. All these elements are also part of the visual character of the proposed Dartbrook Extended REA.

2.2.3 Existing Visual Treatments

In addition to the benefits of Browns Mountain as a screening and visual integration element, there are a number of existing visual treatments and elements that reduce the visibility of the REA site. These include a range of bunds and tree screens that were designed to mitigate the visual impact of the

CHPP and are proposed to be upgraded in accordance with the approved Dartbrook Extended Landscape and Lighting Management Plan.

The current Dartbrook REA, which will be rehabilitated soon after the construction of the Dartbrook Extended REA commences, is also of significant visual screening value. This rehabilitated REA will provide some screening of the Dartbrook Extended REA from areas to the north-west and south-west.

2.3 REA

2.3.1 Introduction

The Dartbrook Extended REA is located to the south and east of the existing Dartbrook CHPP (Figure 1). The Dartbrook Extended REA consists of two separate emplacement areas, the southern REA and the northern REA (Figure 2). The visual character of the REA is influenced by the appearance of the active emplacement area and rehabilitated REA slopes, and the REA development sequence. These factors are discussed below.

2.3.2 Active Emplacement Area

The active emplacement area includes the active rejects dumping area where the reject material will be placed by dump trucks, spread with a dozer and compacted by a drum roller. An outer bund (approximately 10 m high) will be maintained at the active dumping area to screen views of the mobile equipment on the active dump area (refer SEE Figure 4). It will also include an area of ground that will be stripped of vegetation, topsoil and clay in advance of the active dumping area. Emplaced rejects will have a black colour and the stripped areas will be the earth colour of the substrate. These colours will contrast to varying degrees with the colours of the adjoining landscape, which includes grassland and various densities of tree cover. The regular outline of the active emplacement will also contrast with the more natural lines in the landscape, created by hills, drainage lines and vegetation outlines. The area of the active emplacement will be up to approximately 600 m in length and up to 40 m above the existing ground surface.

2.3.3 Rehabilitated REA Slopes

The outer slopes of the REA will be progressively rehabilitated with grass cover. The visual character of the rehabilitated slopes will therefore emulate the colour characteristics of the adjoining existing grasslands. This will remove the strong colour contrast and unnatural lines created by the active emplacement area.

The general visual effect of the active emplacement areas and rehabilitated slopes of the Dartbrook Extended REA will be similar to the visual effect of these components of the existing Dartbrook REA, which has been operating for the last ten years.

2.3.4 REA Development Sequence

The REA development sequence and rehabilitation schedule has been designed, as far as practicable, to maximise screening of the active emplacement area with the rehabilitated outer slopes. The active emplacement area will be visible from some locations, however, this will only occur for limited periods of time until the active area progresses and subsequent rehabilitation works establish screening. Progressive rehabilitation of the outer slopes of the REA will be conducted as soon as practicable after the outer slope has been constructed or raised. Based on past experience, revegetation of the rehabilitated outer slopes would generally be established within 6 months.

The Southern REA will be developed over the initial 15 years. Construction will commence at the southern end and the active emplacement area will progress to the north-east to enable screening from the closest residences with the outer rehabilitated slopes. The Northern REA will be developed over five years after the Southern REA is completed. Construction will start at the northern end and the active emplacement area will progress to the south-east to enable screening from the closest residences to the north-west.

The initial active emplacement area of the Southern REA will be visible for a period of up to two years until the outer face of the emplacement is constructed and rehabilitated. Similarly, the initial active emplacement area of the Northern REA will be visible for up to two years (approximately years 15 to 16) until the outer face of the emplacement is constructed and rehabilitated.

The entire REA will be rehabilitated at approximately year 20. In general terms, the final rehabilitated REA borrows a great deal of character from the existing landscape and it will be difficult to perceive the differences in landform and slope angles created by the REA when it is seen from a distance.

3.0 ASSESSMENT METHODOLOGY

3.1 VISUAL IMPACT

The visual assessment was undertaken by John Van Pelt of JVP Visual Planning and Design, in conjunction with Hansen Consulting. John Van Pelt is a qualified landscape architect specialising in visual planning.

The methodology used to determine the level of visual impact of the REA involved the consideration of both the visual sensitivity of neighbouring residential areas and the visual effect of the REA, as indicated in Table 1. This methodology has been used successfully in the past for major projects involving significant and complex visual impacts.

Table 1
Visual Impact Assessment Methodology

		Visual Effect			
		High	**Moderate**	**Low**	**Very Low**
Visual Sensitivity	**High**	High Impact	High Impact	Moderate Impact	Low Impact
	Moderate	High Impact	Moderate Impact	Low Impact	Low Impact
	Low	Moderate Impact	Low Impact	Low Impact	Low Impact

This visual impact assessment specifically addresses the visual impact of the Dartbrook REA on surrounding residences. The following sections explain the factors considered in assessing the sensitivity of residences and the visual effects of the REA.

3.2 VISUAL SENSITIVITY

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land use areas.

Residences generally have a higher visual sensitivity than other land use areas including industrial, agricultural or transport corridors, as the surrounding landscape may be used as part of a leisure experience and over extended viewing periods. However, the sensitivity of individual residences may range from high to low, depending on the following factors:

- Viewing distance from the residence to visible areas of the REA. The longer the viewing distance, the lower the sensitivity of the residence.
- Use of the view. Residences with active visual orientation towards the REA site (ie those with areas such as living rooms, verandas etc. orientated towards it) have a higher sensitivity than those that are not orientated towards the REA and don't make use of the views toward the REA.
- Screening effects of any intervening topography, buildings or vegetation. Residences with well screened views of the REA site have a lower sensitivity than those with open views.

3.3 VISUAL EFFECT

Visual effect is a measure of the level of visual integration of visible areas of the REA and the existing visual environment. The magnitude of the visual effect is determined by a balanced consideration of the following:

- Level of contrast (i.e. form, shape, pattern, line, texture and colour) between the visible area of the REA and the landscape within which it is viewed;
- The proportion of the view occupied by the visible area of the REA; and
- Screening by buildings and vegetation at, or adjacent to, the REA site.

Generally a high visual effect will result if a visible area of the REA has a high visual contrast to the surrounding landscape and occupies a significant proportion of the field of view. A low or very low visual effect will occur if there is minimal contrast between a visible area of the REA and the existing landscape setting.

3.4 METHODOLOGY

There are numerous residences in the vicinity of the REA site, including residences in the township of Aberdeen, that will potentially be visually impacted by the REA. For the purposes of the visual impact assessment, residential areas within the primary visual catchment were divided into representative residential viewing sectors (Section 4.1). Whilst there will be some variation in the impacts on specific individual residences within each viewing sector, an overall assessment of the visual impact on the sector will be representative for the majority of residences.

3.4.1 Visual Sensitivity

The visual sensitivity of residences within each residential viewing sector was determined by review of aerial photographs and topographic plans of the REA site and surrounding area. This allowed the orientation of the residences, viewing distances and level of screening from topography, buildings and vegetation to be determined. The assigned sensitivities of residences within each sector were also confirmed during a field inspection by the visual planning specialist. In sectors where the sensitivity of individual residences varies significantly, this is noted in the discussion of visual impacts in Section 4.0.

3.4.2 Visual Effect

The visual effect of the REA will change over the 20 year term of the development consent as the REA landform develops. Staged layout plans of the REA (refer SEE Figures 4 to 8) illustrate the progressive development of the Southern REA and Northern REA.

Photomontages of the views of the REA at years 5, 10, 17 and 20 from representative viewing locations within each residential viewing sector were prepared to illustrate the visual effect of the REA over 20 years (Figure 2). The representative viewing locations for each sector were carefully chosen by detailed review of plans. These locations have typical worst case views of the REA from the sector. The appropriateness of these locations was also confirmed in the field. Views from other locations in each sector will vary to some extent, however the viewing locations are typically worst case and the visual impact on other locations will not be significantly more adverse.

Photographs of the REA site were taken at standing eye level from each viewing location and the location of each photograph position was accurately surveyed. Three dimensional (3D) computer models of the REA at years 5, 10, 17 and 20, and the surrounding area were developed from digital surface topography and REA design plans. The models enable accurate views of the REA to be generated from any specified location and account for screening of views by natural topography. The photographs of the REA site were overlain on the model view and the location of future visible components of the REA was determined taking into account any foreground screening from buildings or vegetation in the photograph. The colours and textures of rehabilitation and the active rejects emplacement from a similar viewing distance were then applied to the corresponding components of the visible sections of the REA. The end result is an accurate and realistic photomontage of the future view of the REA.

The photomontages were then used to assist in determining the level of visual effect of the REA over the 20 year term of the development consent. Once the visual effect of the REA was determined, the visual impact on each residential viewing sector was determined using the table shown in Section 3.1.

4.0 VISUAL IMPACT ASSESSMENT

4.1 RESIDENTIAL VIEWING SECTORS

For the purposes of this visual impact assessment the following residential viewing sectors have been defined within the primary visual catchment (Figure 2):

- Aberdeen East – to the north and north-west of the REA;
- Aberdeen East Residential Development Land – to the north of the REA;
- Aberdeen West – to the north-west of the REA;
- Blairmore Lane – to the west and north-west of the REA;
- Kayuga – to the west and south-west of the REA; and
- South West Residences – to the south-west of the REA.

The viewing sectors comprise groups of residences with similar views of the REA. Whilst there will be some variation in the impacts on specific individual residences within each viewing sector, an overall assessment of the visual impact on the sector will be representative for the majority of residences. The orientation of the developing REA in relation to these viewing sectors is shown in Figures 3 to 7. The assessment of the visual impact of the REA on each residential viewing sector is presented in the following sections.

4.2 ABERDEEN EAST

4.2.1 Introduction

The Aberdeen East residential viewing sector is located to the north and north-west of the REA and east of the New England Highway. It includes the most elevated areas of Aberdeen, with elevations of RL 185-255 m.

4.2.2 Sensitivity

The residences in the Aberdeen East viewing sector are located between 2.5 and 4 km from the Southern REA. Residences within the viewing sector are generally orientated towards the streets of Aberdeen, limiting the number of residences that are directly orientated towards the REA. Views from residences to the REA typically have some partial screening from buildings and vegetation. Views of the Northern REA from this sector are totally screened by the topographic spur at the northern end of Browns Mountain. This spur also provides partial screening of views to the Southern REA from the eastern, and more elevated, parts of this sector.

Residences in this viewing sector are generally assessed as having moderate to low sensitivity due to the viewing distance to the Southern REA, partial screening from topography, buildings and

vegetation and the general lack of direct orientation towards the REA. However, any individual residences that have strong visual orientation and open views to the REA will have a high sensitivity.

4.2.3 Visual Effects

The visual effects of the REA on the Aberdeen East viewing sector are illustrated in the photomontages (Figure 8). The photomontage is from the upper end of Campbell Street in the northern part of this viewing sector (Figure 2). The viewing location is elevated with limited screening by the spur at the northern end of Browns Mountain and the view is orientated directly towards the northern end of the REA.

Views of the REA from the Aberdeen East viewing sector will change over time as the REA is developed. There will be a view from the Aberdeen East viewing sector to the active emplacement area of the Southern REA for approximately the first seven years. The extent of the visible active emplacement increases to a maximum in year 5 (Figure 8 – Year 5). After this time, the view to the active emplacement will become more oblique and the active emplacement will eventually be screened from view by the rehabilitated outer slope of the REA (Figure 8 – Year 10). After approximately year 7, the view from Aberdeen East will be of the rehabilitated outer slope of the REA.

From this sector the Northern REA is screened from view by the topographic spur at the northern end of Browns Mountain and existing tree screens at the northern end of the REA site.

The active emplacement area will appear as black/grey and earth coloured strips. During the period when these elements are visible, they will create a colour contrast with the surrounding landscape. However, their visual effect is reduced by the limited scale of these elements relative to the dominant landscape of Browns Mountain. These elements also comprise a relatively low proportion of the view from this sector, which serves to further lessen their visual effect. The REA will in part be viewed against the skyline, which will increase its visual effect.

The rehabilitated areas of the REA will appear as grassy slopes which integrate well, both in terms of colour and form, with the slopes of the adjoining hills. The visual effect of the rehabilitated slopes is considered to be low to very low.

Based on a consideration of these factors, during periods when the active emplacement area is visible (years 0-7), the visual effect of the REA will initially be low increasing to moderate in years 5 to 7. The visual effect will reduce to very low after year 7 once the active emplacement area is screened from view by the rehabilitated outer slope of the REA.

4.2.4 Visual Impacts

Residences in the Aberdeen East viewing sector are generally assessed as having moderate to low sensitivity. Consequently the impact on the residences in the Aberdeen East viewing sector will

initially be low, increasing to moderate during years 5-7 when the maximum extent of the active emplacement area is visible, and decreasing to low after year 7.

Any residences with a strong visual orientation and use of views to the REA, and consequently high sensitivity, will initially experience a moderate visual impact, increasing to a high visual impact during years 5-7 when the maximum extent of the active emplacement area is visible. The impact will be reduced to low once these areas are screened from view by the rehabilitated outer slope of the emplacement from year 7 onwards.

4.3 ABERDEEN EAST RESIDENTIAL DEVELOPMENT LAND

4.3.1 Introduction

The Aberdeen East Residential Development Land is located to the north of the REA, and adjoins the ACDM landholdings (Figure 2). It is gently sloping land with elevations of RL 200-245 m and a south-west aspect. The land is currently undeveloped and used for grazing. The land is owned by SSC and will potentially be developed in the future for residential and rural residential purposes.

4.3.2 Impact Assessment

The Aberdeen East Residential Development Land is located between 2 and 3 km from the Southern REA. Residences built in this area in the future will potentially be sensitive to views of the REA.

Photomontages from two representative viewing locations within the land were prepared for the purpose of illustrating the visual effect of the REA (Figure 2). These are referred to as the western location (Figure 9) and the eastern location (Figure 10). The western location is in the more elevated section of the land and the eastern location, while still relatively elevated, has reduced elevation on the intervening topographic spur from Browns Mountain to screen REA views.

The 3D models and photomontages indicate that both the Northern and Southern REAs are totally screened from view at both viewing locations by the northern spur of Browns Mountain.

Additional sight line assessment was conducted at the northern, western and southern corners of the land (Figures 11 to 16) to confirm the extent of screening on all areas of the land. The sight line transects indicate that total screening is provided by the northern spur of Browns Mountain and the existing tree screens at the northern end of the REA site, except for the western corner of the land (Figure 14). From this limited area, only the upper section of the Southern REA will be visible. Any growth in the height of the tree screens at the northern end of the REA site will reduce the visible extent of the Southern REA (Figure 14).

In conclusion, the Northern REA will not be visible from any point in the Aberdeen East Residential Development Land. The upper section of the Southern REA will only be visible from a small area in

the western corner of the land. Consequently, development of the REA will not result in any visual impact on the majority of the land.

Views from a relatively small area in the western corner of the land will be limited to the top section of the Southern REA. The visual effect and impact of the visible active emplacement on this area will be moderate when the emplacement is visible in the period up to approximately year seven. This is because the views will be restricted to a small strip of the active emplacement, occupying a small portion of the total view. The visual impact on this area will reduce to low after approximately year 7 once the active emplacement has been screened by the rehabilitated outer slope.

4.4 ABERDEEN WEST

4.4.1 Introduction

The Aberdeen West viewing sector is located to the north-west of the REA and west of the New England Highway (Figure 2). It includes the lower elevations of Aberdeen, with elevations ranging from RL 160 to 190 m. Residences in this sector include urban residences, which are part of Aberdeen Township and two isolated rural residences in the southern part of the viewing sector.

4.4.2 Sensitivity

The residences in the Aberdeen West viewing sector are located between one and three kilometres from the REA. Residences within the viewing sector are generally not orientated towards the REA. Views to the REA are generally well screened by foreground vegetation and adjacent houses. The screening effect of vegetation and houses in this sector is significant as the gentle slopes in the sector limit the potential for views over foreground screening. The low elevation and gentle slopes also allow adjacent and intervening lands to create visual separation.

The isolated rural residences in the south of viewing sector do not experience the same degree of screening as the urban residences to the north.

Urban residences in this viewing sector are generally assessed as having low sensitivity due to their lack of orientation towards the REA and the screening of views to the REA by foreground vegetation and adjacent houses. However, any individual residences, such as the two rural residences in the south of viewing sector, with a strong visual orientation and open views to the REA will have a high sensitivity.

4.4.3 Visual Effects

The visual effects of the REA on the Aberdeen West viewing sector are illustrated in the photomontages (Figure 17), which were taken from the Scout Hall in the south-west part of the viewing sector (Figure 2). The viewing location has limited screening by vegetation and no screening

from buildings. It is orientated directly towards the REA at an angle from which the active emplacement area of the Southern REA is most visible (Figure 17 – Year 5).

The photomontage view is broadly representative of views from the two rural residences to the south of the viewing sector. However, it is atypical of views from the urban residences in the sector, which have significantly more screening from foreground vegetation and adjoining houses. The photomontage location was selected to represent the worst views to the REA in the viewing sector.

