Whitehaven Coal Mining Pty Ltd

ABN: 65 086 426 253

Statement of Environmental Effects

For the Increase in Throughput
at the
Whitehaven Coal Handling and Preparation Plant
and
Rail Loading Facility, via Gunnedah

Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

April 2008

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CONTENTS

Page **Page**

CONTENTS

CONTENTS

CONTENTS

Page **Page**

CONTENTS

Page **Page**

FIGURES

PLATES

FOREWORD

This document is an amendment of the Statement of Environmental Effects first lodged with Gunnedah Shire Council in October 2007. As a result of the public exhibition and review of the document by various Government agencies, a range of minor amendments have been incorporated in the document in response to issues raised.

A document entitled "Response to Issues Raised arising from the Statement of Environmental Effects for the Increase in Throughout at the Whitehaven Coal Handling and Preparation Plant and Rail Loading Facility, via Gunnedah" was submitted to Gunnedah Shire Council in February 2008. The various responses in that document have been incorporated into this amended document to provide clarity for all stakeholders on the proposal and its planned environmental performance.

Section 1
Introduction

Preamble

This section introduces the proposal by Whitehaven Coal Mining Pty Ltd to increase the throughput of coal at both the Whitehaven Coal Handling and Preparation Plant and the rail loading facility near Gunnedah. The section provides information on:

- *the format of the document;*
- *the Applicant, Whitehaven Coal Mining Pty Ltd;*
- *the Project Site;*
- *background to the proposal;*
- *an overview of the existing approvals and operations on site; and*
- *the consultation conducted during the preparation of this document.*

The personnel involved in the design of the modified proposal and the preparation of the Statement of Environmental Effects (SoEE) and supporting documentation are also identified.

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1.1 SCOPE

This Statement of Environmental Effects (SoEE) has been prepared to accompany an application (see **Appendix 1**) to increase the throughput of both the Whitehaven Coal Handling and Preparation Plant (CHPP) and rail loading facility (collectively referred to as "the facility") 5km west of Gunnedah. **Figure 1.1** displays the location of the facility and the existing and proposed coal mines that already and would provide coal for washing at and/or despatch from the facility. **Figure 1.2** displays the local setting of the facility.

This document focuses upon the proposed changes to the facility and practices that would be introduced to achieve the increased throughput at the facility. The additional design and operational safeguards required are presented together with an assessment of the impacts of the modified operations and activities. The document does not cover matters relating to transportation of coal external to the facility as this is covered separately in documentation for each of the respective coal mines supplying coal to the facility.

The level of information presented in this document is intended to clearly outline to Gunnedah Shire Council, all relevant government agencies and the local community how the modified facility has been designed, how it would operate and what impacts are likely at the facility.

1.2 DOCUMENT FORMAT

This SoEE has been compiled in five sections and is supported by a set of appendices.

Section 1: introduces the Applicant and the Project Site and provides an overview of the existing facility, its operation and environmental performance, the need for the modification and the results of both government and community consultation.

Section 2: outlines the proposed changes on site and modified practices to enable the increased throughput at the facility to proceed.

Section 3: provides a description of the components of the existing environment that may be impacted upon by the modified proposal and identifies any constraints requiring further assessment (in Section 4).

Section 4: presents the design and operational safeguards to be adopted for the modified project components and the impacts of ongoing operations upon the surrounding environment. Where appropriate, monitoring is outlined.

Section 5: evaluates the modified proposal based upon the results of the assessments in Section 4 and in the context of ESD principles.

Appendices: present the written request to modify Development Consent 0079.2002 and a selection of background documentation relevant to the assessments of impact on noise and air quality.

1.3 THE APPLICANT

The Applicant, Whitehaven Coal Mining Pty Ltd, is the principal Company within the Whitehaven Group – a group formed to explore for and develop coal resources in the Gunnedah Basin. The Group's first Company, Whitehaven Coal Mining Pty Ltd, was established in 1999 and has been responsible for the development of the Whitehaven Coal Mine, Tarrawonga Coal Mine and the Whitehaven CHPP and Rail Loading Facility.

The Applicant is committed to the responsible expansion of coal mining the Gunnedah Basin and it is a primary objective of the Applicant to progressively develop new projects in the Gunnedah Basin to guarantee a long-term reliable supply of coal to domestic and export markets, to maintain and expand the customer base for Gunnedah coal and provide continuing employment for and support to the local community.

The existing and proposed coal projects conducted by the Applicant (see **Figure 1.1**), especially as they relate to the cumulative increase in local coal production are as follows.

Whitehaven Coal Mine

Commenced in February 2000, the Whitehaven Coal Mine has produced up to 1.25 million tonnes of coal annually for washing and loading at the Whitehaven CHPP. At current rates of production, it is anticipated production in 2008 will approximate 700 000t before the resource is exhausted and the mine is closed.

Tarrawonga Coal Mine

Approved and commenced in May 2005, the Tarrawonga Coal Mine provides up to 2 million tonnes for beneficiation (washing) and despatch at the Whitehaven CHPP and rail loading facility. With an estimated mine life of 7 to 10 years, the Applicant anticipates production of at least 1.5Mtpa until 2015.

Belmont Coal Project

An application for project approval is currently being determined by the Minister for Planning for the Belmont Coal Project. If approved, the proposed open cut coal mine would produce approximately 700 000t of coal in its first year of operation (2008) and up to 1.5Mtpa for a period of approximately 9 years (2009 to 2017).

Sunnyside Coal Project

An application for project approval is currently being considered by the Department of Planning. If approved, this open cut coal mine would produce up to 1.0Mtpa between 2008 and 2015.

Considering these four operational or planned coal projects, the Applicant anticipates increasing its cumulative coal production to approximately 4.5 million tonnes per year. Section 1.6 presents an overview of planned coal production, beneficiation requirements and rail loading / despatch.

1.4 THE PROJECT SITE

For the purposes of the application for additional throughput, the area of land that covers the operation of the Whitehaven CHPP and rail loading facility and all ancillary activities is referred to as the Project Site. The Project Site covers an area of approximately 72.3ha and incorporates the following parcels of land (see **Figure 1.3**).

- Lot 678, DP 705086;
- Lot 1, DP 239575;
- Lots 111, 120, 471, 472, 473, 474, 475 and 498, DP 755503;
- Lot 1, DP 810271;
- Lot 12, DP 542047
- Lot 3, DP 875874; and
- That component of the North-western Railway line adjacent to Lot 3, DP 875874 incorporating the rail load-out bin.

The entire Project Site lies within the Parish of Gunnedah, County of Pottinger and Shire of Gunnedah. Details of land ownership are presented in Section 3.3.1.2.

1.5 AN OVERVIEW OF THE EXISTING FACILITY

1.5.1 Introduction

This subsection provides a brief overview of the existing facility to enable readers to understand what operations and activities are currently approved and underway at the facility.

1.5.2 Facility History and Current Approvals

Coal-related activities on the Project Site commenced in late 1986 following the issue of various development consents to the Vickery Joint Venture for the Vickery Coal Mine and the transportation to and loading of coal at the facility on site referred to as the Vickery Coal Loader. Development Consent DA 23/86 issued on 18 October 1986 by the Minister for Planning included the construction and operation of a rail loading facility. DA 23/86 was issued with an expiry date of 14 June 2009. The rail loading facility currently has an approved throughput of 3.0Mtpa.

The rail loading facility was used by the Vickery Joint Venture throughout the life of the Vickery Coal Mine which ceased in May 1998. Following the closure of the Vickery Coal Mine, Whitehaven Coal Mining Pty Ltd acquired the site of the rail loading facility and its infrastructure to use and upgrade for its use in the processing and distribution of the Company's products from initially Whitehaven Coal Mine and subsequent mines developed in the Gunnedah area.

In June 2002, Whitehaven Coal Mining Pty Ltd lodged a development application with Gunnedah Shire Council for the construction and operation of a coal handling and preparation plant adjacent to the rail loading facility. On 2 October 2002, Gunnedah Shire Council, under delegation from the Minister for Planning, granted development consent (for a Development Application DA 0079.2002) for the construction and operation of the coal handling and associated facilities and the road transportation of coarse and fine rejects and coal. The Department of Planning has subsequently confirmed in writing (on 6 June 2005) that Development Consent 0079.2002 relates to both the Whitehaven CHPP and the rail loading facility given the 2002 DA effectively covered both activities. Development Consent 0079.2002 was granted for a period of 20 years expiring on 2 October 2022. *Condition 1.4* of the development consent for the beneficiation of coal at the Whitehaven CHPP nominates the maximum plant throughput to be 2.0Mtpa.

The facility also operates with an Environment Protection Licence (No. 3637) as a "coal works" with a nominated maximum throughput of 2.0Mtpa. This licence is renewed annually on 1 April subject to acceptable performance. The licence nominates relevant noise limits and requirements for monitoring air quality and overflow from the main storage dam.

1.5.3 Existing Layout and Operations

Figure 1.4 displays the existing layout of the Whitehaven CHPP and rail loading facility and **Plates 1.1** to **1.4** display a set of oblique aerial photographs of the overall facility and site components. The principal components of the existing facility shown on **Figure 1.4** are as follows.

North of the North-western Railway Line

- Site entrances from both the Kamilaroi Highway and Torrens Road and internal roads (sealed and unsealed).
- A coal preparation plant and associated coal and reject stockpiles. The plant currently has a continuous rated throughput of 400tph.
- A coal screening plant with a capacity of 200tph.
- A weighbridge for incoming trucks and truck wash for outgoing trucks.
- A reclaim tunnel, conveyor systems and rail load-out bin.

- Various buildings for offices, workshop, amenities and electrical equipment.
- Various fire / water tanks and six lighting towers.
- Various clean and dirty water rains, storage dams and settlement ponds.
- Perimeter tree screens and landscaping.

South of the North-western Railway Line

- Site entrance from Quia Road.
- A rail loop off the main through Northwestern Railway Line.
- Five fine rejects ponds and associated settlement ponds, recovery pond and freshwater dam.
- Perimeter tree screens and landscaping.

At present, the facility receives coal despatched from both the Whitehaven and Tarrawonga Coal Mines. Coal is delivered to the facility typically between 7:30am and 10:00pm. All coal is placed either in a ROM coal stockpile (for washing) or directly onto a product coal stockpile (for loading). Up to 150 000 tonnes of coal (washed / unwashed) can be stockpiled on site at any one time. **Table 1.1** lists the current approved hours of operations.

Table 1.1
Hours of Operations – CHPP and Rail Loading Facility

Activity	Monday to Saturday	Sunday
Coal Preparation Plant Operations and Stockpile Maintenance	24 hours	24 hours
Train Loading (export coal despatch)	24 hours	24 hours
Domestic coal screening and despatch	7:00am to 10:00 pm	-
Despatch of coarse and fine rejects	7:00am to 9:30pm	-
Fine rejects ponds refurbishment	7:00am to 6:00pm	8:00am to 6:00 pm
Delivery of ROM Coal	7:30am to 10:00pm	-

The periods when the various activities operate on site reflect the frequency and timing of product shipments off site. The CHPP currently operates either from 6:00am to about 11:00pm, five days per week or 24 hours per day, 7 days per week, as and when required. The continuous operations invariably occur during periods when the maximum number of trains are operating daily between Gunnedah and Port Newcastle.

The coal screening activities on site to produce coal for domestic sales are generally undertaken for a few hours per day every 3 or 4 days.

Rejects from coal washing are either directed to a coarse reject stockpile or fine rejects ponds. The coarse rejects are loaded by front-end loader into highway trucks and backloaded to either Whitehaven or Tarrawonga Coal Mines for incorporation into the final landform. The fine rejects are excavated from the ponds south of the North-western Railway Line and transported to the former Melville Open Cut to assist in the rehabilitation of that mine. At current production rates, the Melville Open Cut would accept fine rejects for a further 3 years after which the rejects would also be backloaded to either Tarrawonga and/or Belmont mines.

The coal destined to Port Newcastle is currently transported in 42 wagon trains at times dictated by Pacific National. At present, trains are despatched on average once or twice per day.

1.5.4 Environmental Performance

The environmental performance of the existing facility has been established through reference to monitoring data and a review of the site's complaints register.

Noise

The Applicant commissions an annual noise compliance report from an accredited independent acoustic consultant, principally to assess compliance against the site's Environment Protection Licence. *Condition L6.1* stipulates that "noise from the premises must not exceed:

(a) 42dB(A) $L_{Aeq(15\ minute)}$ during the day (7am to 6pm) on any day; and

(b) 35dB(A) $L_{Aeq(15\ minute)}$ during the evening (6pm to 10pm) Monday to Friday; and

(c) at all other times 35dB(A) $L_{Aeq\ (15\ minute)}$, except as expressly provided by this licence."

The results of the noise monitoring over the past 4 years established the following $L_{Aeq\ (15\ minute)}$ levels attributable to site activities.

2004[1]: Inaudible / not measurable to 38dB(A).

2005[1]: 33dB(A) to 41dB(A).

2006[2]: Inaudible / not measurable to 37dB(A).

2007[2]: Noise monitoring completed 18 October 2007, however, results not yet available.

Based upon the noise monitoring conducted, the Applicant has maintained operating noise levels within those nominated in EPL 3637.

[1] Noise monitoring and assessment conducted by Global Acoustics Pty Ltd

[2] Noise monitoring and assessment conducted by Spectrum Acoustics Pty Ltd

Air Quality

Deposited dust levels have been recorded at four monitoring locations around the Project Site since December 2002 with monitoring commenced from an additional two locations (WS5 and WS6) in October and November 2004 respectively. A review of the assembled data established the following.

- There have been occasional months when deposited dust levels exceeded the guideline level (4g/m^2/month), however, insufficient data is available to assess the source of the elevated dust levels.
- During 2003, average deposited dust levels were all below the guideline level at four sites monitored.
- During 2004 to 2006, average deposited dust levels were below the guideline level at five of the six sites monitored. Monthly and annual exceedances occurred at one location (WS-1) set back 30m from the siding access road and close to an adjoining paddock that was regularly slashed ie. almost 800m to the nearest non-project related residence. This monitoring site has been relocated and re-numbered as WS-1A (see Section 3.8.2.3).

Water Quality

Since commencement, there has been only a single discharge from the water storage dam of the Whitehaven Coal Handling and Preparation Plant. This occurred on 4 July 2005 and the following are the results of water quality analyses completed.

- pH – 7.8
- Electrical conductivity – 1 270µS/cm
- Total Suspended Solids – 7mg/L
- Oil and Grease – <2mg/L

The results suggest water in the storage dam is slightly brackish but otherwise of good quality.

Complaints

Since the Applicant commenced operations on the Project Site, any complaints received have actively been dealt with in an amicable manner and actions have been taken to alleviate any adverse impacts.