Views of the REA from the Aberdeen West viewing sector will change over time as the REA is developed. There will be a direct view from the Aberdeen West viewing sector to the active emplacement area of the Southern REA for approximately the first five years. The extent of the visible active emplacement will increase to a maximum in year 5 (Figure 17 – Year 5). After this time, the view to the active emplacement will become progressively more oblique and the active emplacement will be screened from view by the rehabilitated outer slope of the REA by approximately year 10 (Figure 17 – Year 10). The active emplacement area of the Northern REA will be visible during years 15 to 16 while the initial rehabilitated northern face is being constructed. Views of the REA after this time will be of the rehabilitated outer slope of the emplacement (Figure 17 – Years 17 and 20).

The active emplacement areas will appear as black/grey and earth coloured strips. During the period when these elements are visible, they will create a colour contrast with the surrounding landscape. However, their visual effect is reduced by the limited scale of these elements relative to the dominant background landscape of Browns Mountain. These elements also comprise a low proportion of the views from this sector, which serves to further lessen their visual effect. The southern end of the Southern REA will be viewed against the skyline, which will increase its visual effect. The Northern REA and the northern part of the Southern REA are below the ridgeline of Browns Mountain, which provides backgrounding and visual integration.

The rehabilitated areas of the REA will appear as grassy slopes which integrate well, both in terms of colour and form, with the foot slopes of the adjoining hills. The visual effect of the rehabilitated slopes is considered to be low to very low.

Based on a consideration of these factors, during periods when the active emplacement area is visible (years 0-10), the visual effect of the REA will initially be moderate (year 0 to 5), increasing to high during years 5 and 6, and decreasing to low as the view becomes oblique during years 7 to 10. The visual effect will be low for the period during which the active area of the Northern REA is visible (years 15 to 16). The visual effect will be very low during the periods when the active working face is screened from view by the rehabilitated outer slope of the REA (year 10 - 14 and year 17 onwards).

4.4.4 Visual Impacts

The visual impact on the urban residences in the Aberdeen West viewing sector will be low for all but years 5 and 6, given that the residences are assessed as having low sensitivity and the visual effect

ranges from moderate to very low. During years 5 and 6 the visual impact will be moderate because of the temporary high visual effect during the period when there is a direct view of the active emplacement at its largest visible extent.

The visual impact on the two rural residences in the Aberdeen West viewing sector with high sensitivity will initially be high, reducing to moderate during years 7 to 10. The impact will be low during the periods when the view is restricted to the rehabilitated outer slope (year 10 - 14 and year 17 onwards). The impact will increase to moderate during years 15 to 16 when sections of the active emplacement area of the Northern REA are visible.

4.5 BLAIRMORE LANE

4.5.1 Introduction

The Blairmore Lane residential viewing sector is located to the west and north-west of the REA and to north of the ACDM land holdings (Figure 2). This viewing sector is located west of the Hunter River. The residences in this sector are generally located along Blairmore Lane.

4.5.2 Sensitivity

The rural residences in the Blairmore Lane viewing sector are located between 2.5 and 4.5 km from the REA. Residences are generally orientated towards Blairmore Lane. Views from residences to the REA have varying degrees of screening from foreground buildings and vegetation. Views from the northern end of Blairmore Lane to the REA site are partially screened by intervening topography. Residences in this viewing sector are generally assessed as having moderate to low sensitivity due to their distance to the REA and their lack of orientation towards the REA. However, any individual residences that have strong visual orientation and open views to the REA will have a high sensitivity.

4.5.3 Visual Effects

The visual effects of the REA on the Blairmore Lane viewing sector are illustrated in the photomontages (Figure 18). The photomontage was taken from the eastern side of Blairmore Lane at the southern end of the sector (Figure 2). The photomontage position is representative of the worst case views to the REA in the viewing sector. The view has no screening by topography and very limited screening from vegetation. It is also orientated directly towards the REA at an angle from which the active emplacement of the Southern REA is most visible (Figure 18 – Year 5).

Views of the REA from the Blairmore Lane viewing sector will change over time as the REA is developed. There will be a direct view from the Blairmore Lane viewing sector to the active emplacement area of the Southern REA for approximately the first seven years (Figure 18 – Year 5). After this time, the rehabilitated outer face of the REA will screen the active emplacement area from view (Figure 18 – Year 10). The active working emplacement of the Northern REA will only be visible during years 15 to 16 while the initial rehabilitated northern face is being constructed. Views

5.0 CONCLUSION

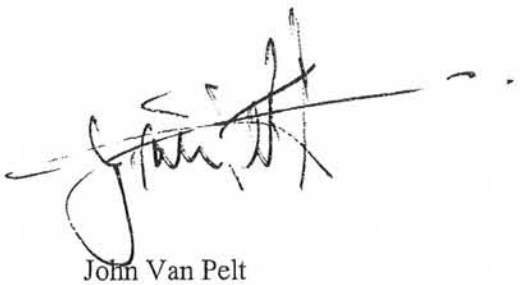
The visual impact of the REA development on surrounding residential areas is dependent on the sensitivity of residences and the visual effect of the REA from the residential viewing sectors. Dependent on the viewing distance, viewing angle and visible proportion, the active emplacement area will potentially have a high visual effect due to contrast of colour and shape with the surrounding landscape. The rehabilitated outer slopes of the REA will appear similar, both in terms of colour and form, to the slopes of the adjoining hills and will have a low to very low visual effect.

The primary visual impact mitigation strategy for the REA therefore involves the screening of views of the active emplacement areas with the rehabilitated outer slope of the emplacement, as far as practicable. Achieving this objective was a key focus of the REA design process.

Overall, some residential areas will experience moderate to high visual impacts for only limited periods of time. These will be generally in the initial construction phases of the Southern and Northern REAs (years 1-2 and 15-16) and for some residences to the north and north-west, during the early years of the southern REA (up to year 7). Following these periods the visual impact will reduce to low once the active emplacement areas are screened from view by the rehabilitated slopes of the REA. The long term (after year 20) visual impact of the REA will be low as the final rehabilitated REA will have similar scale, shape, colour and texture to the existing landscape setting.

* * *

for
JVP VISUAL PLANNING AND DESIGN

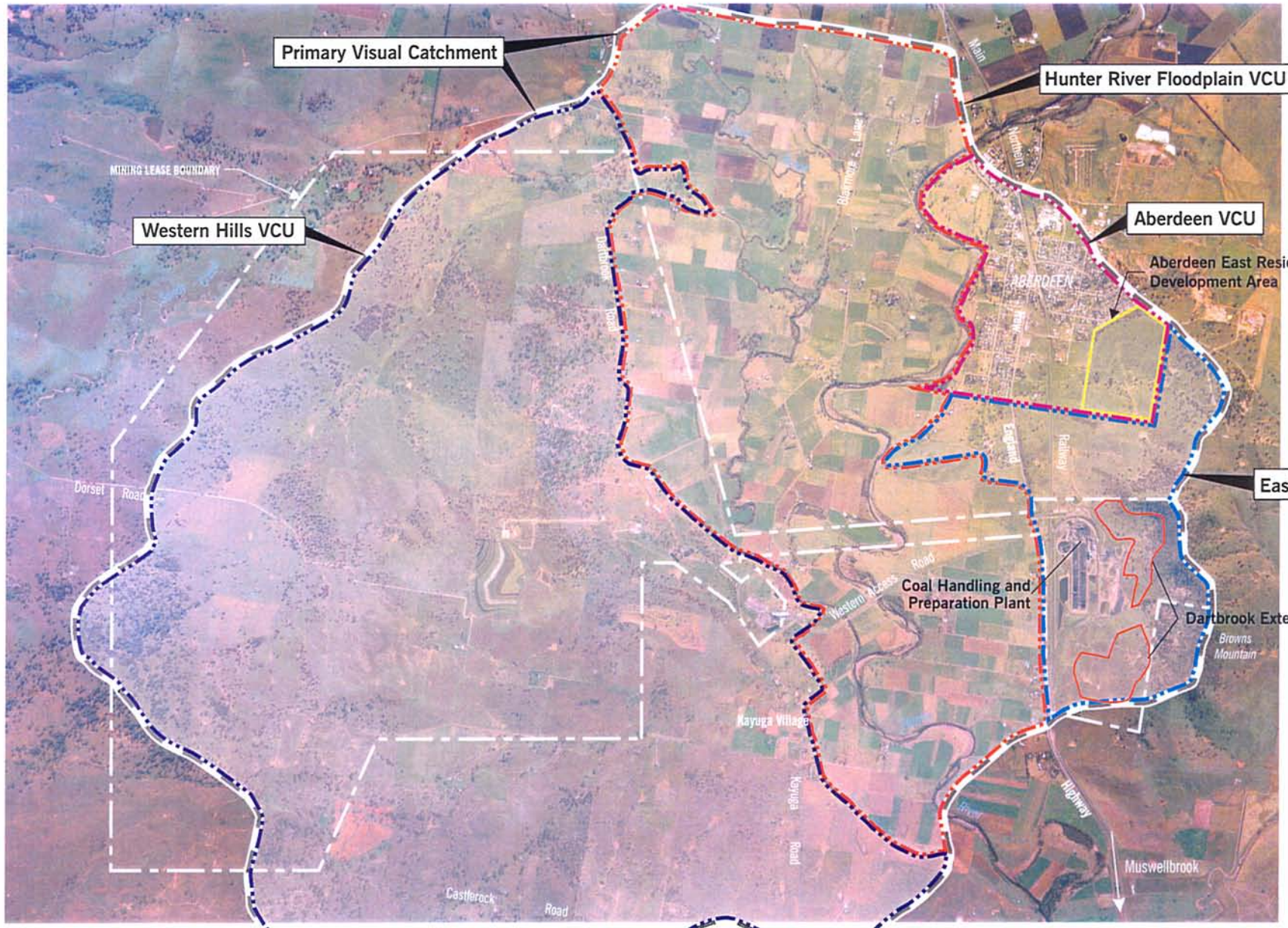


John Van Pelt
Director

for
HANSEN CONSULTING

Peter Hansen
Director

FIGURES



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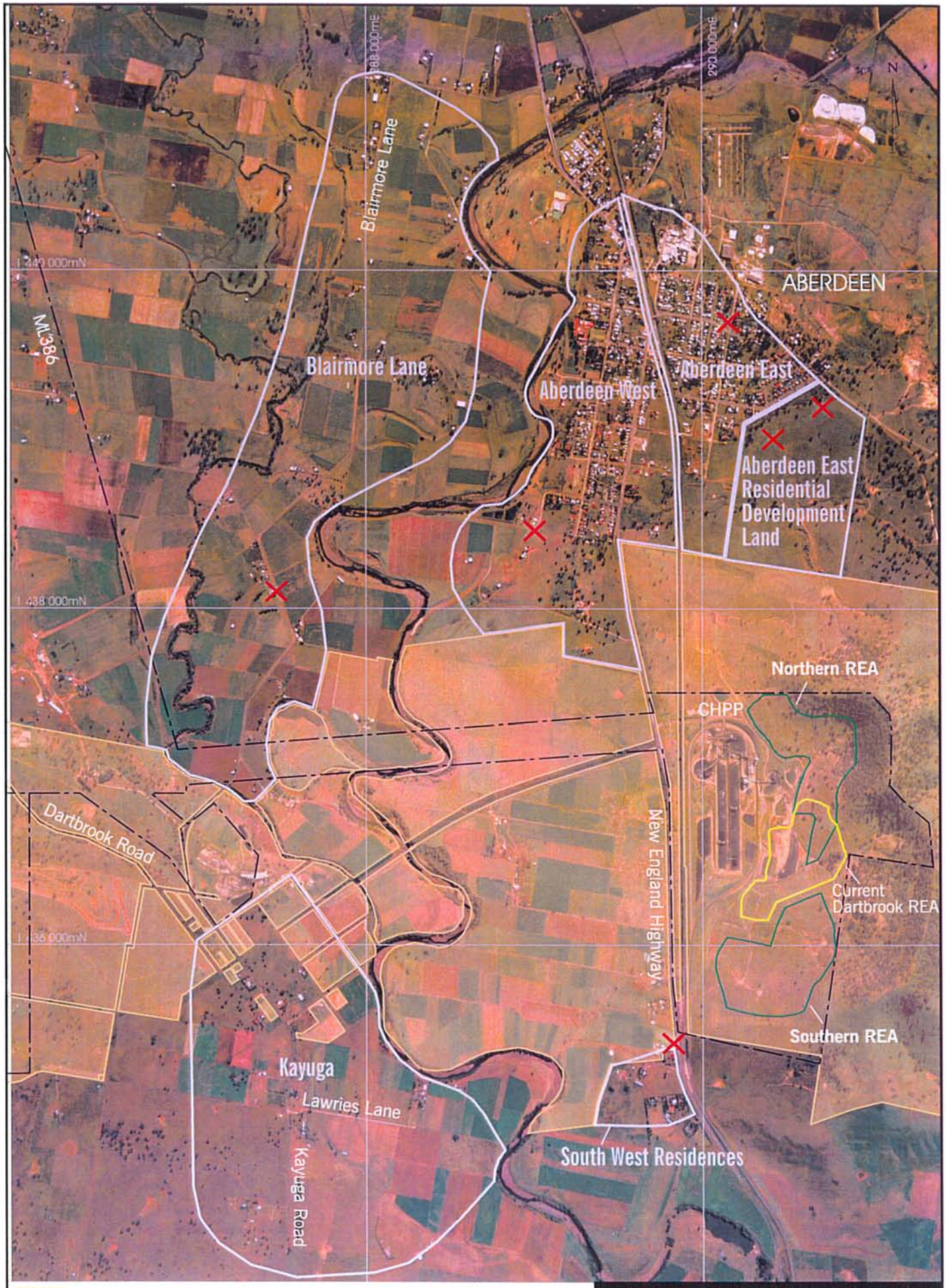
DARTBROOK

DARTBROOK MINE

Rejects Emplacement Area
Visual Setting

FIGURE 1

File Name: KA028 - SEE Visual Setting.cdr | Date: 03.03.04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Aberdeen East
Aberdeen East Residential Development Land
Northern REA
CHPP
Dartbrook Road
New England Highway
Current Dartbrook REA
Southern REA
Kayuga
Lawries Lane
Kayuga Road
South West Residences
ACDM Land
Viewing Sector
Photomontage Viewing Locations
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HANSEN CONSULTING
DARTBROOK MINE
Residential Viewing Sectors
File Name: KA028 - Viewing Locations.cdr
Date : 03.03.04
FIGURE 2