Rail Movements Through Gunnedah

As a result of discussions with Council, it is understood there have periodically been problems with trains carrying the Applicant's coal and other trains carrying coal and grain that have a potential to cause unacceptable delays as they travel through level crossings in the Gunnedah urban area. This issue has been addressed by Country RIC and is discussed further in Section 4.5.

Conclusion

Overall, the facility has operated in a manner that has achieved an acceptable level of environmental performance. The Applicant has been proactive to manage any environmental issues that have arisen on site.

1.6 THE NEED TO INCREASE THROUGHOUT

The Applicant has established additional markets for the high quality Gunnedah district coal products and accordingly is currently seeking project approval for two new open cut coal mines, namely Belmont and Sunnyside Coal Mines (see **Figure 1.1**). The Applicant already has approval to produce up to 2.0Mtpa of coal from the Tarrawonga Mine. The combined increased coal production from all mines needs to be matched with an increased capacity to beneficiate (wash) a proportion of the coal mined and despatch the bulk of the products to Port Newcastle.

It is proposed that by late 2008 the Belmont Coal Mine will replace, and expand upon, the coal currently produced at the Whitehaven Coal Mine. Coal production at Belmont is currently programmed for a period of up to 9 years, ie. until about 2017.

The proposed Sunnyside Coal Mine is also scheduled to be producing coal in the second half of 2008. The coal from this mine is of high quality and does not require beneficiation or washing. Production at the Sunnyside Coal Mine is programmed for up to 7 years concluding in about 2015.

As discussed in Section 1.5, the existing Whitehaven CHPP has development consent to process (wash) a maximum of 2.0Mtpa of coal from Gunnedah district mines. The Applicant is also able to receive, store and despatch coal that doesn't require washing with both the washed and unwashed coal despatched principally by rail via the on-site rail loading facility. The current approved throughput of the rail loading facility is 3.0Mtpa.

Table 1.2 displays the planned coal production levels at each of the mines intended to supply coal to the facility. Distinction is made in **Table 1.2** to coal that requires beneficiation (washing) and "by-pass" coal that does not require beneficiation (washing). It is noted that whilst the planned quantity of coal to be washed from these three mines is only 2.2Mtpa, the Applicant recognises additional capacity (up to 3.0Mtpa) is required in the event it is necessary to beneficiate (wash) additional coal to meet future quality specifications for coal produced at any of the three mines or any other mine approved to deliver coal to the facility.

Table 1.2
Inventory of ROM Coal, Products and Rejects - Mtpa

Mine	ROM Coal to CHPP/RLF@	ROM Coal Washed at CHPP	Saleable Coal After Washing	ROM Coal to RLF@	Total Coal Production	Rejects Produced
Tarrawonga	2.00	0.70	0.65	1.30	1.95	0.050
Belmont	1.50	1.50	1.125	-	1.125	0.375
Sunnyside	1.00	-	-	1.00	1.00	-
Total	**4.50**	**2.20***	**1.775**	**2.30**	**4.075**	**0.425#**

* Subject to future contracts, changes in coal quality or product specifications. # 92% Coarse / 8% Fine
@ Rail Loading Facility

Based upon the entries in **Table 1.2**, the Proponent needs to obtain approval to undertake the following.

(i) To increase the quantity of coal received at the facility from 3.0Mtpa to 4.5Mtpa.

(ii) To accept deliveries of coal from the Belmont Coal Mine between the hours of 10:00pm and 7:00am (if approved from the mine).

(iii) To increase the quantity of coal beneficiated (washed) at the CHPP from 2.0Mtpa to 3.0Mtpa.

(iv) To increase the quantity of coal despatched from 3.0Mtpa to 4.1Mtpa.

(v) To increase the area of fine reject ponds to store additional fines generated by washing the additional quantity of ROM coal.

The increased throughput at the facility is required not only to manage the coal from the three mines referred to above but from future mines that the Applicant intends to develop throughout the Gunnedah area to maintain a sustained production level to meet its customers long term requirements, ie. until at least 2 October 2022, the current expiry date for Development Consent 0079.2002.

1.7 CONSULTATION

1.7.1 Government Consultation

During the early stages of document preparation, discussions were held with and follow-up correspondence sought from Gunnedah Shire Council, Department of Environment and Climate Change and the Department of Planning. **Table 1.3** lists the issues raised by the Gunnedah Shire Council and Department of Environment and Climate Change and identifies the section(s) of this document in which these issues are addressed. It is noted that correspondence from the Department of Planning confirmed that the Department supports that the proposal is determined by Gunnedah Shire Council as a modification to Development Consent 0079.2002 under Section 96(2) of the *Environmental Planning and Assessment Act 1979*.

Table 1.3
Coverage of Issues Raised by Government Agencies

Issue	Covered in Section
Gunnedah Shire Council	
• Sources / timeframes for coal deliveries to facility.	1.3, 1.6
• Additional truck movements.	2.8.2, 4.5
• Extent and environmental impact of additional coal stockpiling.	2.2, 4.3, 4.4
• Changes in train numbers and noise impacts.	2.8.3.2
• Noise levels arising from the additional throughput.	4.3
• Cumulative impacts of existing / proposed rail movements on the North-western Railway Line on the Gunnedah urban centre.	4.5
• Measures to mitigate environmental impacts.	Section 4
Department of Environment and Climate Change	
• Noise impacts.	4.3
• Air impacts.	4.4
• Surface and groundwater impacts.	4.2
• Proposed water management strategies.	4.2
• Actions to avoid / mitigate environmental impacts.	Section 4

1.7.2 Community Consultation

The Applicant's Community Liaison Officer consulted with a total of 18 surrounding landowners during October 2007 to firstly inform them about the Company's proposal and secondly to discuss any issues that they wished to see addressed in the Statement of Environmental Effects accompanying the modification request to Council.

The bulk of the surrounding residents that have co-existed with the facility for all or a substantial part of the period since the CHPP has been operational expressed they have not experienced any detrimental effects during the operation of the facility. Some residents have contacted the Company in the past to complain principally about noise and to a lesser extent about dust-related and tracking of mud onto Kamilaroi Highway during wet conditions. On each occasion, the Applicant was able to identify the cause(s) of the issue and quickly rectify the problem.

The industrial enterprises around the Project Site, which also are able to operate 24 hours per day indicated they had no difficulties with the Applicant's proposal.

As a result of the community consultation program, the following issues were raised for consideration in this document.

1. Noise, particularly from the bulldozer operating at night on top of the stockpile in Coal Stockpiling Area A (see Section 4.5.2).
2. General dust issues (see Section 4.4).
3. Potential for tree planting on the boundaries of some surrounding properties to limit visual impacts of the activities on the Project Site (see Section 4.6.2).
4. Tracking of mud onto Kamilaroi Highway (see Section 4.5.2.1).

1.8 ONGOING DOCUMENTATION AND MANAGEMENT

1.8.1 Ongoing Documentation

The Applicant currently operates the facility in accordance with a site-specific environmental management system comprising the following documentation.

- An environmental policy.
- Environmental procedures for:
  - Noise Monitoring;
  - Air Quality Monitoring;
  - Surface Water Discharge Monitoring;
  - Fine Rejects Ponds – Daily Inspection; and
  - General Site Inspections for Environmental Issues.
- An environmental monitoring program.
- A complaints management system.

The Applicant intends to continue managing the on-site environmental issues with these documents. In addition, the Applicant intends to provide a brief annual report to Gunnedah Shire Council recording quantities of coal delivered to site, washed and despatched by rail and road, environmental improvements and the results of environmental monitoring.

1.8.2 Environmental Management

Ongoing environmental management at the CHPP and rail loading facility with respect to the conditions of Development Consent DA 0079.2002 and the EMS would be the ultimate responsibility of the Applicant's Managing Director. The Applicant's General Manager and CHPP Manager would be responsible for day-to-day on-site supervision including the integrated implementation of all environmental safeguards and procedures identified in all project-related documentation and the EMS. On-site monitoring would be coordinated by the Applicant's Environmental Officer.

1.9 MANAGEMENT OF INVESTIGATIONS

The investigations and report writing for this document have been coordinated by Mr Robert Corkery, M.Appl.Sc., B.Appl.Sc (Hons), Principal of R.W. Corkery & Co Pty. Limited. Mr Alex Irwin, B.Sc. (Hons), Environmental Scientist of R.W. Corkery & Co. Pty. Limited, also assisted with the preparation of this document. Assistance with the preparation of this document has also been provided by:

- Mr Chris Burgess – General Manager – New Projects – Whitehaven Coal Mining Pty Ltd;
- Mr Danny Young – Environment Manager – Whitehaven Coal Mining Pty Ltd; and
- Mr Ken Thompson – CHPP Manager, Whitehaven Coal Mining Pty Ltd.

The assessment of impacts and identification of necessary design and operational safeguards for air quality and noise have been undertaken by Heggies Pty Ltd and Spectrum Acoustics Pty Ltd respectively.

Section 2
Description of the Modified Proposal

Preamble

This section describes the proposed modification to the existing operation of the Whitehaven Coal Handling and Preparation Plant and Rail Loading Facility. Emphasis is placed principally upon those components and activities that would change to achieve the increased throughput at the facility.

Apart from describing the various components and activities that would need to be modified, this section reviews the approvals required and the proposed rehabilitation required for the entire Project Site at the end of the project life.

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2.1 OUTLINE OF THE PROPOSED MODIFICATION

2.1.1 Objectives

The principal objective of the Applicant's modified proposal is to increase the throughput at the Whitehaven Coal Handling Preparation Plant (CHPP) and rail loading facility consistent with the forecast production from its Gunnedah district mines and projected coal sales. Further, the Applicant intends to achieve the increased throughput in a safe and efficient manner that causes negligible impacts to its neighbours or the residents of Gunnedah.

2.1.2 Overview of the Proposed Modification

The proposed modification would involve the following additional or varied operations or activities.

- Minor modifications to the coal preparation plant to increase its throughput from its current level of 400tph to 550tph.
- An increase in usage of the CHPP from its current level of 57% to 86% of available time.
- Deliveries of coal from Belmont Coal Mine of up to 8 trucks per hour between 10:00pm and 7:00am (subject to approval of coal despatch from the mine during this period).
- Construction of a retaining wall (to contain an existing coal stockpiling area) and related conveyors and infrastructure.
- Construction and operation of two additional fine reject ponds and two additional settling ponds.
- Increased use of utilities and increased employment.
- Ancillary activities associated with the above.

Figure 2.1 (Amended) displays the proposed layout identifying the location of both the existing and proposed facilities.

2.1.3 Approvals Required

In order to increase the throughput at the Whitehaven CHPP and rail loading facility Development Consent 0079.2002 requires modification.

It is proposed that Development Consent 0079.2002 would be modified through the amendment of the following conditions.

Condition 1.1: Reference to this document would be sought in this condition.

Condition 1.4: Limit on processing and coal despatch by rail. The maximum throughout of the CHPP is to be 3 million tonnes per year and 4.1 million tonnes per year for the rail loading facility.

Condition 2.7(b): Modified hours of operation to allow deliveries of coal from the Belmont Coal Mine between 10:00pm and 7:00am (if approved), ie. in line with the proposed hours of operation of coal transportation from the mine.

(It is noted that provision for this modification is already included in Condition 2.7(d).

In addition to the modification of Development Consent 0079.2002, the Applicant would need to seek a modification of Environment Protection Licence (EPL) 3637 to increase the scale of activity permissible by the licence. Minor modifications to be locations and numbering of various monitoring sites would also be included in the application to modify EPL 3637.

2.2 MODIFIED SITE LAYOUT

Figure 2.1 (Amended) displays the proposed modified site layout highlighting the proposed additional components. All modifications of which are proposed north of the North-western Railway Line.

The principal modifications to the site layout are as follows.

1. Modifications to Coal Stockpiling Area B covering 6 000m^2 would be undertaken on the western side of a 6m high retaining wall (**Figure 2.1 (Amended**). This area is required for the stockpiling of coal primarily from the proposed Sunnyside Coal Mine and the Tarrawonga bypass coal although coal from other mines may be stored and / or blended with other coals within this stockpiling area.
2. Two new additional conveyors, each approximately 1.2m wide and capable of conveying 2350 tonnes of coal per hour. These conveyors would be used to transfer coal to the Coal Stockpiling Area B and from that stockpiling area to the rail loading bin.
3. Two new ponds would be constructed east of the CHPP to provide additional storage capacity for the additional fine rejects generated by the additional throughput in the CHPP. These ponds would be supplemented by two settlement ponds to collect seepage from the fine rejects ponds.

2.3 COAL RECEIVAL

Coal from the Applicant's mines would be delivered to:

- the ROM coal stockpiling area; or
- Coal Stockpiling Area.

No substantial change is proposed to the coal receival arrangements.

2.4 PROCESSING PLANT AND PROJECT STOCKPILES

The coal washery component of the CHPP currently has a rated continuous throughput of 400tph. The Applicant proposes to modify the plant to achieve a constant throughput of 550tph through the introduction of:

- a stand-alone reject screen and circuit;
- an additional centrifuge for coal dewatering; and
- a full re-establishment of the coarse coal circuit.

These minor adjustments would all occur within the existing plant building with minimal changes to the external componentry or appearance.

The existing screening plant located immediately north of Coal Stockpiling Area A would be retained for screening the small quantity of coal required by domestic customers. No changes are proposed to be configuration or throughput of this plant.

2.5 RAIL LOADING FACILITY

No changes are proposed to the configuration of the rail loading facility. The facility would, however, be used more frequently to load up to 4.1 million tonnes of coal into coal wagons destined for Port Newcastle. The facility would continue to load coal wagons at a rate of approximately 3 000tph. The operation of this facility is further discussed in Section 4.5. The Applicant expects to continue to load 42 wagon trains (3100 tonnes capacity) until about February 2008 after which all coal destined for Port Newcastle would be despatched in 72 wagon coal trains. Each 72 wagon coal train would carry approximately 5 400 tonnes and would take approximately 1.75 hours to load.

2.6 REJECT MANAGEMENT

2.6.1 Coarse Reject

Coarse reject would continue to be discharged from the CHPP into the dedicated stockpiling area immediately to the northeast of the CHPP. This stockpiling area has a capacity of approximately 20 000 tonnes. Following the cessation of the reject backloading program to Whitehaven Coal Mine, the coarse reject would be loaded into trucks returning to Tarrawonga Coal Mine and / or Belmont Coal Mine.

2.6.2 Fine Reject Management

2.6.2.1 Fine Reject

The existing fine reject management system is operating to capacity and would need to be upgraded to manage the additional fines generated by washing up to an additional 1 million tonnes of coal annually.

The Applicant proposes to construct two additional ponds to cater for the additional fine rejects produced. The locations of these fine reject ponds, referred to as Ponds RP-7 and RP-8 are shown on **Figure 2.1 (Amended)**. **Figure 2.2** displays a set of typical sections through the proposed new ponds.