Blairmore Lane
ABERDEEN
ML386
Blairmore Lane
Aberdeen West
Aberdeen East
Aberdeen East Residential Development Land
CHPP
Dartbrook Road
New England Highway
Rehabilitated Dartbrook REA
Kayuga
Lawries Lane
Kayuga Road
South West Residences
Viewing Sector
Photomontage Viewing Locations
DARTBROOK
HANSEN CONSULTING
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Residential Viewing Sectors
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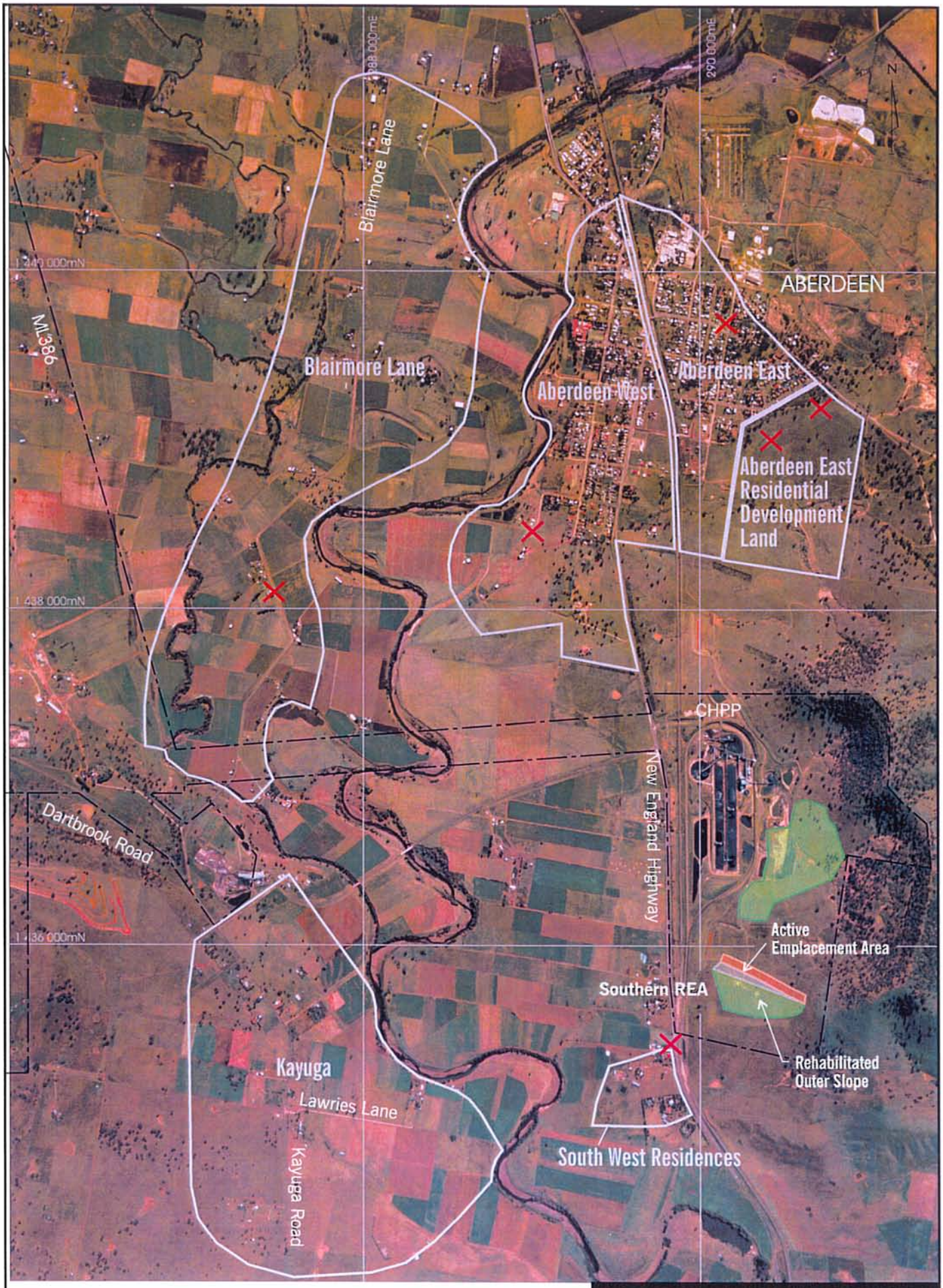
FIGURE
3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Aberdeen East Residential Development Land
CHPP
New England Highway
Dartbrook Road
Active Emplacement Area
Southern REA
Rehabilitated Outer Slope
Kayuga
Lawries Lane
Kayuga Road
South West Residences
Viewing Sector
Photomontage Viewing Locations
DARTBROOK
HANSEN CONSULTING
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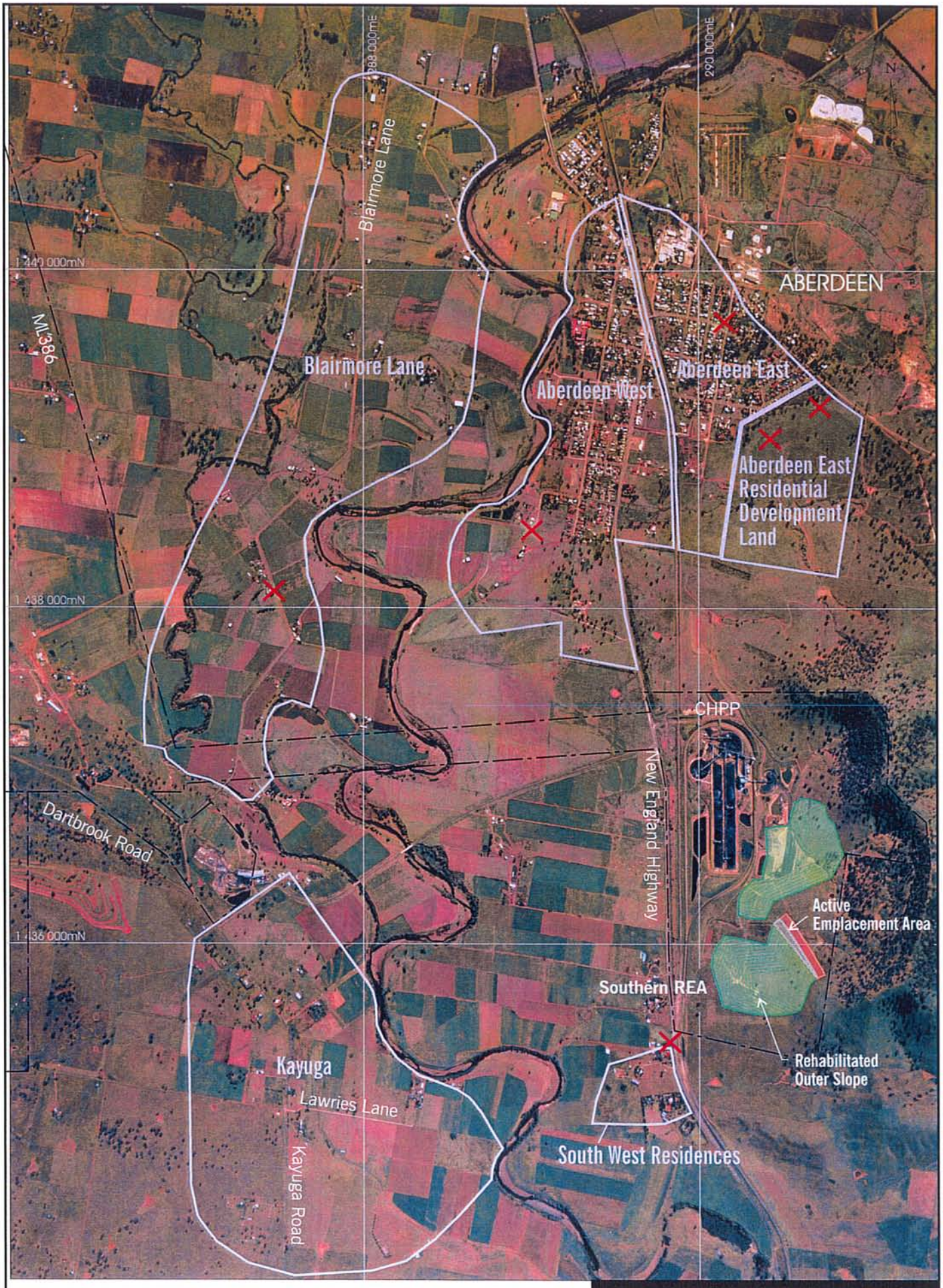
FIGURE
4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Southern REA
Rehabilitated Outer Slope
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Kayuga Road
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Viewing Sector
Photomontage Viewing Locations
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HANSEN CONSULTING
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Residential Viewing Sectors
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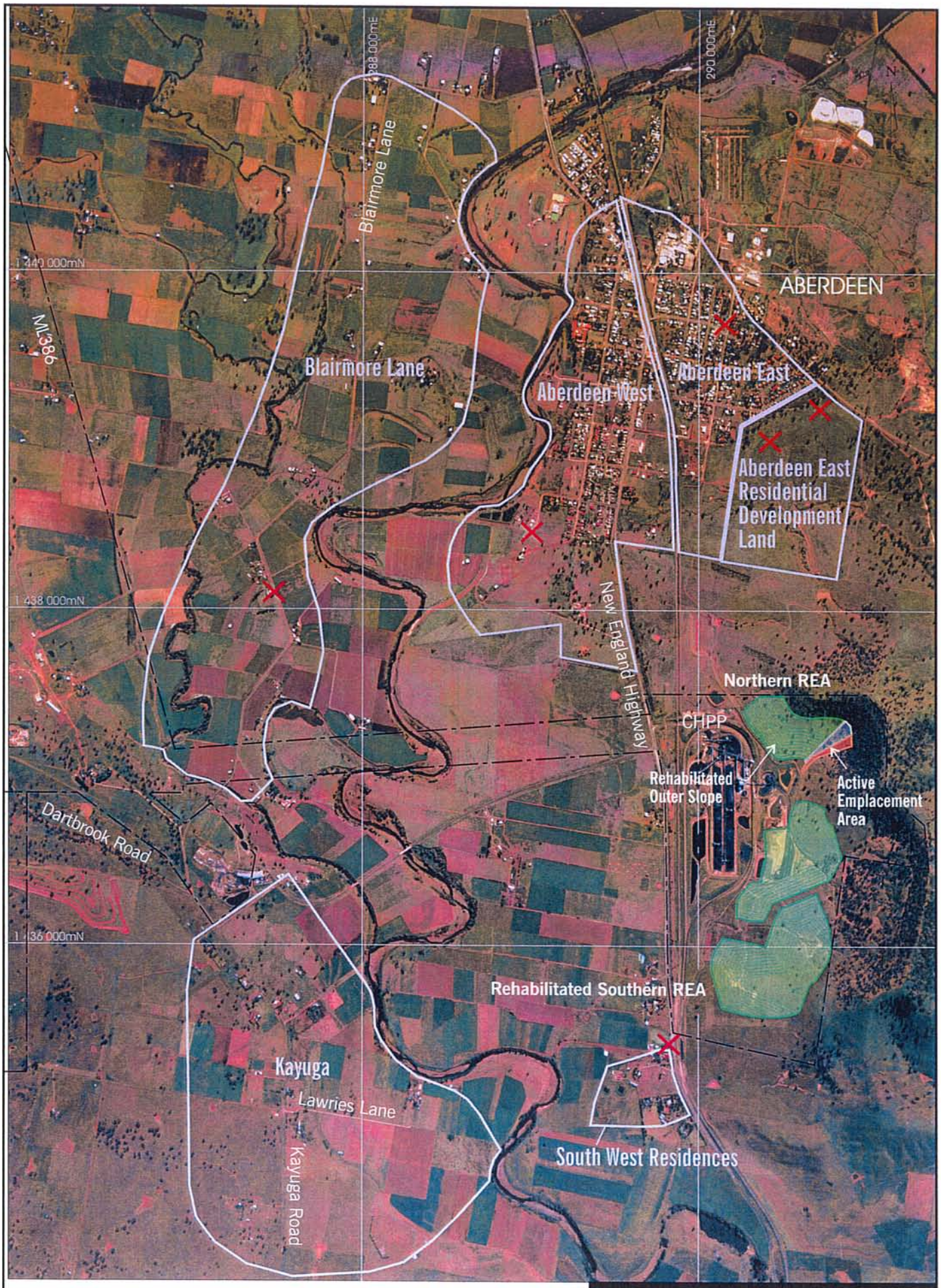
Date : 03.03.04
FIGURE
5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Aberdeen West
Aberdeen East
Aberdeen East Residential Development Land
New England Highway
Northern REA
CHPP
Rehabilitated Outer Slope
Active Emplacement Area
Dartbrook Road
Rehabilitated Southern REA
Kayuga
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Viewing Sector
Photomontage Viewing Locations
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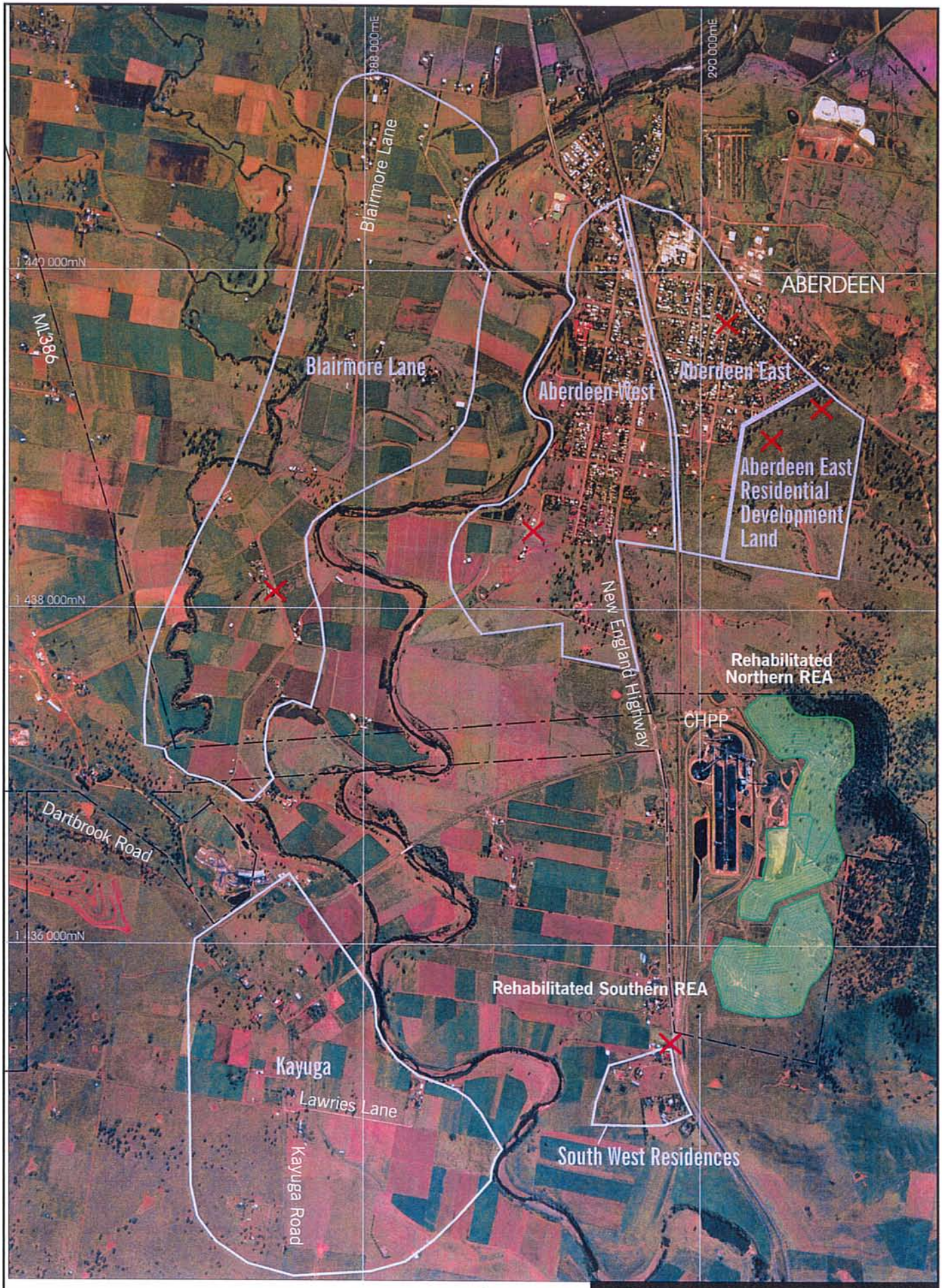
FIGURE
6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Blairmore Lane
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Aberdeen West
Aberdeen East
Aberdeen East Residential Development Land
New England Highway
Rehabilitated Northern REA
CHPP
Dartbrook Road
Rehabilitated Southern REA
Kayuga
Lawries Lane
Kayuga Road
South West Residences
Viewing Sector
Photomontage Viewing Locations
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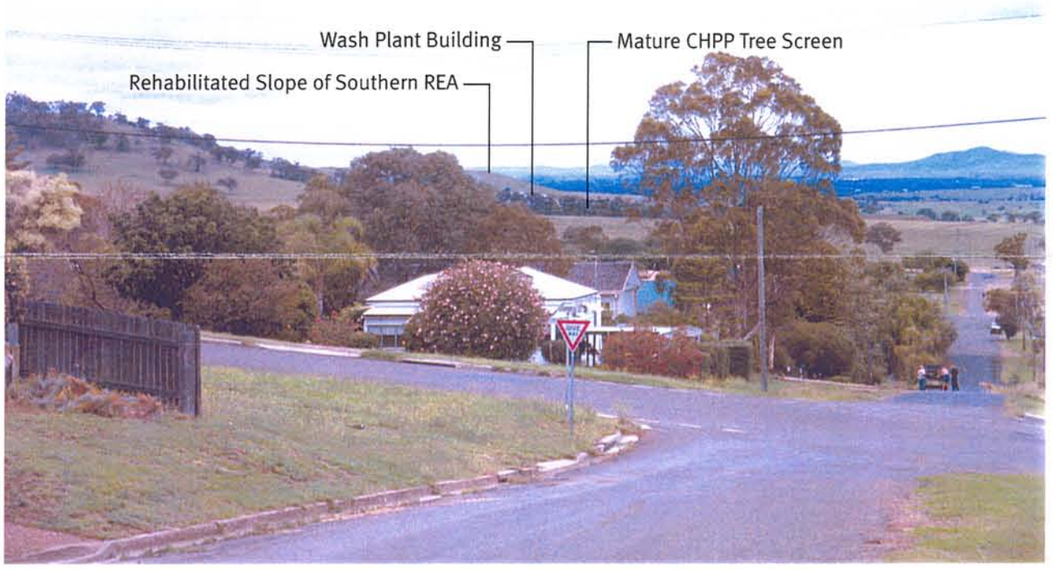
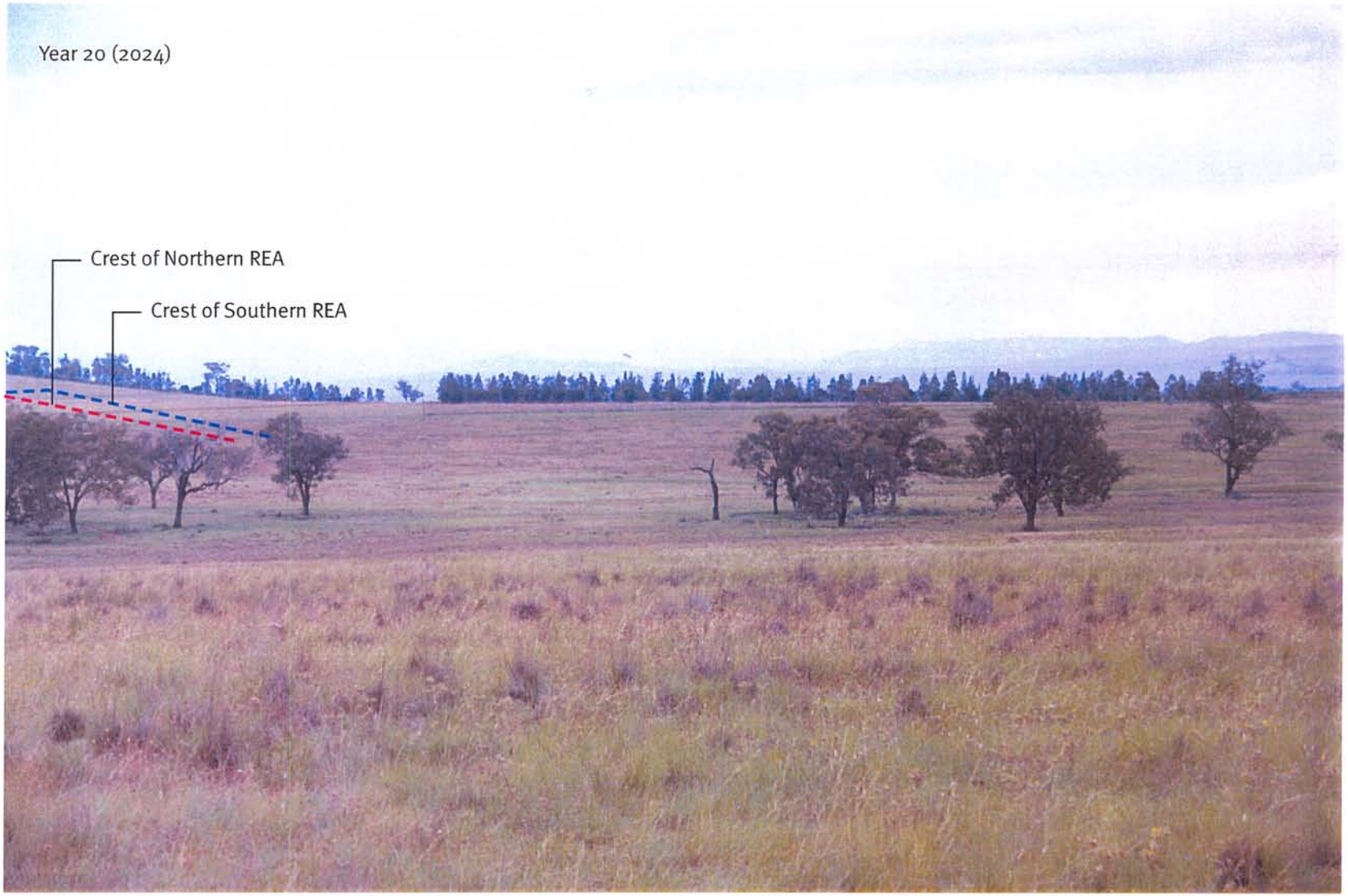
Residential Viewing Sectors
Year 20 (2024)
File Name: KA028 - Viewing Locations_Year 20.cdr
Date : 03.03.04
FIGURE
7