2.6.2.2 Fine Reject Pond Construction

Construction of the two additional fine reject ponds would involve the following activities.

(i) Vegetation and soil removal.

Up to four trees (two White Cedar / two Pepperina) would be removed within the foot-print of Ponds RP-7 and RP-8. After tree removal, up to 25cm of topsoil would be removed from the entire pond footprint. Approximately 45cm of subsoil would be removed from sections of the proposed perimeter drains and from the pond floor to achieve a 1% final slope to facilitate suitable drainage. Both the topsoil and subsoil would be used to form a perimeter bund around the entire footprint. A total of 9 800m^3 of topsoil and approximately 17 700m^3 of subsoil would be removed during the construction of the ponds and perimeter drains. Surplus topsoil would be stockpiled in an area adjacent to other topsoil stockpiles northwest of Settling Ponds SP-6 and SP-7 (**Figure 2.1 (Amended)**).

(ii) Shaping/grading of the pond floor.

The floor of each pond would be graded to achieve a minimum gradient of 2 per cent to the north. The floor of each pond would be compacted to achieve a permeability of 1 x 10^{-9}m/s for a depth of at least 0.9m.

(iii) Construction of the pond walls using coarse reject.

The pond walls would be approximately 3m in height, have a toe width of approximately 11m and batter slopes of 1:1.5 (V:H). The 1m to 2m wide crest of the walls would provide access for discharge pipe placement and relocation.

The walls would be constructed in a manner which minimizes the compaction of the reject walls, eg. using a front-end loader from the pond floor or natural surface, thereby maximizing their permeability. All reject pond walls would be constructed under the supervision of a certified civil engineer.

(iv) Construction of a drainage blanket on the pond floor.

Up to 0.5m of coarse reject would be placed on the graded pond floor to create a thick drainage blanket. Coarse reject for the construction of the pond walls and drainage blanket would be sourced directly from the CHPP.

(v) Excavation of settlement ponds.

Two settlement ponds would be excavated to a depth of approximately 2m providing a storage capacity in each pond of 2 000m^3. The floor and side walls of each pond would be compacted to achieve a permeability of 1 x 10^{-9}m/s for a thickness of at least 0.9m.

(vi) Installation of peripheral V-drains.

A set of peripheral V-drains would be installed to collect water filtering through the walls of each pond and direct it to the settlement ponds. The drains would be approximately 5 m wide to allow maintenance by a grader, with the drain invert below the level of the adjacent reject pond floor. A maintenance access way would be positioned between the peripheral drain and the toe of the external pond walls.

Ponds RP-7 and RP-8 would each have a storage capacity of approximately 22 000m^3, that is, sufficient capacity for approximately 3 months each for fine reject production from the CHPP.

The above construction activities would be undertaken with the equipment listed in **Table 2.1**. The primary function and the nature and duration of their use is also listed. Not all equipment would operate concurrently. Overall, it is envisaged both ponds would be constructed within a period of approximately 4 weeks.

Table 2.1
Mobile Equipment During Construction Phase

Item	No.	Function	Duration
Bulldozer (Cat D6)	1	Soil stripping / bulk earthworks	1 week
Scraper (Cat 627)	1	Bulk earthworks	1 week
Excavator (30t)	1	Settlement pond excavation	1 week
Front-end Loader (Cat 988)	1	Pond wall construction	2 weeks
Grader (Cat 14G)	1	Floor shaping / perimeter drain construction.	1 week
Semi-tipper	2	Coarse reject delivery	2 weeks

Source: Whitehaven Coal Mining Pty Ltd

2.6.2.3 Pond Operations

The thickened fine reject from the CHPP (a 30 per cent solids slurry) would be pumped to the active fine reject pond via a 150mm diameter pipe which would discharge on the southern section of the pond and would enable the slurry material to disperse in shallow layers across the pond, ie. to within 0.6m of the top of the pond wall crest. Water contained within the fine reject would also move laterally through the pond walls and through the drainage blanket. Discharge of the fine reject in this manner would maintain a free draining surface to the north and minimize the potential for water infiltration into the previously deposited and partially consolidated materials.

Water draining through the walls of the ponds and/or via the under-drainage blanket would be collected in the peripheral drains and directed to either of the two settlement ponds (SP-6 and SP-7 – **Figure 2.2**) where the majority of any contained sediment would settle. Water would be pumped from the settlement ponds to the dirty water drain flowing to the Main Storage Dam.

Based upon on-site experience, the presence of fines within the water draining from the reject pond walls would be a short duration occurrence following construction and refurbishment activities, with the water rapidly clarifying as the fines create a binding/filtering layer on the internal reject pond walls. The fine reject within each pond would consolidate sufficiently to enable cleanout and refurbishment to commence approximately 4 months after the cessation of fine reject deposition.

Ponds RP-7 and RP-8 would be operated cyclically with Ponds RP-1 to RP-6 such that at any one time, one pond would be receiving fine reject, two ponds would be awaiting receipt of fines or in the process of consolidated fines removal/pond refurbishment, and the other previously filled pond(s) would be consolidating.

Refurbishment of individual fine reject ponds would involve the:

- removal of the consolidated fines, together with the coarse reject drainage blanket and the inner layer of coarse reject from the pond wall;
- installation of a new drainage blanket;
- replacement of the inner pond wall with fresh coarse reject; and
- settlement pond cleanout.

Refurbishment of each fine reject pond generally takes approximately 2 months to complete.

Materials removed from the pond during refurbishment would be transported to the source mine for disposal with the overburden or to the Melville Open Cut to complete the post-mining landform in that area.

2.7 WASTE MANAGEMENT

There would be no modifications to the collection or disposal of wastes generated other than the coarse and fine rejects discussed in Section 2.6.

2.8 TRANSPORTATION

2.8.1 Introduction

Figure 2.3 schematically displays the proposed transport routes and the average daily traffic movements on the road network to and from the facility. Distinction is made between laden trucks carrying coal and trucks backloading with coal reject, although when rejects are returned to the respective source mine, it would be backloaded and not involve any more truck movements. **Figure 2.3** also displays the various periods of the day when the nominated traffic levels would occur. The information in this section relating to traffic routes and levels is provided to describe the level of traffic entering and leaving the CHPP and rail loading facility. The coal transportation off site is not the subject of the application outlined in this document. Rather, coal transportation is addressed fully in the documentation for each of the coal mines supplying coal to the facility.

2.8.2 Road Transportation

2.8.2.1 Transport Routes

Figure 2.3 displays the local road network to be used by incoming / laden trucks from the four coal mines. The routes for each of these are or would be approved in the project approval issued by the Minister for Planning for each mine. Effectively, 75% of the trucks would enter and depart from the facility via the siding access road and Kamilaroi Highway whilst the remaining trucks would enter from the Oxley Highway and via Torrens Road.

2.8.2.2 Traffic Levels

The delivery of up to 4.5 million tonnes of coal by road to the Whitehaven CHPP and rail loading facility would generate an average of 736 truck movements (368 loads) each day[1]. **Table 2.2** provides a breakdown of the proposed truck movements to and from the facility in addition to the delivery of coal reject to the Melville Open Cut. The likelihood of truck movements exceeding 736 per day in 2008 would be low given production would be simultaneously ramped up at Belmont Coal Mine and wound back at Whitehaven Coal Mine. The heavy vehicle traffic involved in the delivery of domestic coal to local markets is also reflected in **Table 2.2**.

[1] For 2009 onwards, ie. following cessation of production from Whitehaven Coal Mine. Prior to closure of the Whitehaven Coal Mine, combined traffic levels from both the Whitehaven and Belmont Coal Mines would not exceed the maximum level from the Belmont Coal Mine.

Table 2.2
Indicative Average Heavy Vehicle Traffic Movements

Mine (Annual Production)	Material	7:00am to 10:00pm	10:00pm to 7:00am	Total
Tarrawonga[$] (2.0Mtpa)	ROM Coal	320	Nil	**320**
Belmont[$] (1.5Mtpa)	ROM Coal	184	56	**240**
Sunnyside[@] (1.0Mtpa)	ROM Coal	176	Nil	**176**
Sub-total		680	56	**736**
Melville Open Cut[#]	Coal Reject	18	Nil	**18**
CHPP (Domestic Coal Sales)		4	Nil	**4**
TOTAL		**702**	**56**	**758**

* 2008 only
[#] Dedicated trip to deliver rejects for rehabilitation of the open cut
[@] Truck arrival and despatch via Torrens Road
[$] Truck arrival and despatch via Siding Access Road

2.8.2.3 Vehicles Types

Coal Mines

Coal is and would continue to be transported between the Applicant's mines and the Whitehaven CHPP primarily using 40t capacity purpose-built B-double configuration trucks. Occasionally, some coal is transported using a standard articulated truck configuration with an assumed payload of 28 tonnes, however, the proportion of these types of trucks continues to decrease and is likely to cease completely as the proposed Belmont and Sunnyside Coal Projects are approved and commence production.

The use of purpose-built B-double trucks, with modifications to reduce noise levels and impacts on the amenity of other road users and road-side residences, is currently being trialled for the northern mines. The modifications incorporated on these trucks are as follows.

- All units are side tipping B-Double combinations, purpose-built for on-road coal haulage.
- The prime mover specification including model, motor size, differential ratios and gearbox selection have all been specifically engineered to comply with emission and noise criteria.
- The trucks are speed limited to maximise operational efficiency whilst optimising fuel economy, tyre wear and vehicle maintenance and minimising engine noise. The speed limit set would reflect the mine and the number of return trips capable within a standard shift.

- The B-double trailer units are on airbag "road friendly suspension" (System Approval No. RF2108).
- All units are fitted with electronic management systems including GPS, enabling reporting any speed breaches.
- All units have the engine compression brakes (Jake brakes) disabled to reduce noise.
- All units are have high powered driving lights removed.
- All units have cruise control mode disabled.
- All units are fitted with Optalert driving system to identify driver fatigue.

Should 24 hour transport from the Belmont Coal Project be approved, it is proposed to upgrade the entire fleet transporting coal from the northern mines, ie. Whitehaven, Tarrawonga and Belmont, to the purpose-built, low noise trucks described above. Should transport be restricted to between 7:00am and 10:00pm for all mines, the current B-double fleet would be maintained, with a gradual upgrade of the fleet with the purpose-built, low noise trucks.

Melville Open Cut

Coal reject would be transported from the Whitehaven CHPP to the Melville open cut for disposal using 18t capacity rigid trucks.

2.8.3 Rail Transportation

2.8.3.1 Introduction

The Applicant recognises considerable benefits arise from the use of rail to transport its products to Port Newcastle, particularly through the use of longer trains. Until recently, the coal from the Whitehaven Rail Loading Facility was only able to be despatched in 42 wagon trains carrying 3 100 tonnes of coal. The Applicant has commenced construction activities to lengthen the Whitehaven loop line to enable it to be used by 72 wagon trains capable of carrying 5 400 tonnes of coal. It is envisaged the longer trains will be introduced from February 2008. Hence, planning for future despatch of products has incorporated the use of the longer trains and with the knowledge that the ARTC in conjunction with Country RIC is increasing the capacity of the Gunnedah – Werris Creek – Port Newcastle rail network to increase the tonnage of coal transported from the Gunnedah Basin and other commodities eg. wheat to Port Newcastle. The increased number of train paths is being achieved through:

- increasing the number of passing loops;
- the introduction of motorised points; and
- centralised signalling.

An important outcome for the Gunnedah urban centre from this initiative is that one of the bypass loops to be installed would be in Gunnedah itself which will enable trains carrying coal, wheat and other commodities to pass through Gunnedah at up to 60kph – thereby avoiding the need to stop in Gunnedah urban centre and cause delays at level crossings. The 72 wagon trains will be able to travel through Gunnedah on the new bypass line quicker than the stop/start routine currently used for the 42 wagon trains.

2.8.3.2 Train Levels

With the introduction of 72 wagon trains capable of transporting a total of approximately 5 400 tonnes of coal, the number of trains to transport 4.1 million tonnes of coal to Port Newcastle would in fact decrease from the current level of train traffic. Based upon the use of 72 wagon trains, a total of 760 train loads would be despatched annually from the Whitehaven Rail Loading Facility to Port Newcastle equating to approximately two trains per day. This is considerably less than the 970 x 42 wagon trains per year required to despatch 3.0 million tonnes of coal.

2.9 SERVICES

2.9.1 Electricity

The Applicant estimates that the electrical power usage on the Project Site would increase by approximately 30% as a result of the increased throughput at both the CHPP and rail loading facility. This would increase the annual power consumption from approximately 850KVA to 1 250KVA.

2.9.2 Water

The additional coal washing arising from the proposed increased throughput at the CHPP would result in the consumption of a further 50ML of water each year to a total level of approximately 150ML per year. Approximately 75% of the existing 100ML is drawn from the Company's licenced groundwater bore (Licence No. 90WA807004) with the remainder pumped from the Namoi River in accordance with River Licence 90AL801821.

The Applicant intends to source the additional 50ML of water from the Namoi River in accordance with the conditional provisions of Licence No. 90AL801821. This high security licence has an approved allocation of 450ML per year. The Applicant also holds a lease for a further 170ML of groundwater. Overall, the water rights / licences held by the Applicant should be sufficient for the increased production particularly in the event not all high security water can be obtained.

Figure 2.4 displays the water balance for the modified proposal based upon current on-site experience.

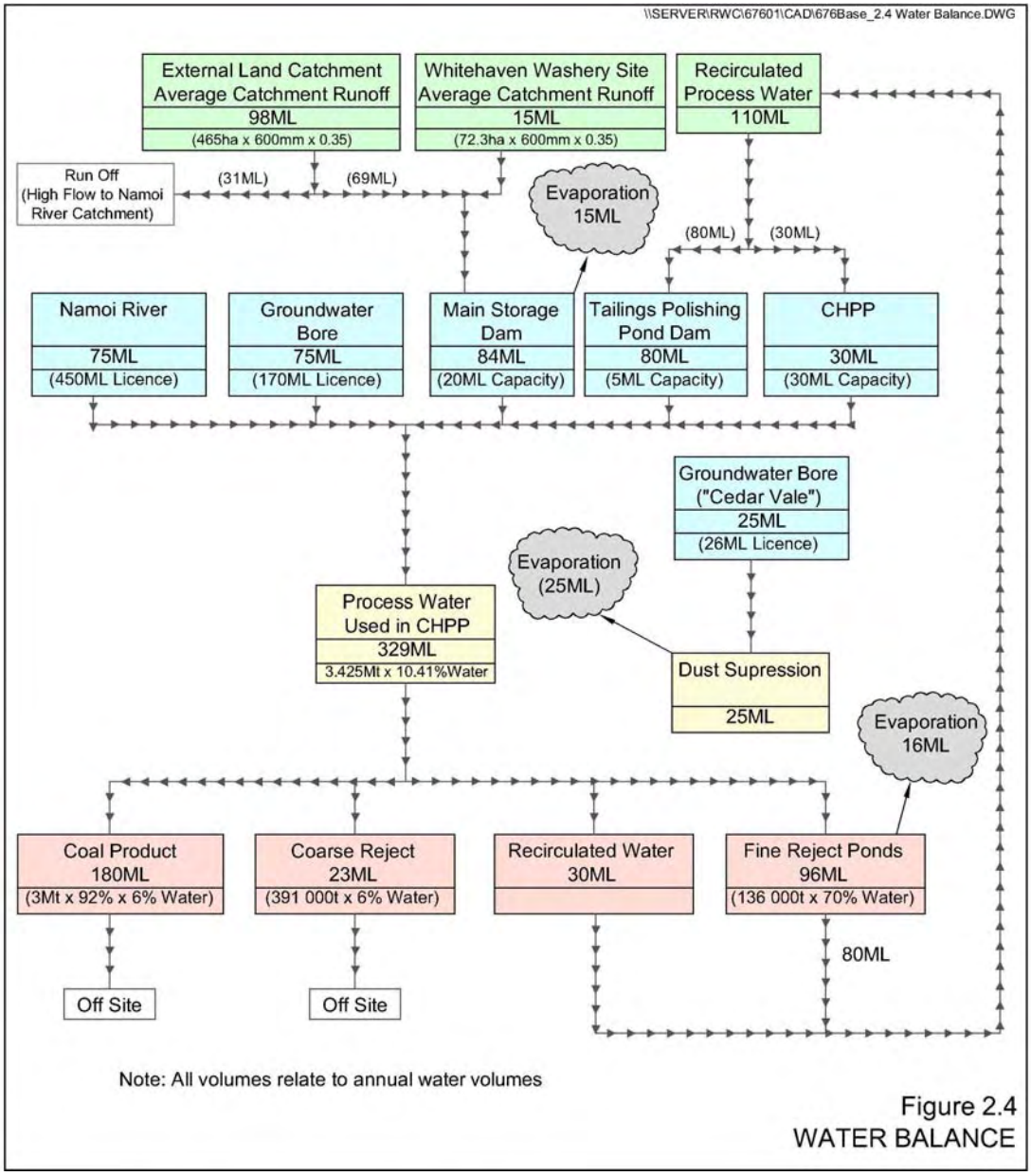

Figure 2.4
WATER BALANCE

2.9.3 Communications

There would be no changes to on-site communications.

2.10 HOURS OF OPERATION AND OPERATIONAL LIFE

2.10.1 Hours of Operation

Table 2.3 displays the proposed hours of operation for all activities within the Project Site. The only variation to the existing hours of operation relates to the delivery of ROM coal from the Belmont Coal Mine. Although not yet approved, the Applicant intends to transport coal from the Belmont Coal Mine 24 hours per day ie. from 6:00am Monday to 10:00pm Saturday.

Table 2.3
Proposed Hours of Operation

Activity	Monday to Saturday	Sunday
Coal Preparation Plant Operations and Stockpile Maintenance	24 hours	24 hours
Train Loading (export coal despatch)	24 hours	24 hours
Domestic coal screening and despatch	7:00am to 10:00 pm	-
Despatch of coarse and fine rejects	7:00am to 9:30 pm	-
Fine reject ponds refurbishment	7:00am to 6:00 pm	8:00am to 6:00 pm
Delivery of ROM Coal from Whitehaven, Tarrawonga and Sunnyside	7:30am to 10:00pm	-
Delivery of ROM Coal from Belmont	24 hours	-[1]
Note 1: 24 hour transport on Sundays has been provided as a contingency for the Belmont Coal Project.		

2.10.2 Operational Life

It is proposed that the approved operational life of the Whitehaven Coal Handling and Preparation Plant and Rail Loading Facility would remain as already approved, ie. until 2 October 2022.

2.11 EMPLOYMENT

Table 2.4 lists the current and proposed employment levels on the Project Site. Overall, the level of employment would increase from 15 to 20 persons. The despatch of an additional 1.1Mtpa tonnes of coal by rail would also contribute to an increased level of indirect employment. The employment of persons driving trucks between the various mines and the Whitehaven CHPP and rail loading facility has previously been identified in the documents for the respective mines. However, overall, the Applicant's mines, coal transportation (by road and rail) and the CHPP operations would employ approximately 125 persons directly and up to 200 persons indirectly.

Table 2.4
Existing and Proposed Employment Levels

	Existing	Proposed
Plant Manager	1	1
Wash Plant operators	2	3
Plant Operators	5	7
Train Loading Operator	1	2
Mechanical Support	1	1
Fitters	2	2
Electricians	1	1
Total	**13**	**17**

2.12 REHABILITATION

2.12.1 Introduction and Objectives

The Applicant is committed to the concept of eventually decommissioning the Whitehaven CHPP and Rail Loading Facility and rehabilitating the Project Site to achieve the following short and/or long-term objectives.

(i) To ensure all earthworks, including temporary stockpiles of soil and other erodable materials are stable and not subject to erosion;

(ii) To minimize the areas of disturbance and hence the quantity of potentially sediment-laden runoff generated on the Project Site;

(iii) To create a final landform that blends, as far as practicable, with the surrounding land fabric;

(iv) To provide for drainage within the final landform that equitably distributes surface water to downstream land users and the environment; and

(v) To leave the land affected by the various CHPP activities in a safe and stable condition, which is amenable to a range of potential land uses.

Given that all areas of existing or proposed disturbance or activity would be required for the life of the Whitehaven CHPP and Rail Loading Facility, rehabilitation works during the operation of these facilities would be primarily of a maintenance and/or aesthetic nature.

The following sub-sections describe the final landform on completion of all activities, and identify the procedures to be employed in the rehabilitation of the Project Site. Routine maintenance activities and enrichment plantings/visual screening to be undertaken throughout the life of the facility are also discussed.

2.12.2 Final Landform

Figure 2.5 presents the final landform on the Project Site following the decommissioning of the facility, assuming the removal of all remaining coarse and fine reject within the rail loop. A proportion of this material could be retained on site for a subsequent land use, if required. Major features of the final landform as presented in **Figure 2.5** include the following.

- A gently sloping landform within the rail loop draining to the retained fresh water dam. There would be small drop in elevation from southwest to northeast of approximately 3m to 4m. The clean water drainage line, which currently diverts water around the existing fine reject ponds and directs water through the fresh water dam, would be retained, with rainfall and runoff from the created landform also directed into this drainage line via the fresh water dam. This drainage line would continue along the alignment of Clean Water Drain (CWD) -2 and CWD-3 of the Project Site (see **Figure 4.2**) before discharging to the Namoi River catchment to the north of the Project Site.

- Fine reject ponds RP-7 and RP-8, along with settlement ponds SP-6 and SP-7, would be backfilled and profiled to create a gently sloping landform to the drainage line flowing from the fresh water dam.
- The main stockpiling and processing area of the Project Site would be profiled to create a mounded landform, draining to both the east, into the drainage line described in the preceding points, and the west, into a drainage line roughly aligned along DWD-2 into the Main Storage Dam (to be retained). Any discharge from the Main Storage Dam would be to the neighbouring property and the Namoi River catchment.
- All settlement ponds and any drains not noted above, fine reject ponds and associated water management structures, and the processing and rail loading infrastructure would be removed as part of the final landform. However, the siding area access road (and eastern section of the internal loop road), main storage dam, fresh water dam and associated diversion drains, the Torrens Road access way and the main office would be retained, subject to the proposed land use at the time.

All established tree screen plantings would be retained.

2.12.3 Final Land Use

The final landform has been designed to suit a number of potential final land uses. These may include:

- agricultural activities, where the retained water storages would provide advantage for grazing or stockyards;
- a bulk storage / transport depot or freight terminal, where the large cleared area, proximity to the Kamilaroi Highway and railway line would be advantageous; or
- industrial activities, where the large cleared areas and location outside Gunnedah would provide advantages from an access and amenity perspective.

The final land use would ultimately influence the final landform, although the final landform concept would be as described in Section 2.12.2, with both to be determined closer to the completion of activities on the Project Site.

2.12.4 Rehabilitation Methods

2.12.4.1 Fine Reject and Settlement Ponds

RP-1 to RP-6 and SP-4 and SP-5

During the last 6 months of operations, all fine reject discharge and consolidation activity would be restricted to RP-7 and RP-8 and the following rehabilitation activities commenced within the rail loop.

- The remaining consolidated fine reject remaining within the fine reject ponds RP-1 to RP-6 would be excavated and despatched to one of the Applicant's open cut coal mines for placement.
- Settlement Ponds SP-4 and SP-5 and the polishing and recovery ponds would be de-silted with the removed silt transported with the consolidated fine reject for placement within one of the Applicant's open cut coal mines.
- Coarse reject material would be used to fill the de-silted ponds with subsoil material previously excavated to create the ponds and contained within a bund between the ponds and the North-western Railway Line placed over the coarse reject. Should insufficient subsoil be contained within the bund, additional subsoil material would be sourced from the dump hopper ramp.
- The subsoil would be profiled to create a gentle slope to the east and a small drainage depression towards the Fresh Water Dam. Sufficient subsoil would be used to ensure a final thickness of at least 0.3m.
- A thin layer of topsoil would be placed over the profiled landform to aide in the establishment of vegetation.
- A mixture of pasture species appropriate to the season would be sown and include fast-growing non-persistent cover species and perennial grasses and legumes.
- A suitable fertilizer would be applied at the time of seeding, with maintenance applications as necessary.

RP-7, RP-8, SP-6 and SP-7

These structures would be active right up until the completion of coal preparation and rail loading activities on the Project Site. As such, the fine reject material and silt would be left for at least 4 months to allow it to consolidate and then be removed from site to one of the Applicant's open cut coal mines for placement.

Once all fine and coarse reject is removed from these areas, the area would be rehabilitated in the same manner as RP-1 to RP-6 and SP-4 and SP-5. All runoff from this area would be directed to the Main Storage Dam.

2.12.4.2 Stockpiling and Processing Areas

The rehabilitation procedures to be employed over the remainder of the Project Site following the completion of all coal handling and preparation activities would potentially involve the following, although should any component area or facility be required for a subsequent land use, it would be retained in the manner nominated. All materials recovered during site decommissioning would be recycled whenever possible.

- Removal of all buildings other than the main office. Building removal would include the excavation and disposal of concrete foundations off site.
- Removal of all processing infrastructure, including the CHPP, conveyor systems and foundations.
- Removal of the coal loading conveyor structure and bin. The reclaim tunnel would be exposed and filled using materials from the elevated ramp.
- Removal of all on-site roads other than the siding access road to the main office, the Torrens Road access way and the sealed road linking these two roads.
- Following removal of any remnant coal, removal and/or ripping of compacted materials in the area of the coal pads, truck parking and hardstand areas. Available subsoil and topsoil would be spread over the profiled surface and a selection of pasture grass species sown. The soil materials would be sourced from the bunds within the north-eastern corner of Lot 111.
- Removal of the truck wash, fuel tanks and bunding, and excavation and remediation of any contaminated soil.
- Removal of the water tanks, surface water pipelines, any electrical substations and other infrastructure owned by the Applicant.
- Removal of septic tanks and back-filling remaining voids.
- Removal of any accumulated sediment in the settlement ponds, and re-profiling to accommodate the proposed final landform.
- Installation of appropriate drainage controls to prevent erosion and maximize water storage within the main storage dam.

2.12.4.3 Enrichment Planting and Visual Screening

The existing tree plantings around the Project Site would be retained to maintain a visible screening of the site whilst rehabilitation is ongoing (see **Figure 2.5**). The tree heights currently range up to 10m.

Further to the existing plantings, the Applicant proposes to progressively undertake additional tree plantings in order to:

- screen the proposed additional fine rejects ponds RP-7 and RP-8 from the North-western railway line;
- establish tree lots to the north and east of the truck wash; and
- establish vegetation screens along the western and eastern boundaries of the Project Site.

The species planted would comprise a selection of those occurring naturally within the local area, including Bimble Box, Pilliga Grey Box, Wilga, White Cypress Pine, River She-Oak and Yarran.

2.12.4.4 Rehabilitation Maintenance

The Applicant's commitment to effective rehabilitation of areas of existing and proposed disturbance, minimisation of erosion and visual screening, would involve an ongoing maintenance program both during facility operations and following plant decommissioning including the following.

- Regular inspections of all drainage lines and controls for evidence of erosion and implementation of appropriate rectification works. Maintenance works (if required) would potentially involve a combination of physical and vegetative treatments and would be designed on a case-by-case basis designed.
- Monitoring of vegetation establishment on the rehabilitated fine rejects ponds and if required, re-topsoiling, re-seeding and maintenance fertilizer applications.
- Installation of tree guards around screen plantings should grazing by native animals be excessive. No domestic stock would be permitted within Project Site during, or for a period of at least two years following the rehabilitation of the various component areas.
- In-fill screen plantings should a significant mortality rate of planted trees occur.
- Regular inspection of all areas of the Project Site for excessive weed growth. Noxious weed eradication programs would be undertaken in consultation with the local Noxious Weeds Inspector.

Section 3
Description of the Existing Environment

Preamble

This section describes the existing environment within and around the Project Site. As identified in Section 2 of this document, the proposed modifications to existing operations would allow for an increase in the volume of coal received and processed through the Whitehaven CHPP and despatched from the Rail Loading Facility. As such, this description of the existing environment focuses on those elements that would be affected by the amended operations or would have some influence on impacts on other elements of the existing environment (for example, weather conditions influence the dispersal of dust and propagation of noise). For each element of the existing environment, the potential constraint(s), if any, that were taken into account in developing the amended proposal are identified.

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3.1 TOPOGRAPHY

3.1.1 Existing Environment

3.1.1.1 Regional Topography

Figure 3.1 places the Project Site within its regional topographic context.

The Project Site lies within the Namoi River Basin in an area representative of the transition from the higher broken country to the northeast and south associated with the Nandewar, Great Dividing and Liverpool Ranges and the open plains to the west in the Wee Waa and Coonamble areas. Elevations in the region range from 761m AHD on King Jack Mountain (approximately 12km south-southwest of the Project Site) and 886m AHD within Community Conservation Area Zone 2 - Kelvin (formerly known as Kelvin State Forest) (25km north of the Project Site)[1] to less than 260m AHD along the Namoi River valley immediately north of the Project Site.

3.1.1.2 Local and Project Site Topography

The topography on and within the vicinity of the Project Site is also shown on **Figure 3.1** and shows the Project Site to be located on shallow northeasterly sloping land which grades towards the Namoi River at slopes ranging from 2° to less than 0.5°. The Project Site is visible from four public vantage points within 8km, namely Porcupine Lookout, Borethistles Hill, Pensioner Hill and Little Sugarloaf Mountain. The scale of site operations diminish considerably at distances greater than approximately 2km.