Existing (December 2003)

Year 5 (2009)

Year 10 - 20 (2014 - 2024)
Note: Northern REA is not visible from this viewing location





ABERDEEN EAST RESIDENTIAL DEVELOPMENT LAND
(WESTERN LOCATION)

Photo Montages

Figure 9

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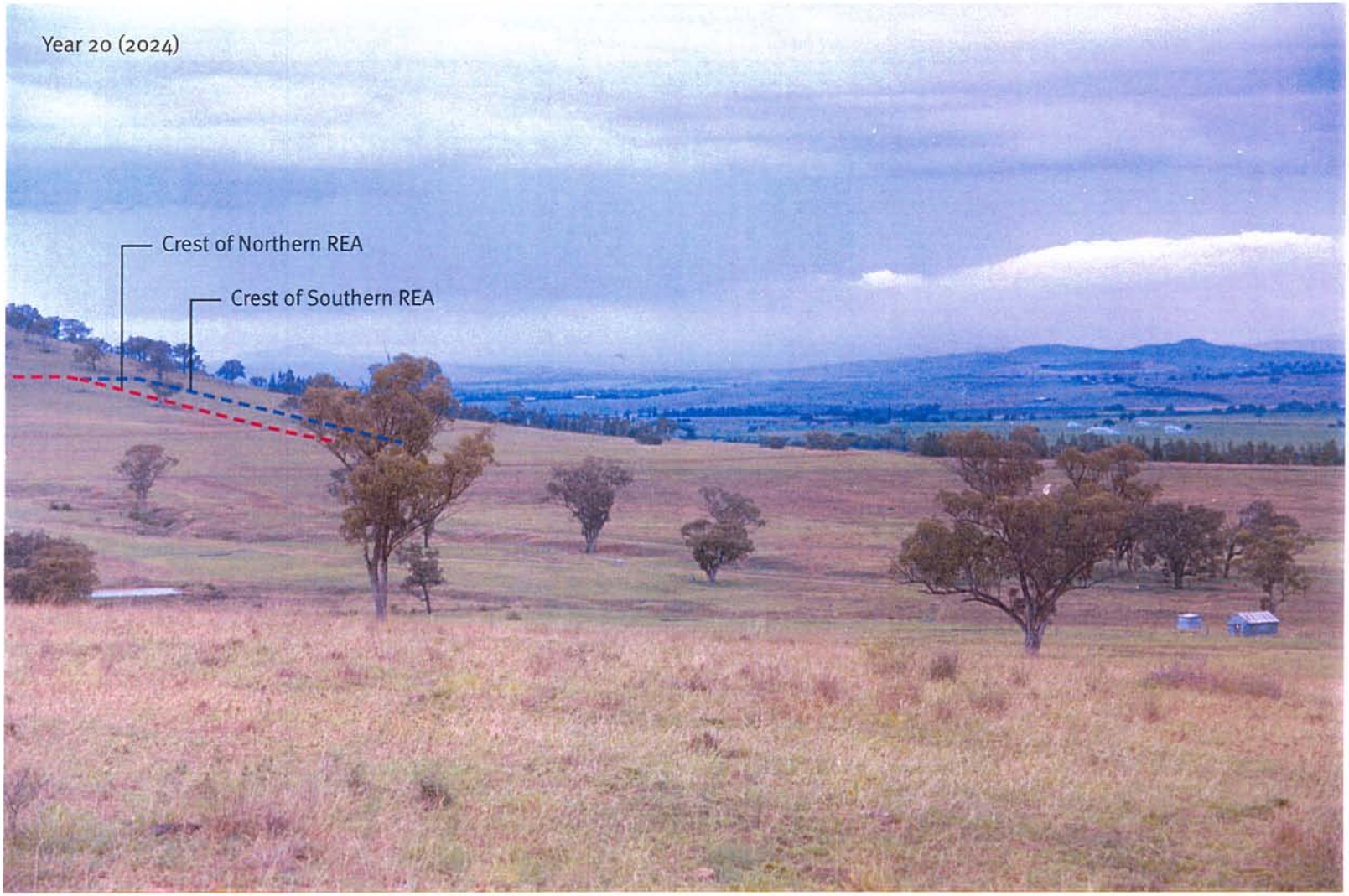
DARTBROOK



ABERDEEN EAST RESIDENTIAL DEVELOPMENT LAND
(EASTERN LOCATION)

Photo Montages

Figure 10

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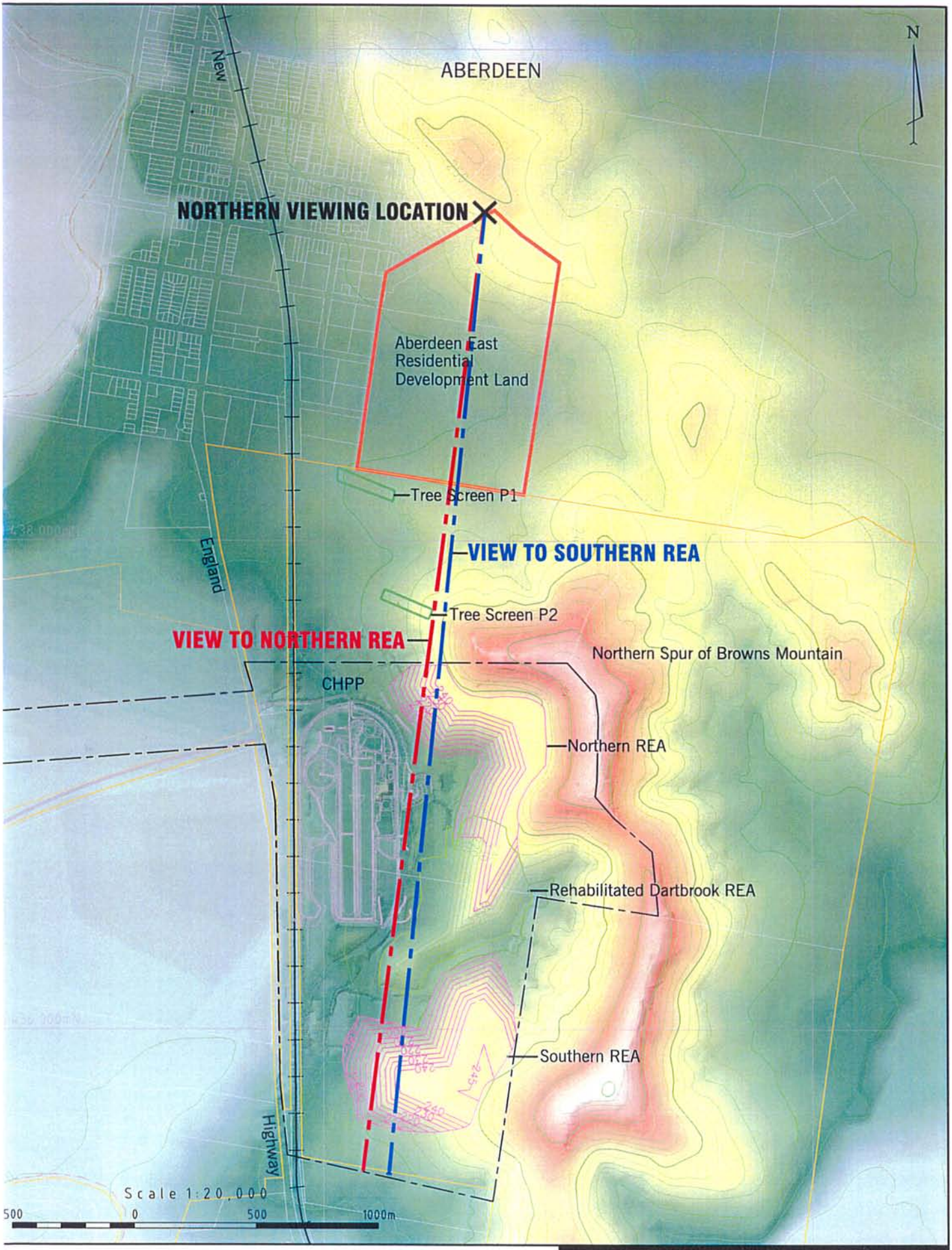


DARTBROOK MINE

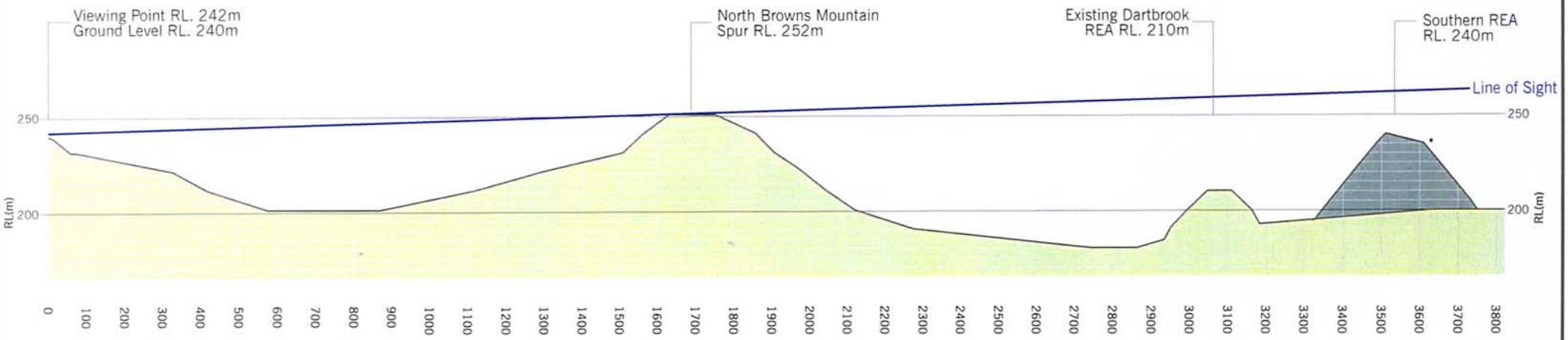
Northern Viewing Location
Lines of Sight

HANSEN CONSULTING DARTBROOK

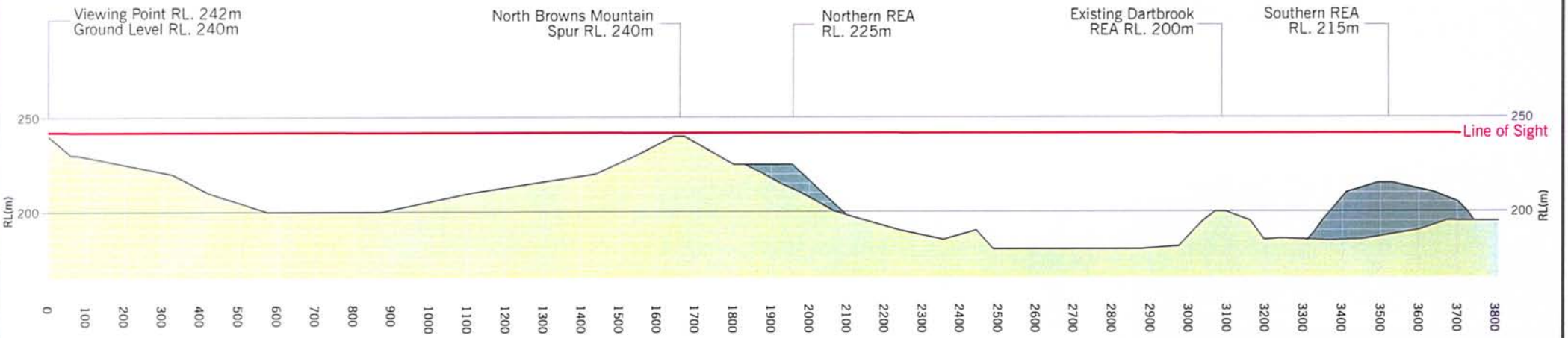
TSG Drawing No: KA028 - Northern Viewing Location.dwg Date: 03.03.04

Figure 11

View to Southern REA



View to Northern REA



Note: These Sections have 250% vertical exaggeration for presentation purposes and do not represent the actual vertical scale of the REA

HANSEN CONSULTING

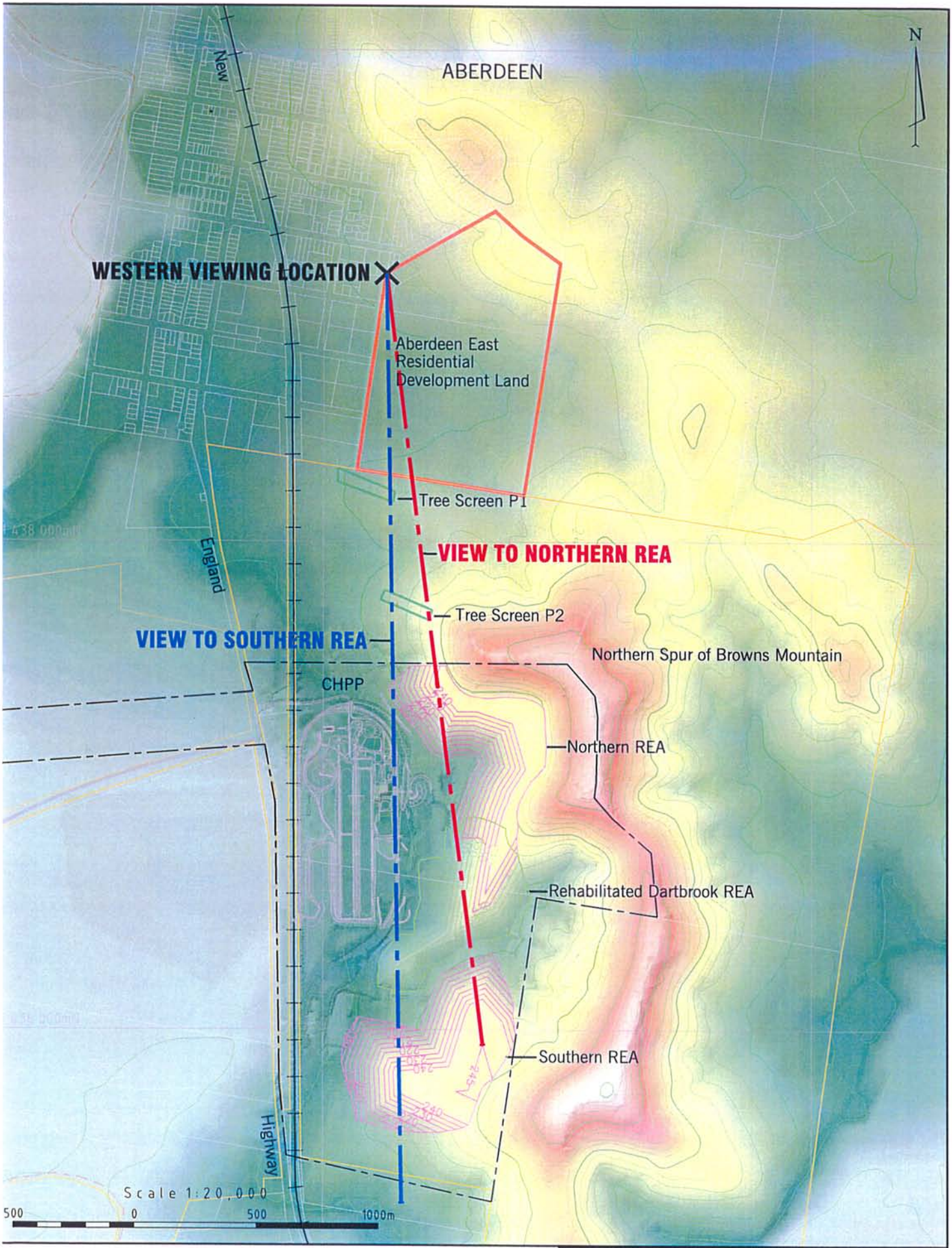
DARTBROOK

DARTBROOK MINE

Northern Viewing Location
Line of Sight Section

FIGURE 12

File Name: KA028 - Northern Viewing Location.cdr | Date: 03.03.04



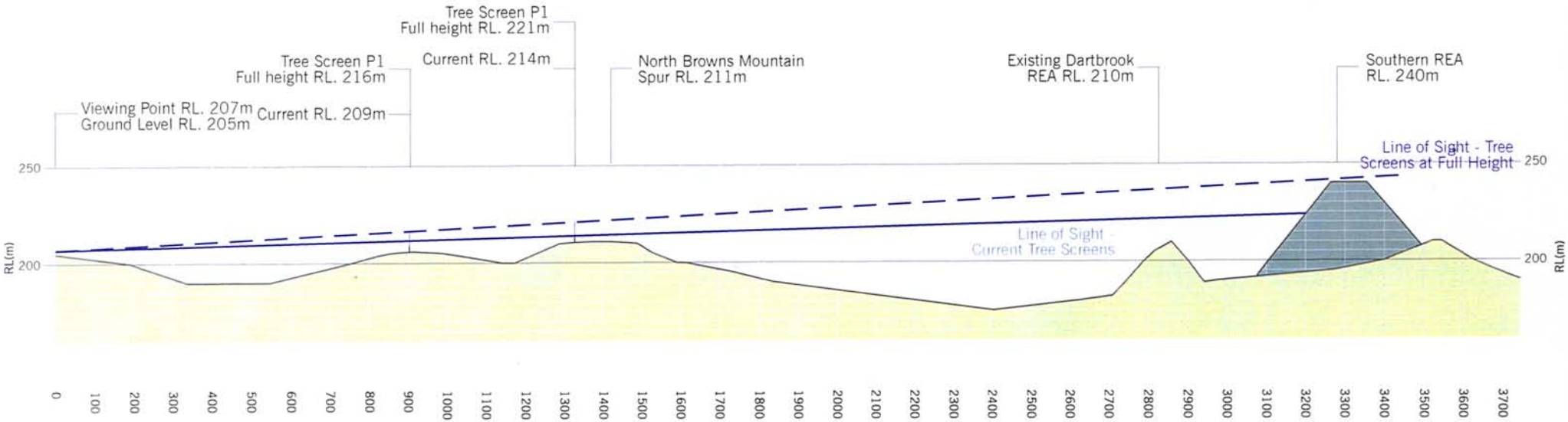
DARTBROOK MINE

Western Viewing Location
Lines of Sight

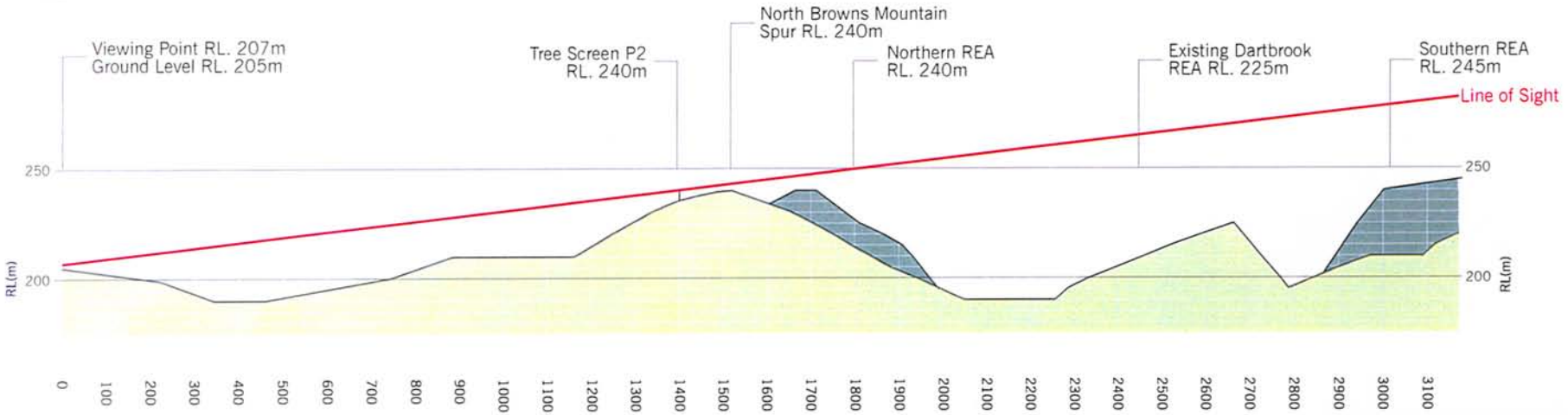
HANSEN CONSULTING DARTBROOK

TSG Drawing No: KA028 - Western Viewing Location.dwg | Date: 03.03.04 | Figure 13

View to Southern REA



View to Northern REA



Note: These Sections have 250% vertical exaggeration for presentation purposes and do not represent the actual vertical scale of the REA

HANSEN CONSULTING

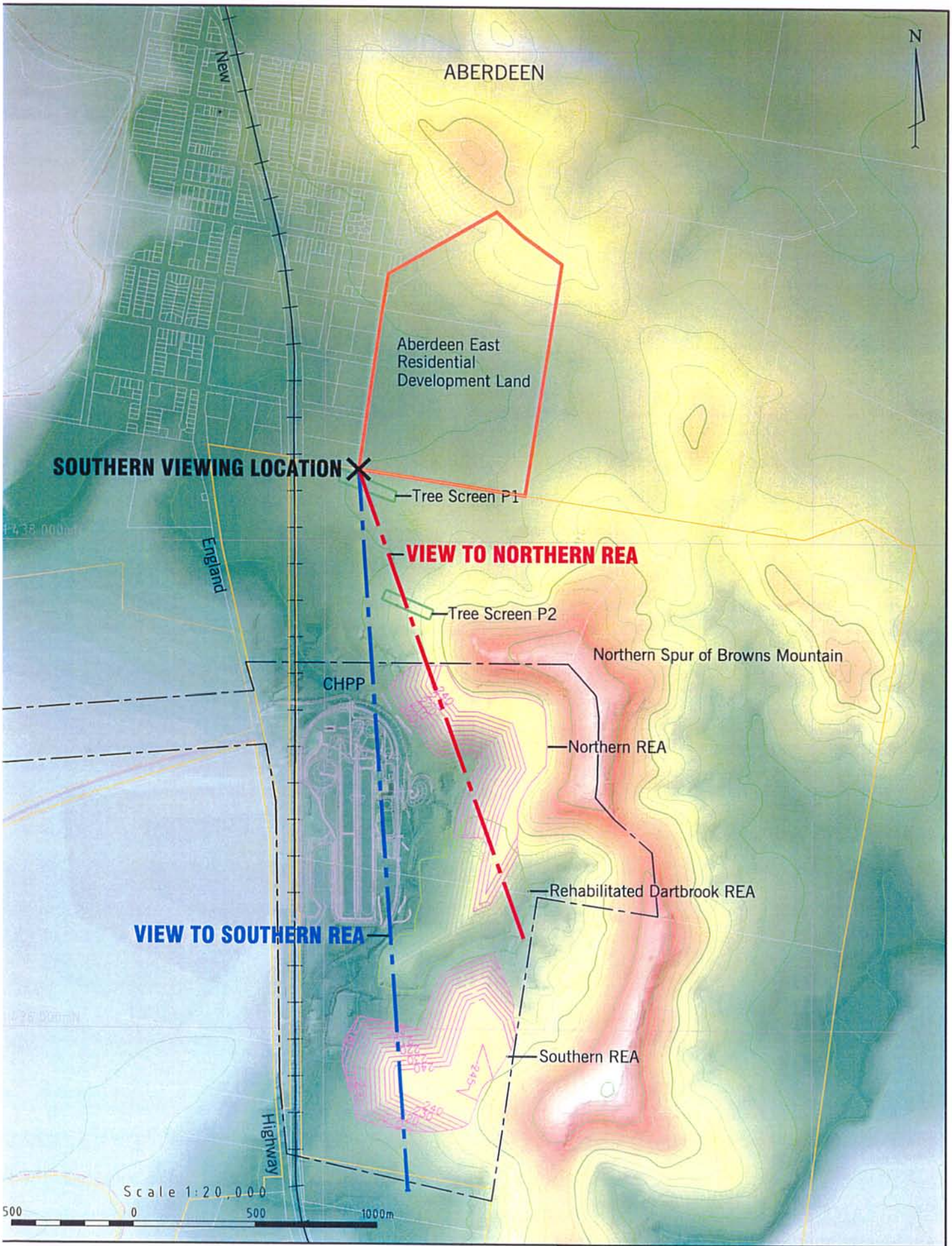
DARTBROOK

DARTBROOK MINE

Western Viewing Location
Line of Sight Section

FIGURE 14

File Name: KA028 - Western Viewing Location.cdr | Date: 03.03.04



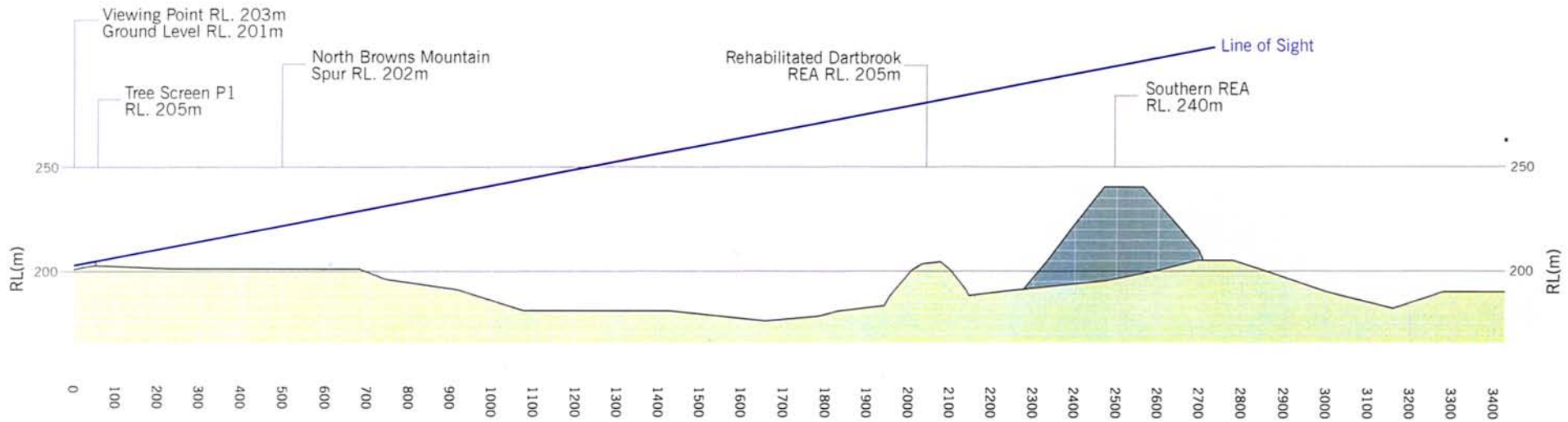
DARTBROOK MINE

Southern Viewing Location
Lines of Sight

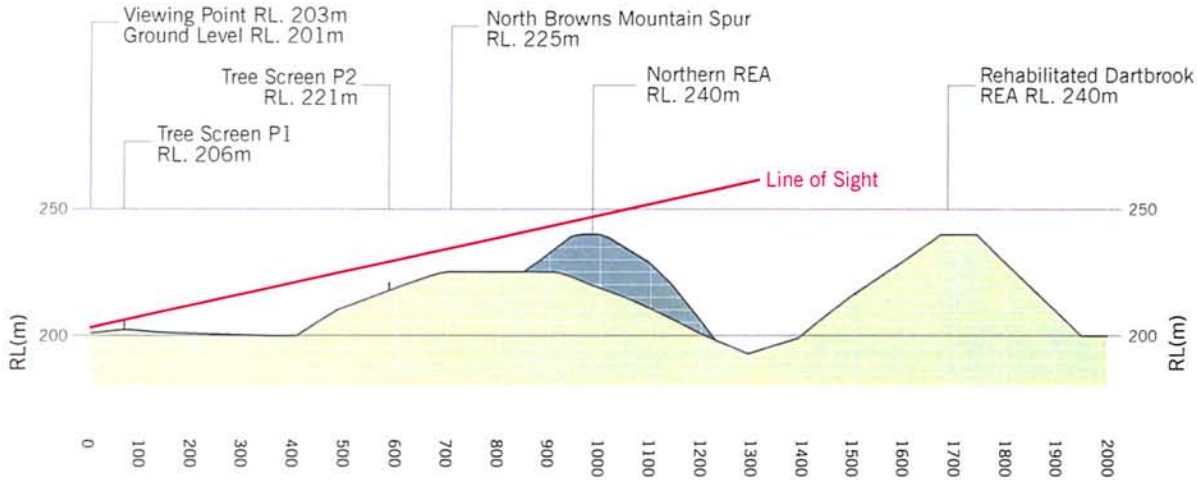
HANSEN CONSULTING DARTBROOK

TSG Drawing No.: KA028 - Southern Viewing Location.dwg | Date: 03.03.04 | Figure 15

View to Southern REA



View to Northern REA



Note: These Sections have 250% vertical exaggeration for presentation purposes and do not represent the actual vertical scale of the REA