The topography of the Project Site has been modified through minor cut and fill operations to create a generally flat surface on which the various items of plant, buildings, ponds and other infrastructure has been constructed. There is a general fall from southeast to northwest across the facility of less than 10m (from 280m AHD to 270m AHD) with the North-western Railway Line passing through the Project Site at an elevation of approximately 285m AHD.

As illustrated on **Figure 3.1**, the comparatively low elevation of the Project Site places part of the Siding Access Road within the 1 in 100 year floodline of the Namoi River. This is discussed in greater detail in Section 3.4.1.2.

3.1.2 Constraint(s)

The topography of the Project Site would not constrain the amended proposal, however, the location of the Project Site within the 1 in 100 year floodline of the Namoi River requires consideration be given to the placement of coal stockpiles and drainage within the Project Site. The local topography around the Project Site needs to be considered when the environmental issues of noise, visibility and water management are considered.

[1] Not shown on **Figure 3.1**

3.2 CLIMATE

3.2.1 Existing Environment

3.2.1.1 Introduction

The Project Site is situated within the Namoi River Valley between the tropical and temperate climatic zones, and between the belts of the sub-tropical highs and the zone of mid-latitude westerlies. In summer, synoptic highs dominate the climate. Low pressure systems pass at regular intervals bringing milder temperatures and winds from the southerly quadrant. The climate is also influenced by substantial mountain ranges located to the east and south, and to a lesser extent to the west.

3.2.1.2 Source of Data

The following summaries of meteorological information for the Whitehaven CHPP and rail loading facility have been derived from long term data collected by the Bureau of Meteorology at Station No. 055023 and Station No. 055024 in Gunnedah (Gunnedah Pool Station and Gunnedah Soil Conservation Research Station respectively).

Data collected from each of the above sources is as follows.

Station 055023	:	temperature, rainfall, relative humidity, fog and frost frequency and wind (9:00am and 3:00pm).
Station 055024	:	pan evaporation.

Garradd (1997) has also been sourced with respect to temperature inversions.

With the exception of continuous wind data, all meteorological data is summarised in **Table 3.1**.

3.2.1.3 Temperature

The data summarised in **Table 3.1** indicates that the Gunnedah area is characterised by mild to hot summers and cool winters. December, January and February are the warmest months with mean daily maximum temperatures approximating 34°C. July is the coldest month with a mean daily minimum of 2.9°C. Autumn and Spring are generally mild with occasional erratic temperature fluctuations. Mean diurnal temperature variation is relatively constant throughout the year at about 15°C.

Table 3.1
Mean Monthly Meteorological Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
TEMPERATURE (°C)													
Gunnedah Pool (Station No. 055023) – 116 Years of Records													
Mean Maximum	34.0	32.9	30.8	26.4	21.2	17.5	16.7	18.9	22.7	26.6	30.2	33.0	
Mean Minimum	18.3	18.1	15.8	11.4	7.1	4.2	2.9	4.1	6.9	10.6	14.0	16.8	
RAINFALL (mm)													
Gunnedah Pool (Station No. 055023) – 126 Years of Records													
Mean	72.4	65.9	48.5	38.2	43.3	42.5	42.3	41.9	39.5	55.6	59.9	66.3	616.4
Median	53.9	50.2	34.4	32.5	33.1	36.3	33.3	35.7	32.6	52.4	52.8	50.2	619.9
Mean Rain Days	6.5	6.0	4.7	4.3	5.3	6.2	6.2	6.2	5.8	6.9	6.7	6.9	71.7
Highest	301.0	253.5	367.6	151.4	171.2	172.5	177.8	138.5	128.0	161.2	259.3	185.4	
Lowest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.0	
EVAPORATION (mm)													
Gunnedah Soil Conservation Research (Station No. 055024) – 20 Years of Records													
Mean Monthly Pan Evaporation *	238.7	187.6	186.0	129.0	83.7	57.0	58.9	83.7	117.0	164.3	198.0	244.9	1 752
RELATIVE HUMIDITY (%)													
Gunnedah Pool (Station No. 055023) – 33 Years of Records													
Mean 9:00am	61	65	64	67	73	78	77	71	65	61	58	57	67
Mean 3:00pm	43	43	44	46	52	55	53	48	43	43	39	38	46
WINDS km/hr													
Gunnedah Pool (Station No. 055023) – 42 Years of Records													
Mean 9:00am Wind Speed	7.7	8.4	8.2	6.7	5.8	5.8	5.4	5.8	6.8	8.0	7.9	7.3	7.0
Mean 3:00pm Wind Speed	9.8	9.1	9.7	8.7	7.7	9.2	10.2	11.0	11.0	10.5	11.2	10.5	9.9
FROST FREQUENCY (DAYS/MONTH)													
Gunnedah Pool (Station No. 055023) – 33 Years of Records													
Mean Monthly	0.0	0.0	0.0	0.0	1.0	3.8	3.8	5.0	1.2	0.0	0.0	0.0	
FOG FREQUENCY (DAYS/MONTH)													
Gunnedah Pool (Station No. 055023) – 33 Years of Records													
Mean Monthly	0.1	0.0	0.0	0.1	0.3	0.4	0.4	0.1	0.3	0.1	0.0	0.1	
Source: Bureau of Meteorology *Based on daily data													

3.2.1.4 Relative Humidity

The relative humidity of the Gunnedah area can be described as moderate based on the observed conditions at the Gunnedah Pool Meteorological Station. The mean 9:00am and 3:00pm relative humidity is 67% and 46% respectively, with an increase occurring through the winter months.

3.2.1.5 Rainfall

Rainfall in the Gunnedah area results from the passage of one of three major synoptic systems, or from localised convective thunderstorms, namely:

- the regular passage of cold fronts across NSW, whenever these fronts extend north into the area; or
- the passage of moist upper atmosphere low cells into the area from Queensland; or
- the passage of inland tropical cyclones or low pressure systems which have been located over the Pacific Ocean.

Of these, the latter two principally occur in the warmer months when convectional storms are also most frequent and result in the majority of the area's total rainfall. Falls during this period are often of high intensity.

Monthly rainfall for Gunnedah is presented in **Table 3.1** and shows that highest rainfalls recorded occur during spring and summer with January having the highest median rainfall of 53.9mm. April is on average the driest month with a median rainfall of 32.5mm. On average, Gunnedah experiences 72 rain days per year.

A statistical review of rainfall records has identified that for a dry year (10^{th} percentile rainfall event) the annual rainfall is 373.6mm. For a wet year (90^{th} percentile rainfall event) the annual rainfall is 843.4mm.

3.2.1.6 Temperature Inversions

Temperature inversions are often expressed as fogs and/or frosts and invariably occur during calm, clear, cool nights. After sunrise, the inversions normally increase in height before being broken down by solar heating of the land surface.

Table 3.1 records that frosts generally occur in the Gunnedah area between May and September. Fogs may occur at any time of year but are a rare phenomenon. Based on these records alone, it may be concluded that temperature inversions could occur on up to 20% of days each year. However, in a detailed review of the meteorology of the Gunnedah area, Garradd (1997) noted that "*surface inversions might be expected on 50% or more nights throughout the year*".

An assessment of inversion occurrence at the Whitehaven Coal Mine during 2001 showed a similar result to that identified in Garradd, with weak to strong inversions occurring on 42%, 46%, 54% and 47% of nights in summer, autumn, winter and spring. Night-time inversions generally prevail from about 8:00 pm.

During the day time, ie. 7:00am to 6:00pm, weak to strong inversions occurred on less than 1% of summer, autumn and spring days and on approximately 3% of winter days, but only prevailed to approximately 8:00 am before dissipating. Given the proximity of the Whitehaven Coal Mine, similar inversion occurrence patterns would be expected for the Whitehaven CHPP Project Site.

3.2.1.7 Wind

Wind data recorded daily at 9:00am and 3:00pm at the Gunnedah Pool Bureau of Meteorology Station (No. 055023) reveals the following.

- In the morning, the prevailing winds are from the southeast with calm conditions experienced approximately 40% of the time.
- The predominant afternoon winds tend to either continue from the southeast of swing around to be from the northwest.
- Winds speeds above 20km/hr are relatively rare, however, are generally stronger in the afternoon with calm conditions occurring approximately 40% of the time at 9.00am, reducing to 20% by 3.00pm.

Figure 3.2 presents the wind rose data obtained from the Gunnedah Pool Bureau of Meteorology Station for morning (9:00am) winds and afternoon (3:00pm) winds.

3.2.1.8 Constraint(s)

Climatic data provides a basis for planning with respect to air quality, water management, noise enhancement and rehabilitation.

3.3 LAND OWNERSHIP AND LAND USE

3.3.1 Existing Environment

3.3.1.1 Introduction

In order to assess the impact the proposed modifications to the operation of the facility would have on the surrounding environment, an understanding of the number and location of surrounding landholdings and residences together with the current land use is required. This subsection identifies the landholdings and residences in the vicinity of the Project Site and provides an overview of the land uses both in the local area and surrounding the Project Site.

3.3.1.2 Land Ownership

The Project Site and Surrounds

Table 3.2 and **Figure 3.3** present the ownership of land, and identified residences, on and surrounding the Project Site.

Table 3.2 (Amended)
Land Ownership

Reference[1]	Lot	DP	Landowner	Residence[1]
1	1	239575		
	2	246792	Whitehaven Coal Mining Pty Ltd	A
	12	542047		
	111	755503		
	120	755503		
	446	755503		D
	471	755503		
	472	755503		
	473	755503		
	474	755503		
	475	755503		
	498	755503		
	678	705086		
2	1	810271	The Council of the Shire of Gunnedah	
	2	875874		
	3	875874		
3	111	599624	New Wave Leathers Pty Ltd	
	5	587712		
5	453	755503	R.W. Tibbs#	B
	137	755503		
	199	755503		
6	677	705086	T.D. & P.A. Burns	
7	7	714466	K. & K. Guillaumier*	C
8	1	119957	Namoi Valley Coal Pty. Limited	
	112	755503		
9	447	755503	J.C. & J.E.Wilkinson	E
10	448	755503	C.J. & W.D. Jaeger	F
11	449	755503	P.A. & D.L. Rankin	G
12	450	755503	R.S. & C.A. Brown	
13	1	402537	J.L. & R.M. Torrens	
14	1	1111136	North West Projects (NSW) Pty Limited	H (derelict)
	339	755503		
15	155	755503	W.P. Small	I (derelict)
16	154	755503	G & D Tibbett#	J
17	153	755503	C.B.C. Finlay & K.M. Hunt#	K
18	10	701400	G.S. & H.A. Finlay	
19	9	701400	Pryde and Scott Investments Pty Limited	
21	2	613172	Pryde's Tucker Bag Pty Ltd	
22	4	629803	Ryleend Pty Limited	
23	1	613172	Manildra Flour Mills Retirement Fund Pty Limited	
	1	875874	P.E. & R. Harris	

Note 1: see **Figure 3.3 (Amended)**
Source: Land and Property Information Service
Currently being purchased by WCM.
* An agreement is held with Owners with respect to the increased production and throughput and the management of predicted noise and dust.

An easement for stock movement is located east and north of the Project Site (see **Figure 3.3**). The 40m wide strip of land incorporating the North-western Railway Line is owned / administered by Rail Infrastructure Corporation.

Figure 3.3 (Amended) also identifies the nearest residences to the Project Site whilst **Table 3.3** lists the typical distances from component areas on the Project Site to surrounding residences.

Table 3.3
Proximity of Surrounding Residences to Project Site Components

Residence *	Project Related	Proximity to Project Site Component (m)			
		Siding Access Road	Coal Preparation Plant	Coal Stockpiling Area A	Rail Loading Bin
A	Yes	960	1330	1230	1370
B	Yes	530	1170	1090	1320
C	Yes	1430	1600	1500	1520
D	Yes	310	750	720	1010
E	No	970	985	1005	1250
F	No	1200	1130	1170	1370
G	No	1460	1430	1460	1670
H	No	1550	1420	1480	1580
I	No	1460	1300	1370	1430
J	Yes	1250	1100	1160	1240
K	Yes	1170	1020	1080	1170

* See **Figure 3.3 (Amended)**

3.3.1.3 Land Use

The Project Site

The Project Site formerly comprised part of a larger landholding which was used for seasonal crop production and the grazing of sheep. With the construction and operation of the Project Site, the siding component of the landholding was used for mining-related purposes (stockpiling and despatch of coal) or left fallow and leased for grazing purposes. During the care and maintenance period between 1998 and 2002, the siding area was used intermittently for cattle grazing.

The rail loop component within the Project Site has in the past been used for the disposal of earth and waste rock materials from road and rail loop construction activities. Since the construction of the rail loop in 1988, the area has not been used for any agriculture-related purpose.

Surrounding Land

A range of agricultural and industrial land uses occur within the vicinity of the Project Site (see **Plate 3.1**) including small rural holdings used for grazing and/or cultivation activities (including a market garden), larger holdings used for grazing and crop production, the Council landfill/garbage depot, a grain storage / distribution centre, a tannery (New Wave Leather), a stockfeed manufacturing plant (Prydes Tuckerbag), a civil contractor's yard and workshop, a landscape supplies outlet, the Gunnedah Colliery rail siding and train loader and isolated residential buildings. The abandoned former Gunnedah Abattoir is located approximately 1.7km southeast of the rail siding.

Plate 3.1 Oblique aerial photograph to the east-northeast across the CHPP and land uses to the south. The unsealed McDonald Road is in the foreground (Ref: E676E-044).

3.3.2 Constraint(s)

Land ownership and land use pose a potential constraint on the development in so far that changes to dust generation, the noise climate and visual amenity as a result of the proposed modification may potentially adversely affect the existing land use or amenity of the current (or future) land owners.

3.4 WATER RESOURCES

3.4.1 Existing Environment

3.4.1.1 Groundwater

Due to its proximity to the Namoi River, groundwater is generally accessed from the overlying alluvium or in aquifer zones within solid rock below the alluvium. Yields from bores accessing water from the alluvium are generally good, with recorded yields of up to 56L/s (DLWC groundwater database). Water from a registered bore on the "Cedar Vale" property (GW37959) is currently used to supply dust suppression water to the Project Site whilst 75% of all make-up water is currently drawn from groundwater – see Section 2.9.2.

3.4.1.2 Surface Water

Regional Drainage

The Project Site lies within the catchment of the Namoi River Basin of north-western NSW. The Namoi River Basin covers an area of approximately 43 000km^2 and incorporates the centres of Tamworth, Gunnedah, Narrabri and Walgett. The Namoi River, one of the main tributaries of the Barwon Darling River system, flows into the Darling River immediately west of Walgett. The Namoi River catchment upstream of the Project Site covers an area of approximately 17 100km^2.