HANSEN CONSULTING

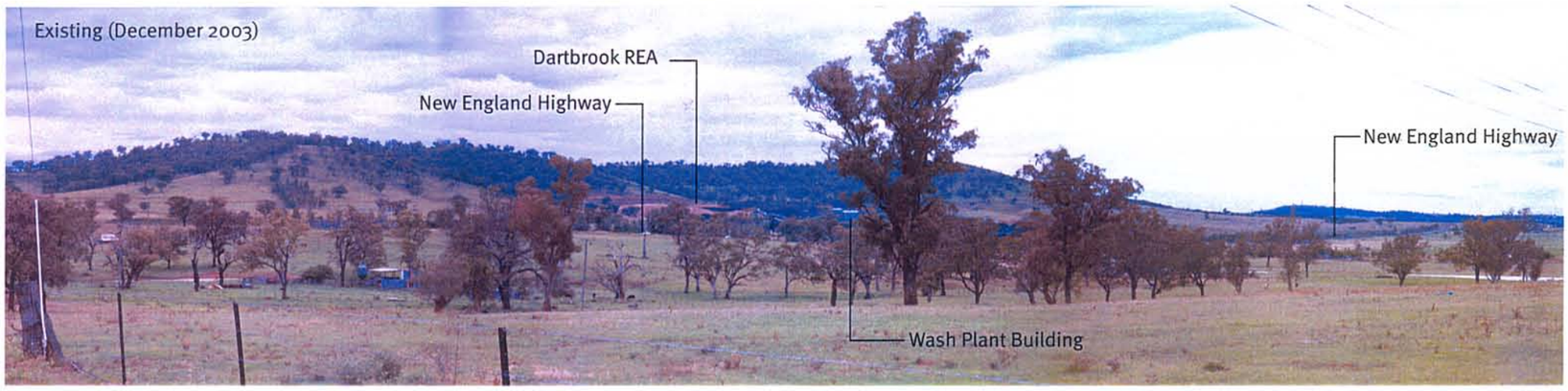
DARTBROOK

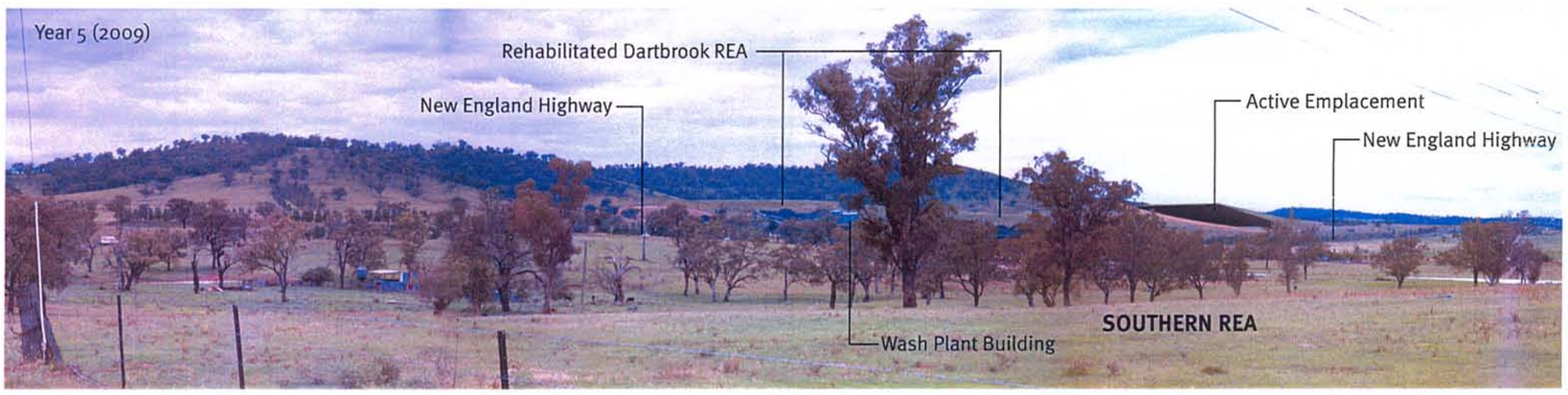
DARTBROOK MINE

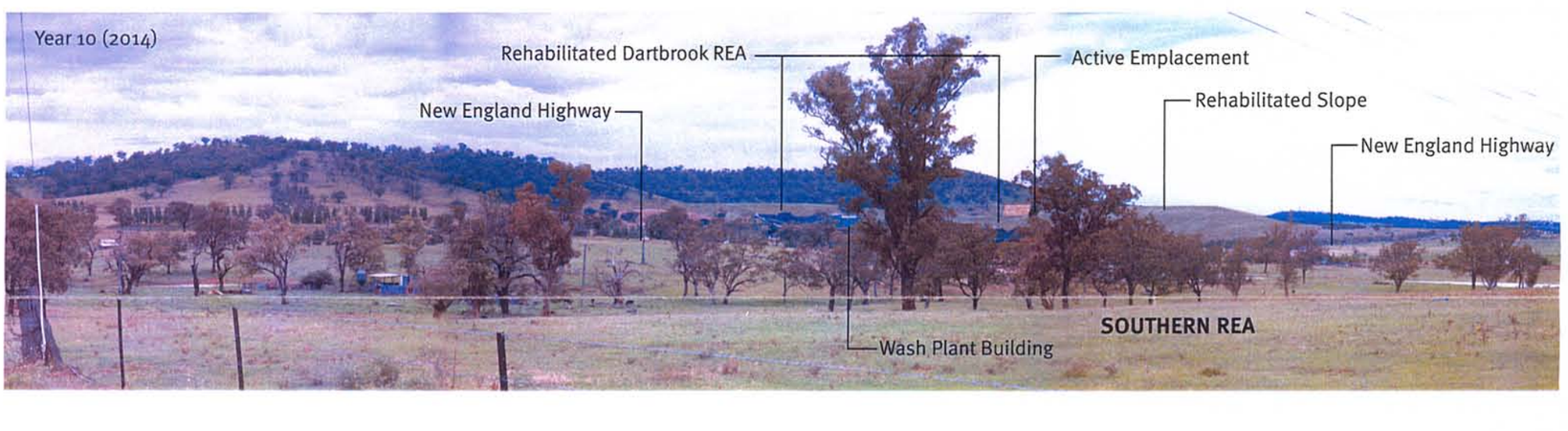
Southern Viewing Location
Line of Sight Section

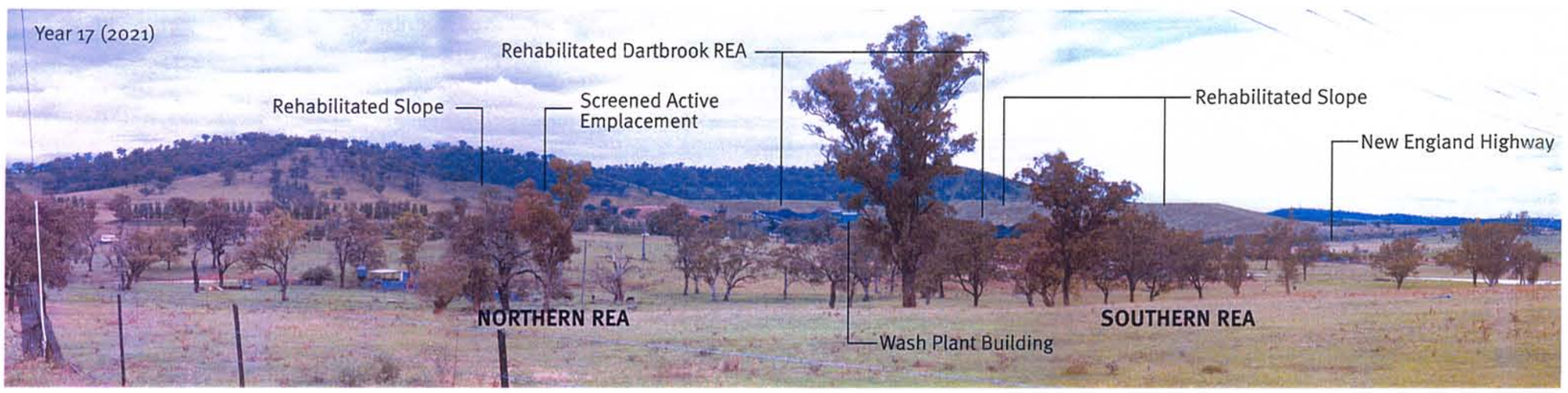
FIGURE 16

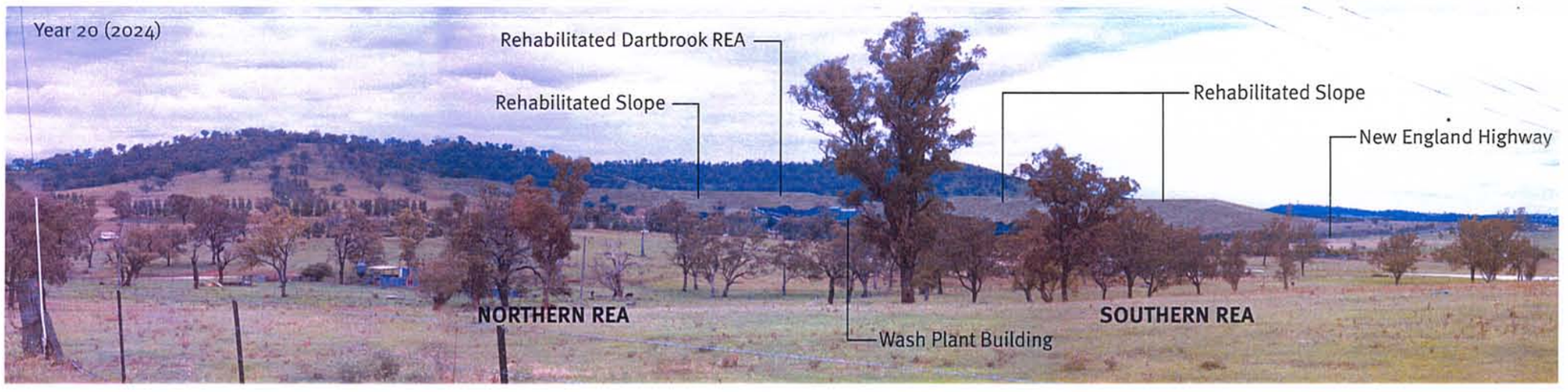
File Name: KA028 - Southern Viewing Location.cdr | Date: 03.03.04











ABERDEEN WEST

Photo Montages

Figure 17

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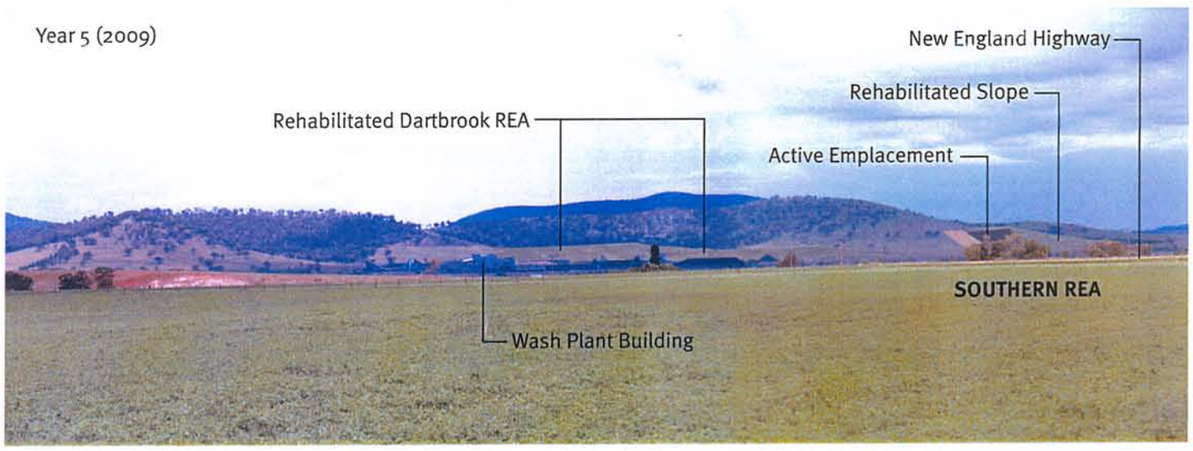
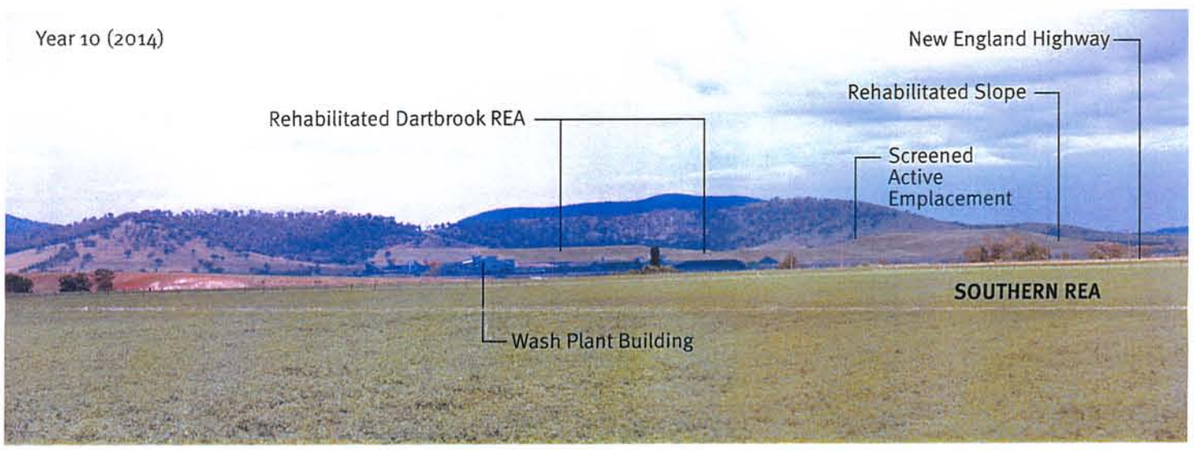
DARTBROOK

Existing (December 2003)

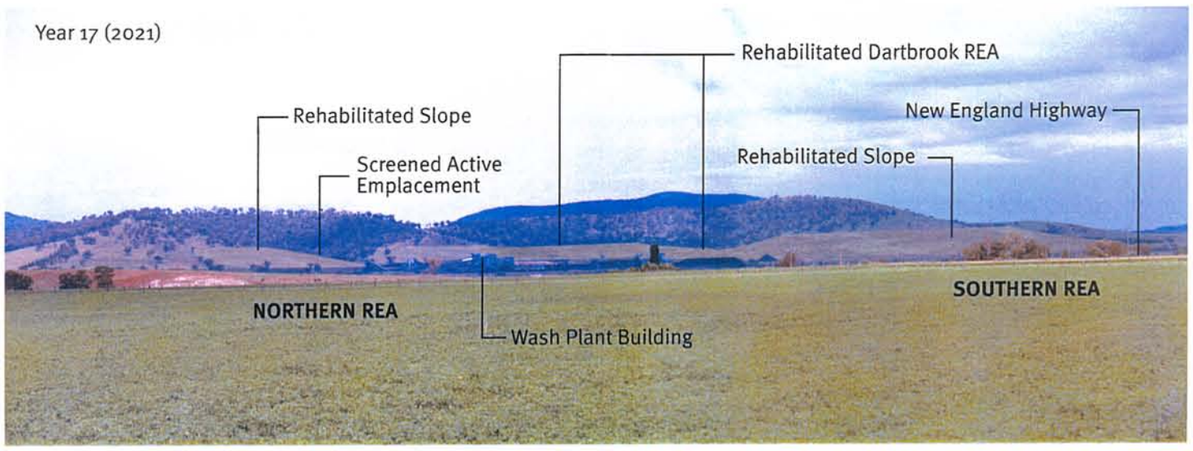
Year 5 (2009)



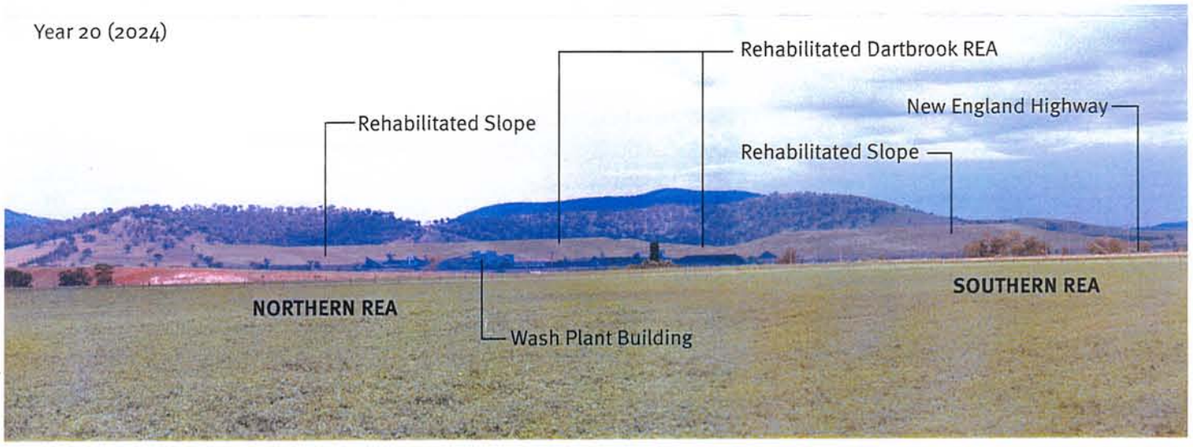
Year 10 (2014)



Year 17 (2021)



Year 20 (2024)



HANSEN CONSULTING

DARTBROOK

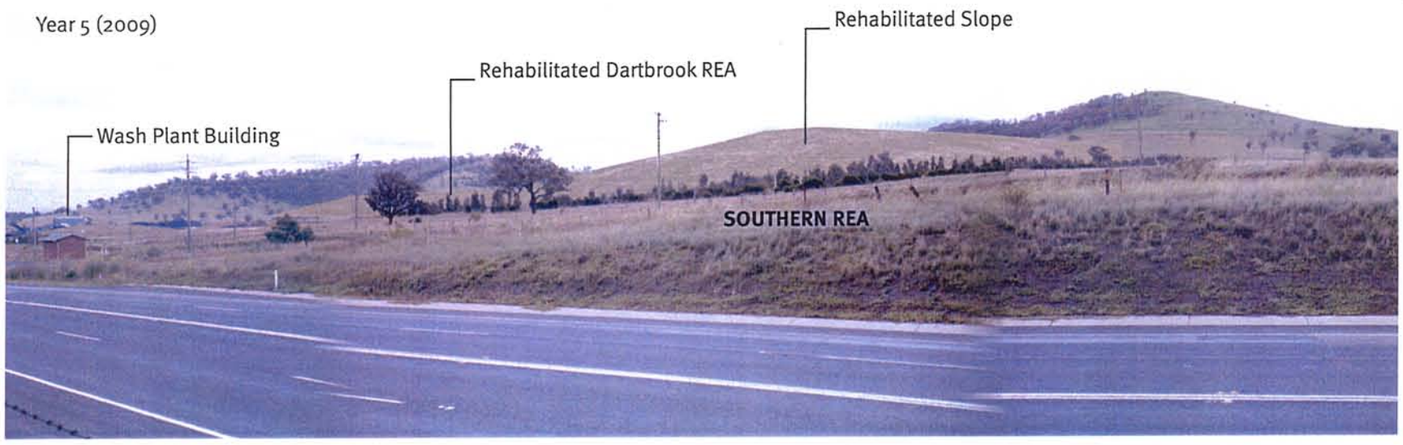
BLAIRMORE LANE

Photo Montages

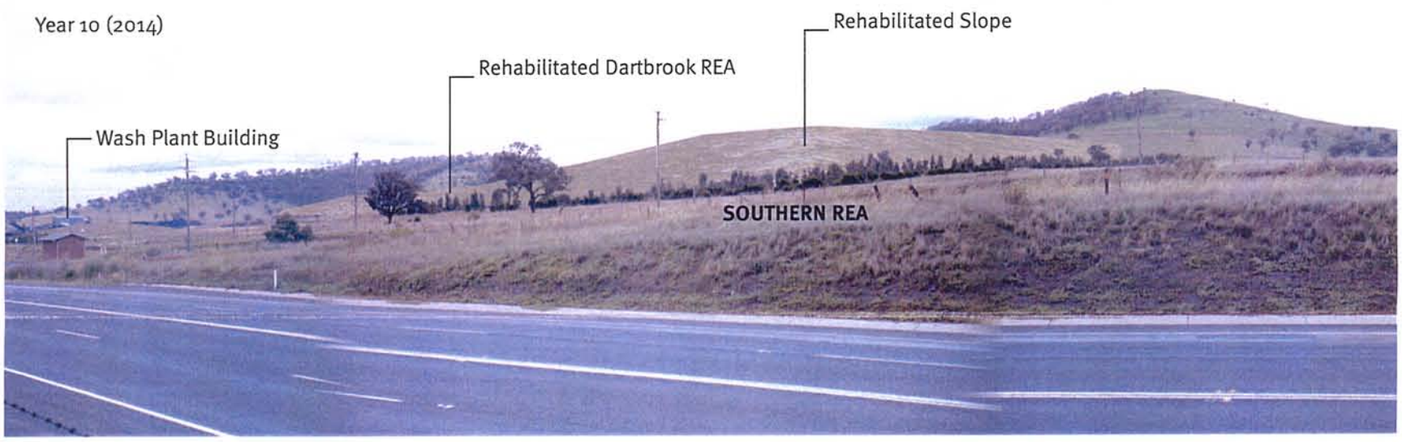
Figure 18

Existing (December 2003)