Local Drainage

Local drainage is dominated by the close proximity of the Namoi River, with numerous and often poorly defined ephemeral drainage lines flowing towards the river from small hills and ridges (see **Figure 3.4**).

External to the Project Site, surface runoff flows generally in a northwesterly direction, with box culverts and causeways directing flows from areas to the south, beneath the North-western Railway Line and Torrens Road. The railway culvert capacities (cross-sectional areas of approximately 3m^2), control the rate of storm water flow.

Project Site Drainage

Figure 3.5 presents how natural drainage patterns have been modified on and surrounding the Project Site by the construction of the rail loop, stockpiles areas, water storages and a network of drainage channels which were installed to divert water around, or direct water to the various storages.

Surface water runoff emanating from south of the rail loop is diverted around the loop and fine reject ponds to a fresh water dam immediately south of the North-western Railway Line (see **Figure 3.5**). Water overflowing from this dam is diverted beneath the North-western Railway Line and a concrete diversion weir and gate is used to direct water either into the Main Storage Dam of the Project Site (under low flow conditions) or through the Project Site for discharge to natural drainage and ultimately the Namoi River (under high flow conditions or periods when all flows are assessed to satisfy discharge criteria). The Main Storage Dam incorporates a 600mm diameter discharge pipe. High level flows from the dam are to the north and west of the structure via natural depressions within the landform.

All water originating from areas of disturbance within the siding area is directed to one of two 0.66ML capacity settlement ponds (SP-1 and SP-2 – **Figure 3.5)** which also discharge to the Main Storage Dam. The settlement ponds contain extensive reed growth, which assist in the filtration of sediments from the runoff.

Water also seeps/flows from the Fine Reject Ponds (RP-1 to RP-8, see **Figure 3.5**) into settlement ponds SP-4 to SP-7 where it is captured and ultimately recirculated through the Whitehaven CHPP. Water from Fine Reject Ponds RP-1 to RP-8 and settlement ponds SP-4 to SP-7 does not enter the clean water system of the Project Site.

Flooding Potential

Much of the Gunnedah Shire comprises a natural floodplain and has always been associated with flooding at times of high flow in the Namoi, Peel and Mooki River sub-catchments. The most extensive floods occur when high flows in the Mooki and Namoi Rivers coincide. The Namoi River is also influenced by the Manilla and Peel Rivers upstream. Downstream of the Gunnedah township, the low river gradient and flat topography can combine to cause widespread shallow inundation on both sides of the main Namoi River channel.

Occurrence of Namoi River floods is irregular, with critical flood levels having been recorded in every month of the year. Flood levels can be modified to some degree by the management of Keepit Dam, 55km upstream of Gunnedah. Keepit Dam, the largest storage on the Namoi River system, is primarily operated as a conservation storage but can be used for flood mitigation by controlling releases of water before and after flood levels peak.

Local flooding can occur within Gunnedah town itself but, even during a 1 in 100 year event, is confined to areas to the north of the North-western Railway Line. **Figure 3.5** shows that although the 1:100 year flood-line encroaches on the Project Site, all coal storage and processing facilities remain above this level.

3.4.2 Constraint(s)

The Applicant has already gained access to the additional 50ML of water required for the increased production. In fact, the Applicant has purchased allocations to substantially more water to ensure that if water sharing is required, sufficient water would still be available for the Applicant's requirements.

Assuming the continued good management of surface drainage on the Project Site, with appropriate design criteria applied to any additional structures required to accommodate the increase in coal throughput to the facility, surface water is unlikely to constrain the proposed modification.

As coal stockpiling and processing, and reject management activities would continue to be undertaken above the Namoi River 1 in 100 year flood-line, flooding would also not constrain the proposed modified proposal.

3.5 SOILS AND LAND CAPABILITY

3.5.1 Existing Environment

3.5.1.1 Soils

Three dominant soil types occur within or adjacent to the Project Site, namely Euchrozems, Euchrozems overlain by recent alluvium (in low lying areas) and Brown clay soils overlain by recent alluvium. The Gunnedah District Technical Manual prepared by the Soil Conservation Service of NSW (now the Department of Water and Energy) provides the following general morphological descriptions for Euchrozems and Brown clay soils.

- Euchrozems. Strongly structured soils with a somewhat lower clay content near the surface, weak horizon differentiation and a neutral to slightly alkaline reaction trend. The surface soil is clearly defined and consists of reddish brown to dark-brownish red clay loam on a light clay. The Euchrozems pose no special erosion control problems.
- Brown Clay Soils. Generally weakly differentiated light to medium clays with a brown to grey brown colour throughout the profile; have a neutral surface pH and are alkaline at depth.

Existing evidence of erosion on or adjacent to the Project Site is limited to minor scouring in some drainage channels, at exit points from culverts beneath the North-western Railway Line and in other areas of concentrated flows, eg. in causeways on Torrens Road.

3.5.1.2 Land Capability

The 1:100 000 scale Land Capability map of the Boggabri area prepared by the former Soil Conservation Service of NSW (unpublished) shows the areas of the Project Site and surrounds, not disturbed by prior coal stockpiling or construction activities, to comprise mainly Class II and III land, with areas of prior mining-related disturbance being classified as Class M. These land capability classes are defined by Emery (undated) as follows.

- Class II: Soil conservation practices such as strip cropping, conservation tillage and adequate crop rotation. Usually gently sloping land suitable for a wide variety of agricultural uses.
- Has a high potential for production of crops on fertile soils similar to Class I, but increasing limitations to production due to site conditions. Includes "prime agricultural land".
- Class III: Structural soil conservation works such as graded banks, waterways and diversion banks, together with soil conservation practices such as conservation tillage and adequate crop rotation. Sloping land suitable for cropping on a rotational basis. Generally used for the production of the same type of crops as listed for Class 1, although productivity will vary depending upon soil fertility. Individual yields may be the same as for Classes I and II, but increasing restrictions due to the erosion hazard will reduce the total yield over time. Soil erosion problems are often severe. Generally fair to good agricultural land.
- Class M: Mining and Quarrying areas.

3.5.2 Constraints

Disturbance to soils in the area of the new reject ponds would need to be undertaken carefully to avoid any adverse impacts upon the properties of the soils, particularly affecting their long term use for rehabilitation. Impact(s) on soils should not constrain the development of the proposed modification.

The facility is an established aspect of the local environment and the proposed increase in throughput should not have any additional negative impacts on surrounding lands or land uses. As such, land capability and suitability should not constrain the proposed modification.

3.6 ECOLOGY

3.6.1 Existing Environment

The proposed modification to the operation of the facility would require additional disturbance to predominantly cleared agricultural land, with up to four trees likely to be disturbed to accommodate the proposed additional fine rejects and settlement ponds. The area subject to the proposed additional disturbance was previously considered as part of ecological surveys and assessments of the Project Site completed in 2002 (Flora - Geoff Cunningham Natural Resource Consultants Pty Ltd, Fauna - Countrywide Ecological Service).

GCNRC (2002) concluded that no flora species, populations or ecological communities would be impacted by the operation of the Whitehaven CHPP and Rail Loading Facility. Notably the area considered by GCNRC (2002) included the proposed additional areas of disturbance.

CES (2002) concluded that no species of threatened fauna would be impacted by the operation of the Whitehaven CHPP and Rail Loading Facility. Notably the area considered by CES (2002) includes the proposed additional areas of disturbance.

3.6.2 Constraints

On the basis that no flora or fauna species, populations or ecological community would be adversely impacted by the operation of the facility, and the minimal additional disturbance associated with proposed modification, ecology is deemed to not constrain the proposed modification and will not be considered further.

3.7 ABORIGINAL HERITAGE

An assessment of the pre-European archaeology and cultural heritage on and surrounding the areas of activity comprising the Project Site was undertaken in February 2001 by Consultant Archaeologist, Mr John Appleton of Archaeological Surveys and Reports Pty Ltd (AS&R), with the assistance of Messrs Les Field and Wayne Griffiths, Sites Officers and nominated representatives of the Red Chief Local Aboriginal Land Council (LALC).

No evidence of Aboriginal occupation or utilization was found within any component area of the Project Site, including the proposed areas of additional disturbance associated with the proposed modification. Furthermore, the sites' officers were unaware of any specific Aboriginal association with the area.

Based on the results of ASR (2001), Aboriginal heritage is deemed to not constrain the proposed modification and will not be considered further.

3.8 AIR QUALITY

3.8.1 Introduction

The following sub-sections were prepared by Heggies Pty Ltd.

3.8.2 Existing Environment

3.8.2.1 Source of Data

Fine Particulate Matter

The existing concentration of fine airborne dust (referred to as PM_{10}) around the Project Site has been established using monitoring data from the nearest appropriate Department of Environment and Climate Change (DECC) monitoring site at Tamworth, approximately 80km east-southeast of Gunnedah. There are no significant industrial sources of pollution in the Tamworth region although the relatively cold winters and prevalence of wood heating leads to a potential for exceedances of the PM_{10} criteria to be experienced. Due to the lack of industrial sources in the vicinity of the Tamworth monitoring site, and the lack of other urban centres nearby, PM_{10} data from Tamworth is considered to be appropriate to represent background PM_{10} for the Project Site. The Tamworth monitoring site was commissioned in October 2000 and is located in Hyman Park, off Robert Road and Vue Street, Tamworth.

The following air pollutants and meteorological variables are currently measured at Tamworth.

- Fine particles (PM_{10}).
- Wind speed, wind direction and sigma theta.

Deposited Dust

Historical dust deposition monitoring data gathered by the Applicant from the facility has been used to derive a dust deposition average for the area surrounding the Project Site.

Dust deposition monitoring data is available for 1984, 1985, 1998 and from 2002 to 2007 at a range of sites around the Project Site. Data is available both prior and subsequent to the construction of the facility which allows for an assessment of true background dust deposition rates without the incremental contributions of the operation of the facility.

3.8.2.2 Particulate Matter

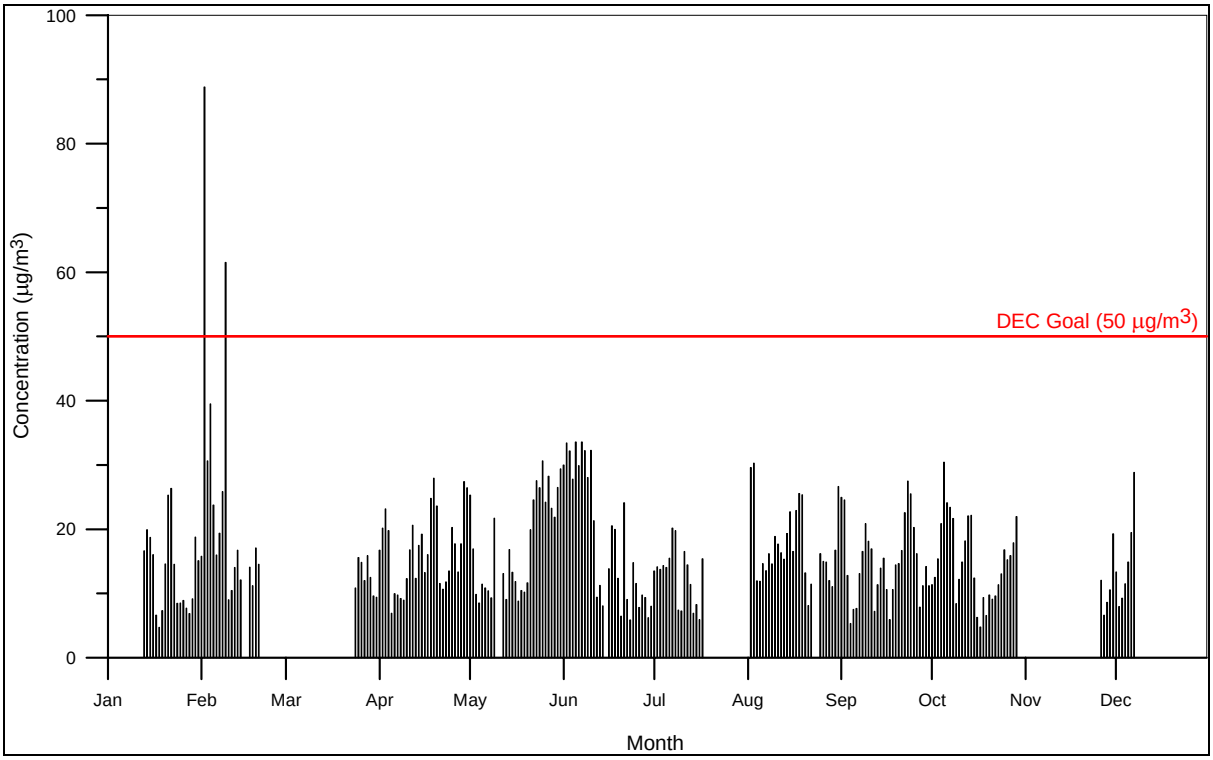
The term “particulate matter” refers to a category of airborne particles typically less than 50µm in aerodynamic diameter and ranging down to 0.1µm in size. Particles less than 10µm and 2.5µm are referred to as PM_{10} and $PM_{2.5}$ particles respectively. Some particles are emitted directly into the atmosphere from a variety of sources that are either natural or related to anthropogenic activity. Natural sources include bushfires, dust storms, pollens and sea-spray. Those related to human activity include motor vehicle emissions, industrial processes, unsealed roads and wood heaters.

Ambient concentrations of PM_{10} were assessed using the DECC air quality monitoring data recorded using a Tapered Element Oscillating Microbalance (TEOM) instrument. This instrument gives real-time recordings of ambient particulate matter, detected by observing changes to the loading on a filter mounted within the unit.

Monitoring of PM_{10} at the DECC's Tamworth site is considered an appropriate background data set for the project site due to the similarity between the two site locations (rural, lack of industrial sources) even taking into account the large distance between the two sites. The verified data for 2005 showing the 24-hour average of PM_{10} is presented in **Figure 3.6**.

The results indicate that the highest 24-hour average PM_{10} concentration at the Tamworth monitoring site was 89µg/m^3, recorded on 2 February 2005. This is above the DECC goal of 50µg/m^3. In addition to this exceedance, a further exceedance occurred on the 9 February 2005.

It is likely that these exceedances were as a result of an anomalous local event such as a dust storm or bushfire. However, in accordance with the DECC *"Approved Methods for the Modelling and Assessment of Air Pollution"*, these values are to be included in the assessment as it is appropriate to demonstrate that no additional exceedances of the impact assessment criteria will occur as a result of the proposed upgrade to the CHPP.



Note: The DECC standard for PM_{10} (24-hour average) is 50 µg/m^3. For the year 2005 at Tamworth there were two exceedances of this value.