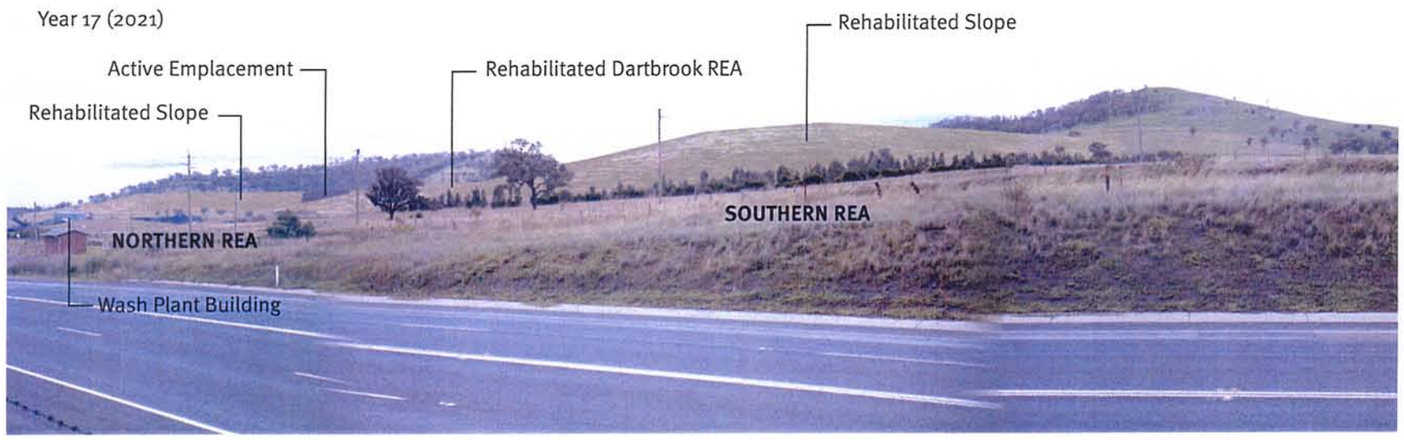
Year 5 (2009)



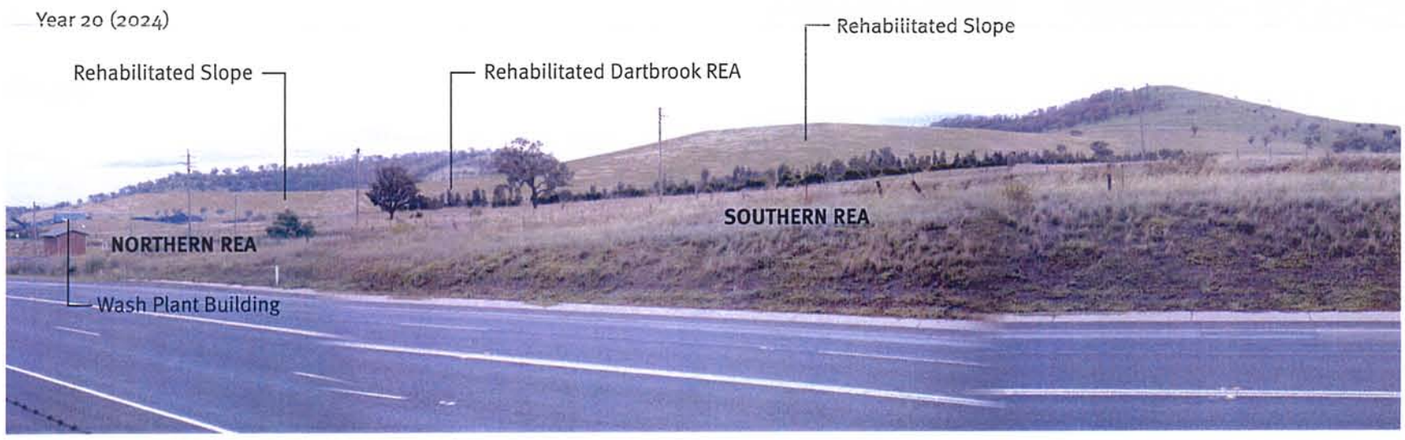
Year 10 (2014)



Year 17 (2021)



Year 20 (2024)



SOUTH WEST RESIDENCES

Photo Montages

Figure 19

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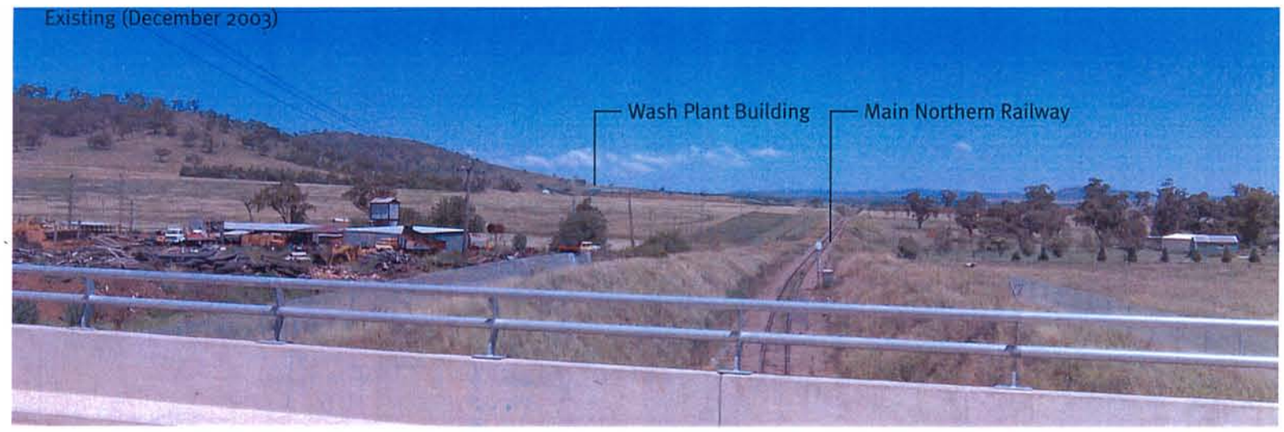
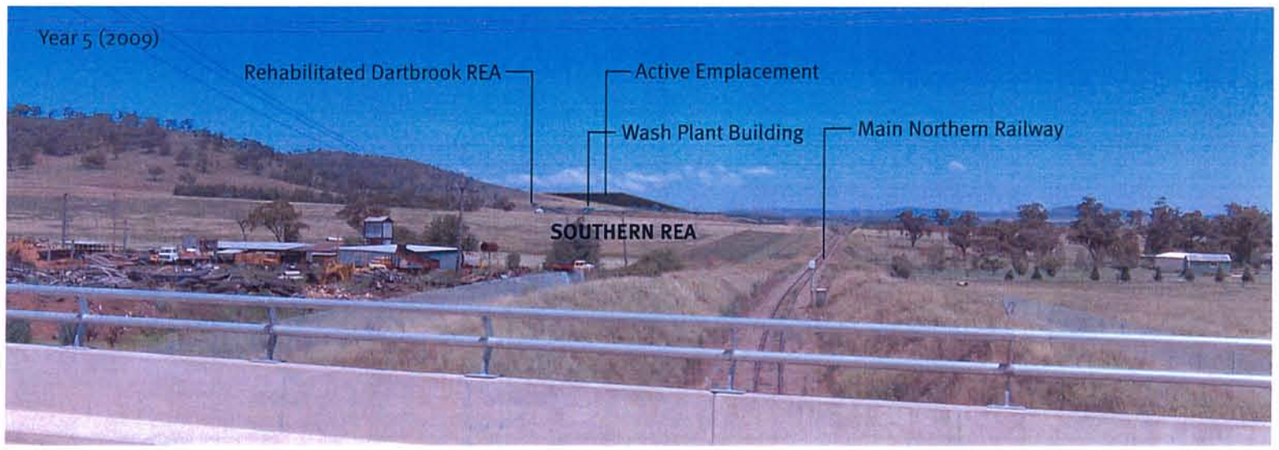
DARTBROOK

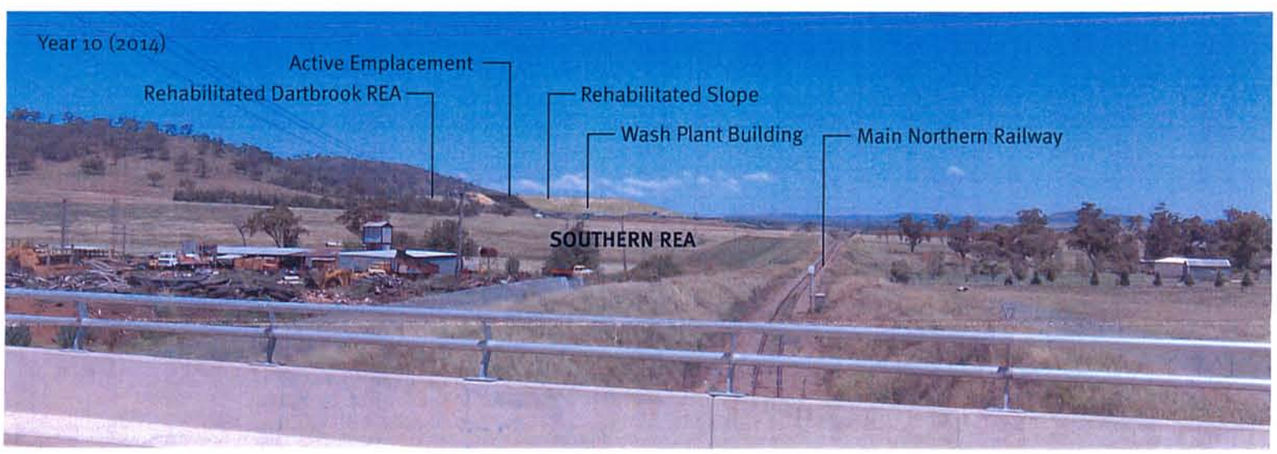
APPENDIX D

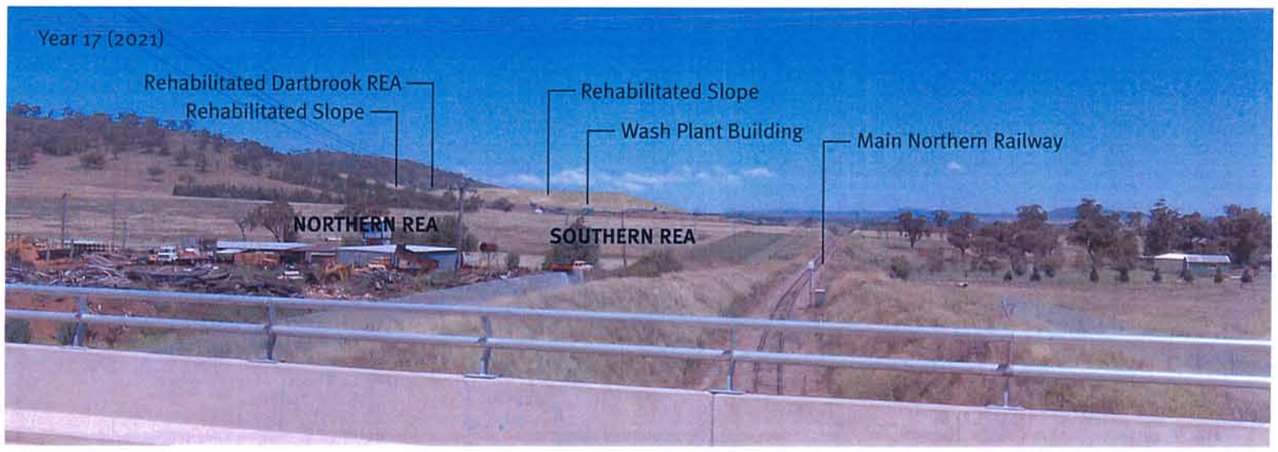
Additional Aberdeen Photo Montages

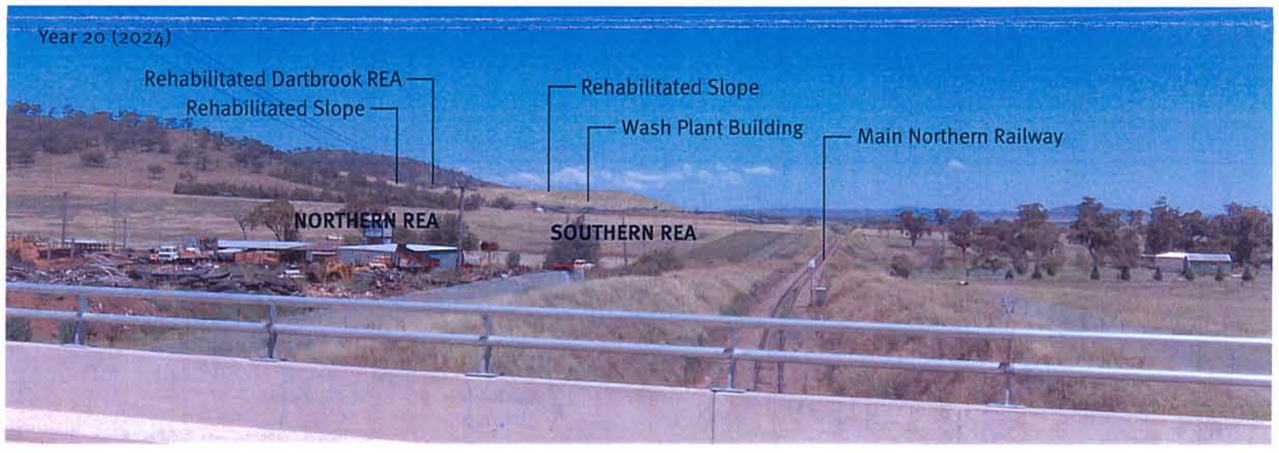

288 000mE
290 000mE
1 440 000mN
1 438 000mN
1 435 000mN
Blairmore Lane
ML386
Blairmore Lane
ABERDEEN
Water Tower
Aberdeen East
Aberdeen West
Aberdeen Bridge
Segenhoe St
Aberdeen East Residential Development Land
Northern REA
CHPP
Dartbrook Road
New England Highway
Current Dartbrook REA
Southern REA
Kayuga
Lawries Lane
Kayuga Road
South West Residences
ACDM Land
Viewing Sector
Photomontage Viewing Locations
Additional Photomontage Viewing Locations
DARTBROOK
HANSEN CONSULTING
SCALE 1:30,000
500 0 500 1000 1500m
DARTBROOK MINE
Additional Photomontage Locations
File Name: KA028 - Additional Photomontage Locations.cdr
Date : 04.03.04
FIGURE 1











ABERDEEN BRIDGE

Photo Montages

Figure 2

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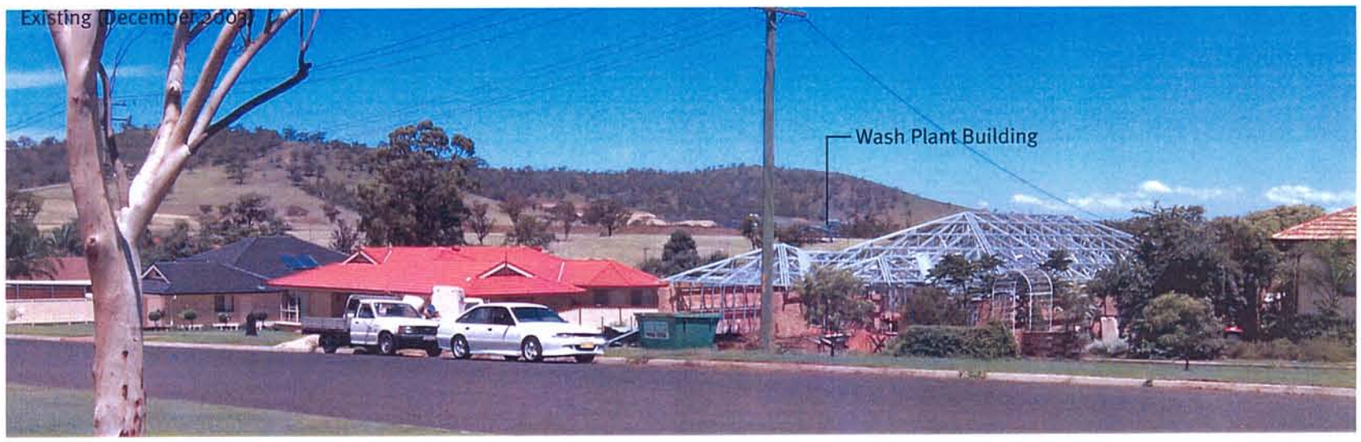
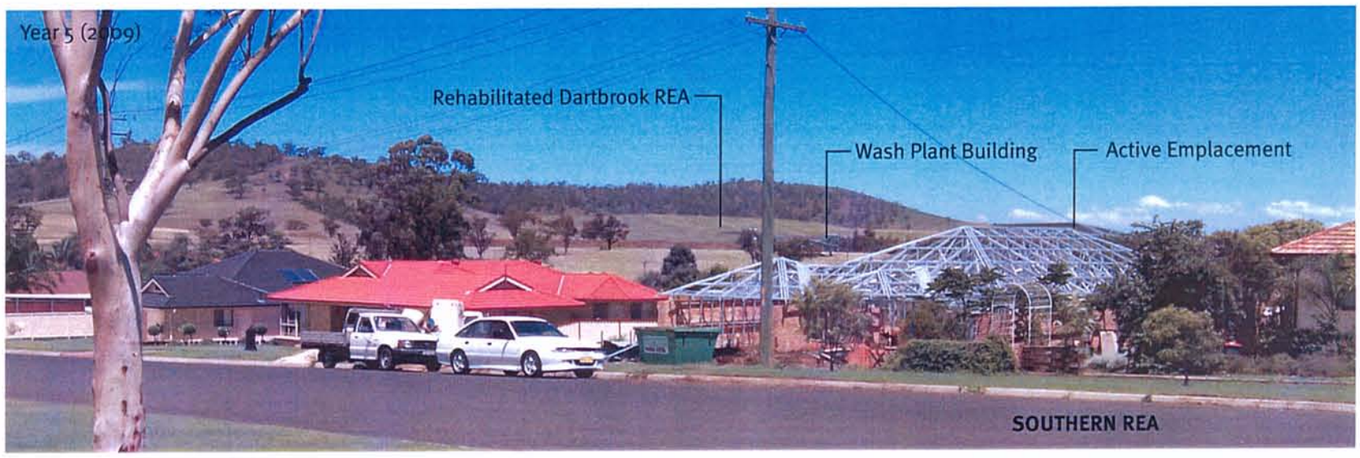
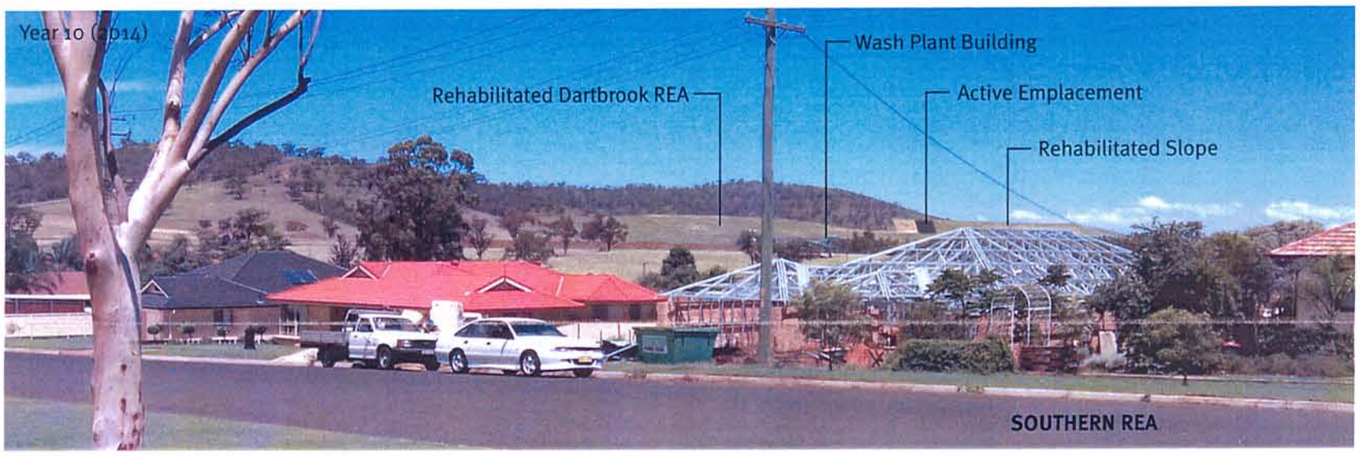
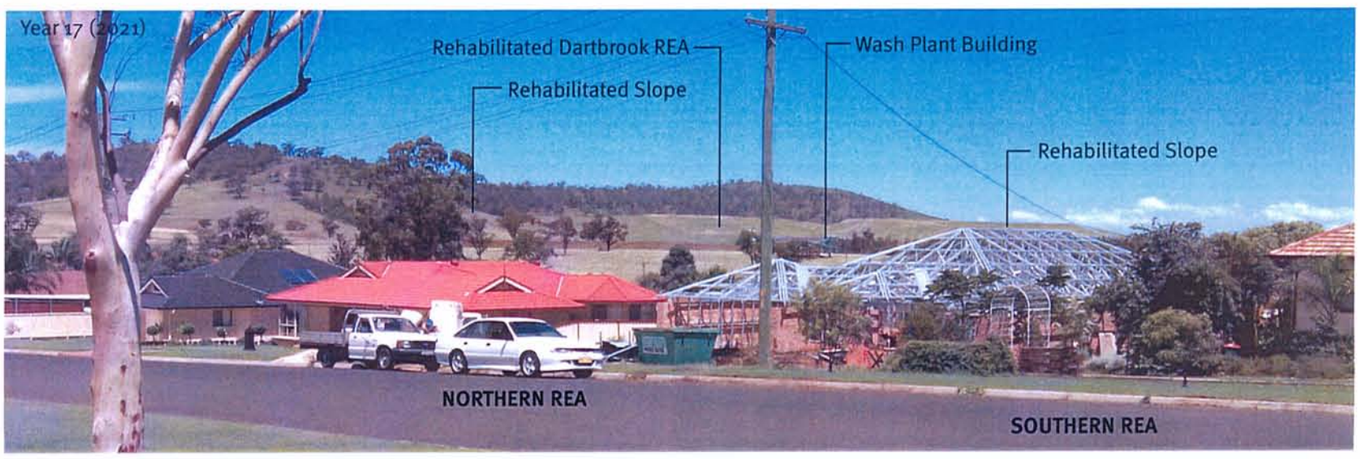
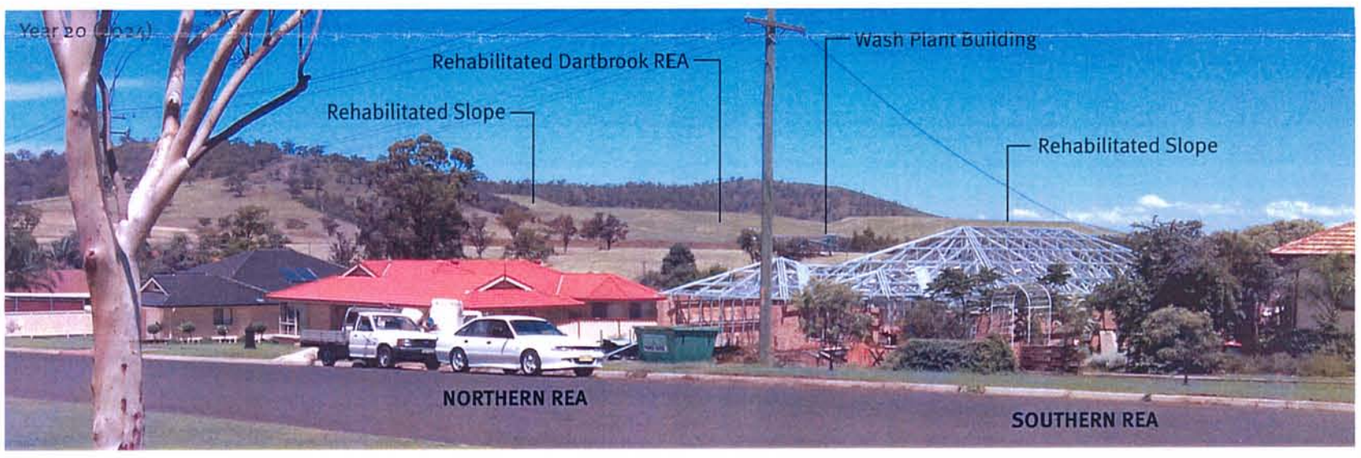
DARTBROOK











SEGENHOE St

Photo Montages

Figure 3

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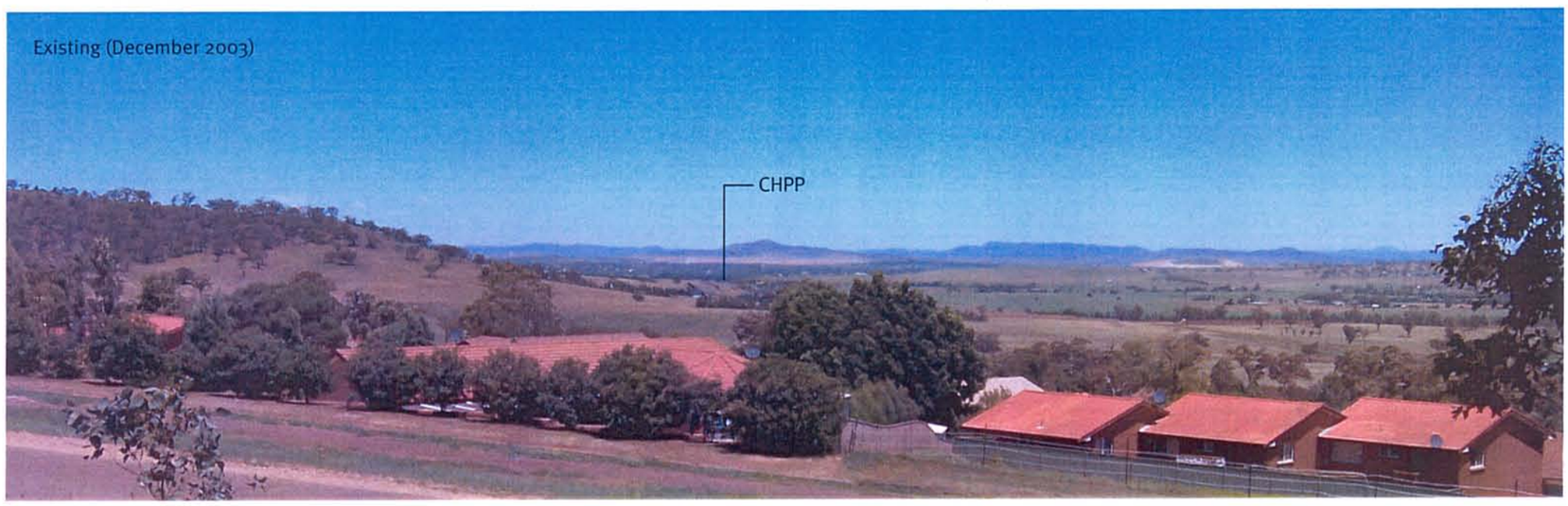

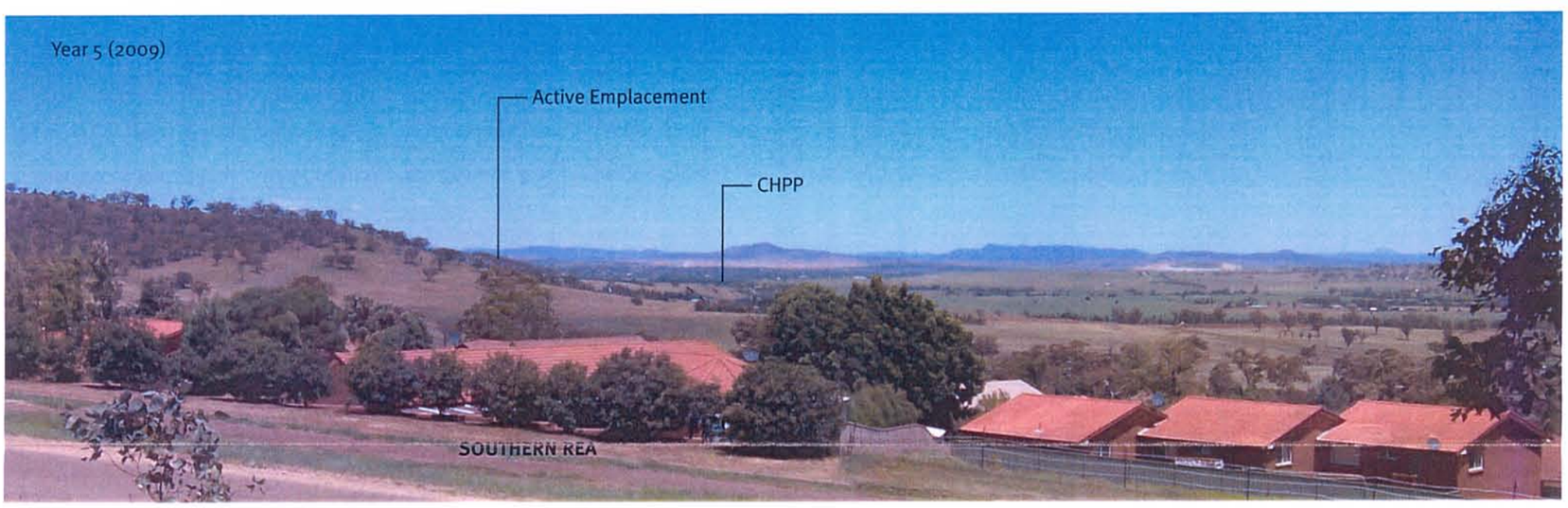

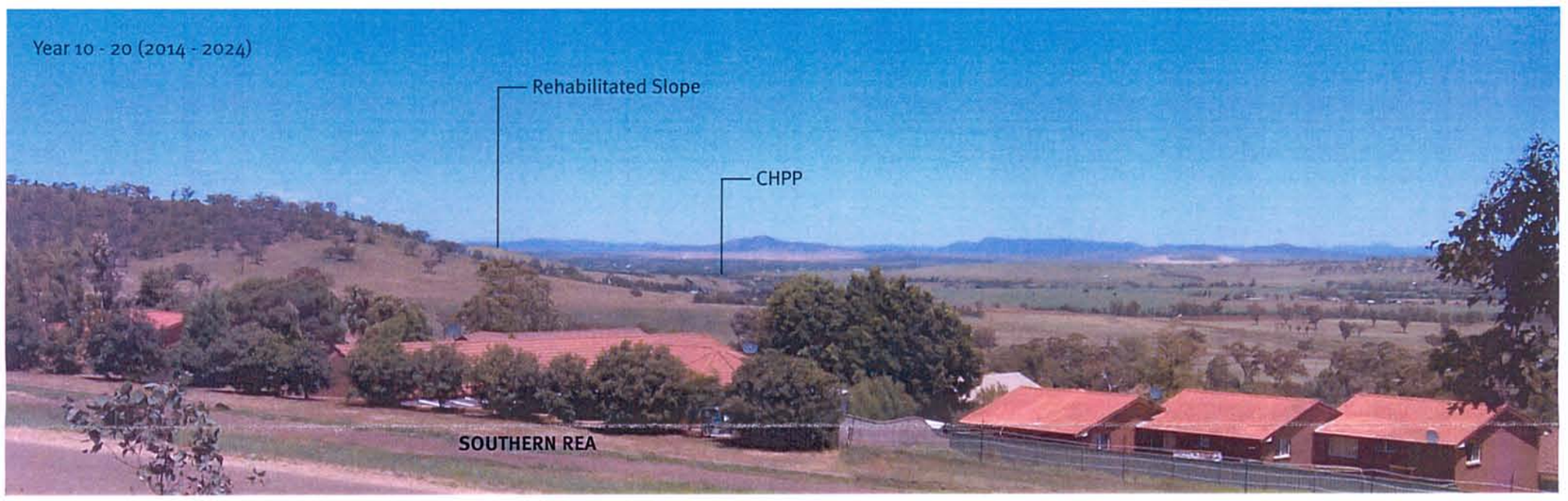

WATER TOWER

Photo Montages

Figure 4

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DARTBROOK