Figure 3.6
24-HOUR AVERAGE PM_{10} MONITORING RESULTS FOR TAMWORTH, 2005

The annual average PM_{10} concentration for 2005, recorded at the DECC's Tamworth monitoring site was 17µg/m^3.

3.8.2.3 Deposited Dust

Results of dust deposition monitoring at four monitoring locations around the Project Site (see **Figure 3.7**), for the period February 1984 to May 1985, ie. before commissioning of rail loading activities on the Project Site, are presented in **Table 3.4**. Data for the period December 1997 to November 1998, ie. following the commissioning of rail loading activities on the Project Site, are presented in **Table 3.5**.

Table 3.4
Dust Deposition Monitoring Data - Average Monthly Deposition (Feb. 1984 – May 1985)

Site Location (see Figure 3.7)	Total Insoluble Solids (Non Filtrable Residue) g/m^2/month	Non Combustible Material (Ash) g/m^2/month
Site 10 (Grazing)	2.3	1.1
Site 11 (Grazing and Cultivation)	1.9	1.0
Site 12 (Floodplain and Grazing)	2.3	1.2
Site 13 (Grazing and Cultivation)	2.3	1.2
Average	**2.2**	**1.1**

No appreciable increase in dust deposition levels occurred at Sites 10 and 11 after commissioning of the Vickery Siding. These concentrations can therefore be considered as background. Significant increases in dust deposition were observed at Site 13, adjacent to the coal stockpile, following the commissioning of the rail siding.

Table 3.5
Dust Deposition Monitoring Data - Average Monthly Deposition (Dec. 1997 – Nov. 1998)

Site Location (see Figure 3.7)	Total Insoluble Solids (Non Filtrable Residue) g/m^2/month	Non Combustible Material (Ash) g/m^2/month
Site 10 (Adjacent to Train Loader)	2.2	0.9
Site 11 (Grazing and Cultivation)	0.9	0.3
Site 13 (Adjacent to Coal Stockpile)	4.7	2.5
Average	**2.6**	**1.2**

Dust deposition data for six locations around the Project Site for the period 2002 to 2007, ie. following the commissioning of the facility, are presented in **Table 3.6**.

Examination of dust deposition data from 2002 to 2007 shows that, with the exception of WS-1, dust deposition levels are lower than observed in the monitoring campaigns prior to the commissioning of the facility. Notably, site WS-1, which shows consistently high dust deposition, was located until recently immediately to the north of the Siding Access Road and adjacent to a bare earth bund. The bund and trucks entering the access road are believed to be the primary source of dust recorded. Average dust deposition levels from sites WS-2 to WS-6 are 1.7g/m^2/month total insoluble solids and 0.9g/m^2/month ash.

Table 3.6
Dust Deposition Monitoring Data - Average Monthly Deposition (Dec. 2002 – Jul. 2007)

Monitoring Location *	Total Insoluble Solids (Non Filtrable Residue) g/m^2/month	Non Combustible Material (Ash) g/m^2/month
WS-1	8.8	4.5
WS-2	1.6	0.9
WS-3	1.9	1.0
WS-4	1.8	1.o
WS-5	1.9	0.9
WS-6	1.3	0.8
Average	**2.9**	**1.5**
Average#	**1.7**	**0.9**

* see **Figure 3.7** # Excluding WS-1

The results listed in **Table 3.6** provide for background levels generally attributable to rural activities and natural sources together with a small proportion of dust generated by the activities on the Project Site. The levels listed in **Table 3.6** are therefore considered to be an overestimate of the background levels for the Project Site.

Excluding the results of WS-1, the maximum background dust level was recorded for WS-3 (1.9g/m^2/month). The use of a background ambient level of less than 2g/m^2/month means that the incremental increase in dust deposition will be the governing criterion for the operation of the facility.

3.8.3 Constraint(s)

Air quality may create constraints on the proposed modification if it is shown that the CHPP is adversely affecting the air quality at the nearest sensitive receptors. However, with the continued adoption of appropriate dust management techniques, air quality should remain within acceptable limits as demonstrated by the dust deposition data collected between 2002 and 2007.

3.9 NOISE

3.9.1 Introduction

A noise impact assessment of the proposal has been prepared by Spectrum Acoustics Pty Limited. Ambient noise monitoring has been conducted at three locations near the site during July-September 2007 and noise level measurements of existing plant/facilities on site were taken to provide accurate data for noise modelling of the proposal.

3.9.2 Existing Environment

3.9.2.1 Source of Data

Ambient noise monitoring was conducted at two locations near the facility from 27 July to 2 August 2007. The first site was located at Residence K owned by Mr C. Finlay south of Quia Road and the second was located at Residence A owned by C&R Southorn on the "Wirringulla" property northwest of the facility. Further noise monitoring was conducted at Residence E owned by J&J Wilkinson located adjacent to the Kamilaroi Highway northeast of the facility from 24 to 29 September 2007. The locations of these sites are displayed on **Figure 3.3**.
Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers used as environmental noise loggers. The measurements were undertaken in accordance with relevant DECC guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used comply with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and have current NATA calibration certification.

Each logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing L_n percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument's initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range.

3.9.2.2 Ambient Noise Levels

Measured noise data were analysed in accordance with procedures set out in the DECC Industrial Noise Policy (INP) to determine the ambient L_{Aeq} and background (L_{A90}) noise levels. Since it was not possible to close down the CHPP operations during the monitoring period, noise loggers were placed in locations where the dwellings acted as a noise barrier between the logger and CHPP. Attended noise measurements at the commencement of the survey indicate that there was minimal contribution from the CHPP to L_{Aeq} and L_{A90} noise levels at both locations.

At Residence K (Finlay), low background noise levels suggest the absence of continuous noise from the CHPP and very high L_{Aeq} levels are attributed to traffic on Quia Road located only 20m from the residence. Although the traffic was low-volume, there was a high percentage of heavy vehicles.

Background noise levels were also comparatively low at Residence A (Southorn) with little continuous contribution from the CHPP. While the dozer operations at the stockpile was audible on occasions during the attended survey on the evening of 27 July 2007, visible coal truck movements were only occasionally audible and the measured CHPP contribution to the L_{Aeq} level was estimated at well under 30dB(A)[2], the major contributor to L_{Aeq} levels was traffic on the Kamilaroi Highway.

[2] It is noted that the attended monitoring location was in direct view of the CHPP but the logger was behind the residence (garage). CHPP noise at the logger is therefore estimated to be negligible.

The acoustic environment was also dominated by traffic noise at Residence E (Wilkinson), with low background levels at night indicative of low night-time traffic volumes on the Kamilaroi Highway.

Ambient noise levels are summarized in **Tables 3.7 to 3.9**.

Table 3.7
Ambient Noise Levels – Residence K (Finlay)

Date	L_{Aeq}(day)	L_{Aeq}(eve)	L_{Aeq}(night)	L_{A90}(day)	L_{A90} (eve)	L_{A90}(night)
27/07/2007	55.5	54.0	52.4	32.0	34.0	27.0
28/07/2007	55.8	52.5	51.0	34.0	26.0	23.0
29/07/2007	54.3	52.5	56.1	28.0	24.5	21.0
30/07/2007	58.5	55.5	55.3	32.2	26.0	21.5
31/07/2007	58.5	57.0	55.9	36.0	29.0	23.5
1/08/2007	58.2	58.1	56.9	37.0	33.5	25.0
2/08/2007	58.3	56.2	53.7	36.0	30.0	24.0
L_{Aeq}	**58**	**56**	**55**	**--**	**--**	**--**
L_{A90}	**--**	**--**	**--**	**34**	**29**	**24**

Table 3.8
Ambient Noise Levels – Residence A (Southorn)

Date	L_{Aeq}(day)	L_{Aeq}(eve)	L_{Aeq}(night)	L_{A90} (day)	L_{A90} (eve)	L_{A90}(night)
27/07/2007	59.6	42.3	41.5	33.4	25.4	21.4
28/07/2007	48.6	40.1	37.7	27.1	18.4	17.9
29/07/2007	47.0	44.1	42.3	25.1	18.0	16.7
30/07/2007	47.2	43.3	42.3	28.3	32.1	18.5
31/07/2007	47.9	44.1	43.0	30.2	22.8	17.8
1/08/2007	50.7	42.0	46.9	33.4	28.7	18.9
2/08/2007	49.0	42.0	43.6	35.9	28.3	26.8
L_{Aeq}	**49**	**43**	**43**	**--**	**--**	**--**
L_{A90}	**--**	**--**	**--**	**30**	**25**	**19**

Table 3.9
Ambient Noise Levels – Residence E (Wilkinson)

Date	L_{Aeq}(day)	L_{Aeq}(eve)	L_{Aeq}(night)	L_{A90}(day)	L_{A90} (eve)	L_{A90}(night)
24/09/2007	--	49.5	47.2	38.0	32.3	22.9
25/09/2007	60.2	46.7	47.1	34.6	32.7	23.6
26/09/2007	50.4	43.4	44.5	30.5	32.0	23.7
27/09/2007	64.5	45.8	47.8	35.4	36.2	21.4
28/09/2007	63.9	46.7	44.0	33.5	35.3	23.4
29/09/2007	53.2	42.7	42.7	27.7	25.7	21.1
30/09/2007	63.3	43.6	43.3	25.4	27.7	21.1
L_{Aeq}	**62**	**46**	**46**	**--**	**--**	**--**
L_{A90}	**--**	**--**	**--**	**33**	**32**	**23**

The INP stipulates that where background levels (L_{A90}) are less that 30 dB(A), then 30 dB(A) is to be adopted as the Rating Background Level (RBL) for the purposes of setting noise criteria. Accordingly, RBLs at the noise monitoring sites are as shown in **Table 3.10**.

Table 3.10
Rating Background Levels (RBL) dB(A),L_{90}

Residence	Day	Evening	Night
K (Finlay)	34	30	30
A (Southorn)	30	30	30
E (Wilkinson)	33	32	30

It is noted that the owners of Residences K and A have entered into a formal agreement with the Applicant since the background noise monitoring program was undertaken. The agreement provides an action plan in the event of a noise (or dust) - related complaint or an exceedance of relevant criteria at their residence.

3.9.2.3 Traffic Noise

Measured L_{Aeq} levels at all sites were quite consistent during each period (day, evening, night) over the seven-day monitoring period. Attended measurements confirmed traffic noise as the major source at all sites. Traffic noise levels are summarised in **Table 3.11**.

Table 3.11
Traffic Noise Levels, dB(A),L_{eq}

Residence	Day	Evening	Night
K (Finlay)	58	56	55
A (Southorn)	49	43	43
E (Wilkinson)	62	46	46

3.9.3 Constraint(s)

The existing noise climate provides a constraint upon the operations of the CHPP and rail loading facility, principally with respect to night-time noise and sleep disturbance in particular. For the purposes of the noise assessment (discussed in Section 4.3 of this document), reference is to be made to residences E (Wilkinson), F (Jaeger) and G (Rankin). It is noted the owners of five surrounding residences have a formal agreement with the Applicant relating to noise and as such are recognised as Project-related residences.

3.10 TRANSPORTATION AND TRAFFIC

3.10.1 Existing Environment

3.10.1.1 Road Transport and Traffic

The Project Site lies adjacent to, and is accessed directly from, the Kamilaroi Highway, with supplementary access/egress provided to Torrens Road via the private Torrens Road access way. **Figure 3.8** presents the road network used, or proposed to be used, by coal and reject carrying trucks along with the location of recent count sites at various points along these routes[3].

[3] It should be noted that the movement of coal trucks along each of the roads identified on **Figure 3.8** is either an approved activity by virtue of the various development consents for local coal mines, eg. Whitehaven Coal Mine, Tarrawonga Coal

The Kamilaroi Highway pavement between Blue Vale Road (SR 7) and the entrance to the Siding Access Road, though generally in good condition, does exhibit areas of pavement deformation, principally on the northern-most lane which carries the laden trucks entering the Siding Access Road.

East and west of the entrance to the Siding Access Road, the Kamilaroi Highway comprises a minimum 6m wide sealed pavement in good condition, with barrier and centre line marking provided. The highway speed limit is 100kph.

The Kamilaroi Highway / Siding Access Road intersection is similar in form to the intersection of the Kamilaroi Highway and Blue Vale Road (SR 7) and was designed and installed to service the former Vickery rail siding / train loader (now the Whitehaven CHPP and Rail Loading Facility) and a projected 690 coal truck movements per day. The intersection comprises:

- a free flow slip lane, merge taper and secondary lane for westbound vehicles leaving the Siding Access Road;
- a lane for right-turning vehicles leaving the Siding Access Road. The right turn lane and the free flow left slip lane are separated by an island with concrete kerbing to the north and east and by an 0.9 m high concrete barrier to the west; and
- a deceleration taper for westbound vehicles on the Highway entering the Siding Access Road.

Visibility at this intersection is 600m to the west, and approximately 800m to the east. Warning signs indicating trucks crossing are positioned to the east of the Siding Access Road intersection and lighting is provided at the intersection.

Traffic counts were completed by Gunnedah Shire Council in February 2007 at two locations on Blue Vale Road as illustrated on **Figure 3.8**. Count location F is west of the intersection with Blue Vale Road, ie. does not carry coal traffic from the mines to the north, whereas location G is east of Blue Vale Road and west of Siding Access Road and does carry coal traffic from the mines to the north. **Table 3.12** shows an increase in AADT from 1 729 to 2 273 between locations F and G, with the proportion of heavy vehicles increasing from 26% to 30%.

Mine, or has been provided for in the application for project approval of proposed coal mines, eg. Belmont Coal Project and Sunnyside Coal Project.

Torrens Road and Torrens Road Access Way

The Torrens Road access way, is a private extension of Torrens Way (from the former North-western Railway Line level crossing) to provide entry/egress from the Project Site from Quia Road (for traffic from the Sunnyside Coal Project). Pavement widths range from 6m to 7m with pavement conditions ranging from good, to fair in isolated areas. Minor pavement edge break-off and deformation is evident in sections.

The Applicant has proposed to upgrade the section of Torrens Road and Torrens Road access way as part of the Sunnyside Coal Project.

3.10.1.2 Rail Transport and Traffic

Coal is currently loaded into 42 wagon coal trains at the Whitehaven Rail Loading Facility and transported to Port Newcastle for export. The coal trains use the North-western Railway Line, which passes through Gunnedah, and joins the Main Northern Railway Line at Werris Creek. From Werris Creek, the Main Northern Line proceeds to Newcastle passing through Willow Tree, Murrurundi, Scone, Aberdeen, Muswellbrook Singleton, Maitland, and a number of other smaller locations en route (see **Figure 3.9**). Total rail haulage distance is approximately 325km from the Whitehaven rail loading facility to Port Newcastle.

The North-western Railway Line provides rail access (with a single standard gauge track) between Werris Creek and Moree. Daily rail traffic on this line between Narrabri and Gunnedah is currently as follows.

- Passenger train – 1 return journey (2 movements).
- Wheat train – 2 return journeys (4 movements).
- Container train – 2 return journeys (4 movements).
- Coal train – up to 5 return journeys (10 movements) including:
    - one to two return journeys from the Whitehaven Rail Loading Facility; and
    - two to three return journeys from the Idemitsu rail siding 4km north of Boggabri (Idemitsu Boggabri Coal Pty Ltd) – drawing coal from the Boggabri Coal Mine.

Further south on the Main Northern Railway Line, one to two return journeys are generated daily from the Werris Creek rail siding, 3km southwest of Werris Creek (Werris Creek Coal Pty Ltd). It is also noted that Narrabri Coal Pty Ltd has proposed two to three return journeys from a rail loop constructed 30km south-southeast of Narrabri.

During a busy grain season, the number of wheat trains per day could increase to 6 or 7 return journeys (12 to 14 movements), however, a representative of Pacific National (T. Kaminski pers. comm.) indicated that this has not occurred for several years and was unlikely in the future as local agriculture moved away from cropping cereals to grazing or other land uses, eg. mining.

It is noted that through Gunnedah, there are three level crossings affected by the movement of rail traffic on the North-western Railway Line at New Street, Marquis Street and Carroll Street (see **Figure 3.10**). A single rail overpass is located on Abbott Street. The current frequency of rail movement through Gunnedah has been identified as creating some traffic congestion during the closure period of the level crossings. It is acknowledged that the duration of level crossing closures at present is attributed mainly to the fact that trains are effectively passing through these crossings commencing at a standing start.

3.10.2 Constraint(s)

Through appropriate road upgrades and ongoing contribution to road maintenance, the condition of local roads should not constrain the proposal. Similarly, assuming appropriate safeguards are in place and the coal haulage fleets travelling to and from the local coal mines are maintained and managed in accordance with approved codes of conduct, the proposed traffic levels would be within acceptable levels and not constrain the ongoing operations at the facility.

The current closure periods of the level crossings in Gunnedah will only continue until February 2008 when the Gunnedah bypass line will become operational. After that time, the Applicant will be able to use 72 wagon trains compared with the existing 42 wagon trains.

3.11 VISIBILITY

3.11.1 Existing Environment

The component areas of the Project Site are located on virtually flat land between the Kamilaroi Highway or Quia Road and the North-western railway line and, as such, are potentially visible from these local vantage points and a limited number of local residences. The rail loop area is also bounded to the west by the infrequently used McDonald Road.

Views of the existing facilities on the Project Site from the Highway, Quia Road and local residences, eg. the rail loading bin and associated conveyor assembly, stockpiles, lighting towers (at night, when operating) and trains moving on the rail loop, are obscured to varying degrees by intervening vegetation, planted tree screens and the low relief of the site. Views of the facilities on the Project Site from McDonald Road and the eastern end of Emerald Hill Road are essentially unobstructed.

The rail loading bin and conveyor structures, though dominant features of the visual environment from a number of vantage points, are consistent with the industrial nature of the area adjacent to Quia Road.

Extensive views of the Project Site are possible from trains passing along the North-western Railway Line, with unobstructed views of the existing structures and stockpile areas possible. However, passenger trains passing are generally travelling at speeds in the order of 100km/hr and accordingly, the duration of visibility is minimal.

More distant views of the Project Site are available from elevated publicly accessible vantage points to the southeast, south and southwest including Borethistles Hill (4km), Little Sugarloaf Mountain (5.5km), Black Jack Mountain (8km), Pyramid Hill (5km) and Sugarloaf Mountain (6km) (see **Figure 3.1**). All distances provided relate to the location of the load-out bin above the Whitehaven Rail Loop. However, in each case the views are obscured by the vegetation at the vantage points, masked by the industrial developments in the foreground or limited in scale given the considerable intervening distance.

3.11.2 Constraint(s)

Facilities and operations on the Project Site would not change as a result of the proposed modification and as such, visual amenity is unlikely to constrain the proposed increase in coal throughput and rail loading.

3.12 SOCIO-ECONOMIC SETTING

3.12.1 Introduction

The Project Site is located on the outskirts of Gunnedah, providing a regional and rural setting in central northern NSW which, like many other regional areas, has been in relative decline in socio-economic terms over the past twenty years, and particularly during the period between about 1997 and 2002 when the coal mining industry around Gunnedah was effectively closed down. Recent demographic trends in Australia have demonstrated acceleration in the trend to the "sea change" phenomenon, or country residents migrating to larger regional centres, placing considerable stress and change on areas in decline.

In recent times, the re-introduction of a viable coal mining industry in the Gunnedah area has provided welcome diversification of industry, employment generation and skills provision. Its re-introduction has in fact been recognised as the catalyst for much of the growth in other sectors throughout Gunnedah in recent years. In this context, the Applicant's proposal would in effect be a further boost to the sustained and increased economic inputs provided by the coal industry.

The description of the existing socio-economic setting around Gunnedah draws from and builds up on the results of a socio-economic study completed for the Tarrawonga Coal Mine in 2005, ie. one of the mines providing coal to the Whitehaven CHPP and rail loading facility (Key Insights – Castlecrest, 2005). Further information is provided from discussions held with Mr Don Ewing, a long-time resident and real estate agent in Gunnedah.

3.12.2 Local Socio-economic Setting

Key Insights – Castlecrest (2005) identified the following in relation to the local setting and socio-economic issues of greatest concern.

- The Gunnedah area has experienced declining populations over recent decades although the decline attributed to the closure of the coal mining industry in the late 1990's appears to have been reversed with the increase in recent years. The extent of population adjustments in recent years will be quantified when the detailed 2006 census data is released.
- There had been net out-migration from rural areas, especially as a result of young people moving to regional centres in search of further work and educational opportunities.
- There is generally wide community support for mining in the Gunnedah area. Residents are understood to welcome the economic and employment benefits that have already occurred and are likely to continue as a result of ongoing and increased mining activity. This level of support is based largely on the knowledge of local residents who were aware of the economic contributions the 450 mine workers and their Companies made until the late 1990s. It is noted this also coincided with the closure of the Gunnedah Abattoir causing a noticeable reduction in employment opportunities.
- The community view mining as a positive way to achieve population growth and much needed diversity within the local economy.
- Concerns for housing supply is being responded to with the release of new building blocks and building of new houses and home units.
- The Gunnedah economy is primarily driven by agriculture and subsequently, the labour market and skills pool are not particularly deep. The development and operation of the Applicant's Whitehaven and Tarrawonga Coal Mines in the area has provided increased opportunities for the necessary skills to be attained through employment direct or ancillary to these mines.
- There has already been a transfer of workers from the agricultural sector to the better paid mining sector, particularly given the reduction in employment opportunities during the drought. However, high levels of youth unemployment suggest a considerable pool of young workers, who would be available to engage in low-skill jobs or participate in structured training.
- The substantial reduction in employment opportunities experience in the late 1990s appears to have been overcome with employment generated in the retail and health care sectors, in particular. It is understood employment levels in 2007 are again approaching the pre-late 1990s level.

3.12.2.1 Existing Services and Facilities

Educational Facilities and Services

Gunnedah is serviced by four primary schools: two State schools, one Catholic and one Christian Community School. There are also two high schools in Gunnedah, a State school and a Catholic High School, St Mary's College. In 2001[4], there were reportedly, 819 primary school children and 580 high school aged students, most of whom were presumably attending a local school (ABS, 2001). Gunnedah is served by a range of childcare centres and preschools. Gunnedah TAFE operates from Hunter Street, providing a range of State-approved courses with local content. It is most likely that Gunnedah TAFE would benefit from mining growth in the region and is likely to provide flexible delivery options to new and young workers.

The nearest university campus is the University of New England, which has a campus in Armidale.

Healthcare Facilities and Services

Gunnedah has a 50 bed capacity hospital which provides a high standard of general medical and surgical services including a Slow Stream Rehabilitation Unit, a day surgery care facility, a Public Health Dental Clinic and a Physiotherapy Unit. A range of additional healthcare services including but not limited to mental health, drug and alcohol, dental, family health and speech therapy are provided by the Gunnedah Community Health Service.

Other health care facilities are available in Gunnedah include the following.

- The Gunnedah Nursing Home (Lundie House) has 58 nursing home places. The Alkira has 32 hostel places and McAuley Aged care has 22 hostel places. Yalambi has 13 units. The Frail Aged hostel provides 24 hour-a-day care.
- NSW Ambulance.
- Baby health centre.
- X-ray facilities.
- Pathology services.

General Facilities and Services

Gunnedah, as a larger regional centre, provide numerous sporting and recreational clubs, sporting grounds and facilities, restaurants, retail facilities and several franchises.

Gunnedah is recognised as attractive to business because of its rail and road transport links. A focal point for activity of a cultural nature within Gunnedah and surrounding areas is the Gunnedah Cultural Centre. It includes the Civic Theatre, which houses new cinema/theatre facilities. Also included are the original town hall and the creative arts centre. The creative arts centre displays the Shire's art collection. Gunnedah also has a swimming centre incorporating a 50m Olympic pool, 25m indoor heated pool, children's wading pool, kiosk and BBQ facilities.

Gunnedah has the following business and industry groups.

- Gunnedah and District Chamber of Commerce and Industry.
- Gunnedah Stock and Station Agents Association.
- New South Wales Farmers Association.
- Tourism Gunnedah (Gunnedah Visitors Information Centre).
- Gunnedah District Unlimited. (Main Street Program).

3.12.3 Local Capacity: Demand and Supply

Gunnedah Shire is well serviced by a range of clubs, service organisations, facilities and government services and have high levels of social capital. A summary of the existing supply and demand for 'soft' infrastructure such as access to education and health services is provided below. These are purposefully provided as indicative only but provide a basis for assessing the potential impact on the ability of Gunnedah and surrounding communities to manage any potential population increase.

- Varying over time, Gunnedah is serviced by between 5 and 6 general practitioners, providing a FTE GP Ratio of around 1:1 400. This is generally higher than optimal, however, is generally within the range considered adequate.
- Additional 'soft' infrastructure such as clubs and sporting groups are well represented.

3.12.4 Constraints

The Whitehaven CHPP and Rail Loading Facility is an established feature in Gunnedah, providing significant employment opportunities and industry diversification. It is considered unlikely that the proposed increase in CHPP throughput and rail loading would be constrained by socio-economic issues. Rather, the modest increase in employment would contribute to the continued economic growth throughout the Gunnedah area.

[4] 2006 Census data was unavailable at the time of writing.

3.13 PLANNING CONSIDERATIONS

3.13.1 Zoning and Relevant Planning Instruments

3.13.1.1 Local Planning Instruments

The Project Site is zoned under the Gunnedah Shire Local Environmental Plan (LEP) 1998. The siding area and Torrens Road access way components of the Project Site lie within land zoned 1(a) Rural (Agricultural Protection) and the rail loop component of the Project Site lies within land zoned 4(b), Offensive Industry. **Figure 3.11** displays the zones within and around the Project Site.

The objectives of the 1 (a) and 4 (b) zones are as follows.

Zone 1 (a) – Rural (Agricultural Protection)

- "to protect the use and efficiency of prime agricultural land while permitting appropriate development subject to suitable subdivision controls;
- to permit other forms of development which are ancillary to rural land uses or that, as a result of their nature, require siting outside the urban area;
- to avoid further fragmentation and alienation of useable rural land;
- to retain the low density nature of settlement within the rural areas and ensure that any future development does not create unreasonable demands on the existing infrastructure or available services;
- to provide for the requirements of the rural community;
- to maintain safety and convenience along main roads by discouraging uses that are likely to generate traffic volumes which disrupt traffic flow; and
- to ensure that the existing level of scenic amenity is maintained by requiring development to have regard for significant ridgelines and hilltops."

Zone 4 (b) – Offensive Industry

- to provide adequate and appropriate land for the accommodation and development of industrial land uses which are offensive;
- to encourage industrial development which will contribute to the local economy;
- to locate offensive industries in areas that will minimize conflict in regard to potential impact on the surrounding environment or local amenity;
- to recognize and provide for a range of industrial development and to ensure adequate infrastructure for the long term viability of such development; and
- to encourage offensive development to be located on land within this zone only so that it may be concentrated and coordinated.

The operations of the Whitehaven CHPP and rail loading facility are permissible under the Gunnedah LEP 1998 (with the consent of Council).

3.13.1.2 Regional Planning Issues

Orana Regional Environmental Plan (REP) No 1 – Siding Spring

The Project Site lies within a region called the Siding Spring Observatory Dark Skies Region, declared by the (then) Minister for Infrastructure and Planning to better protect the observing conditions at the Siding Spring Observatory. The region includes all local government areas falling within 200km of the observatory. While the Project Site is approximately 130km from Siding Spring Observatory, no consultation or concurrence is required with the Observatory Director as, under Section 8 of the REP, consultation or concurrence is only required for locations within 100km of the observatory. As such, this REP has not been considered further.

3.13.1.3 State Planning Issues

State Environmental Planning Policy No. 33 (SEPP 33) – Hazardous and Offensive Development

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that without the implementation of appropriate impact minimisation measures would, or potentially would, pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment.

Hazardous substances and dangerous goods to be held or used on the Project Site are required to be identified and classified in accordance with the risk screening method contained within the document entitled *Applying SEPP 33 2nd edition,* (DUAP, 1997). As the hazardous substances and dangerous goods used / stored on the Project Site would be restricted to well managed diesel fuel, the Project is not considered to be a hazardous or offensive industry.

State Environmental Planning Policy No. 44 (SEPP 44) – Koala Habitat Protection

The Gunnedah Local Government Area (LGA) is identified in Schedule 1 of this policy as an area that could provide habitat for Koalas. The policy requires an investigation be carried out to determine if core or potential Koala habitat is present on the areas of the Project Site likely to be disturbed. Core Koala habitat comprises land with a resident population of Koalas whereas potential Koala habitat comprises land with native vegetation with known Koala feed trees constituting at least 15% of the total number of trees present on a site. There is no core or potential habitat within the Project Site.

State Environmental Planning Policy (SEPP) (Mining, Petroleum Production and Extractive Industries) 2007

The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development, as defined in NSW legislation. **Table 3.12** presents a summary of each element requiring consideration and a reference to the section in this SoEE where each element is addressed.

3.13.2 Constraints

The proposal is permissible under the Gunnedah LEP 1998 and would not be constrained by any of the identified regional or State planning instruments.

Table 3.12
Application of SEPP (Mining, Petroleum Production and Extractive Industries) 2007

Relevant SEPP Clause	Description	SoEE Section
12: Compatibility with other land uses	Consideration is given to:	
	- the existing uses and approved uses of land in the vicinity of the development;	3.3, 3.13.1
	- the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	4.7
	- any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	4.7
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	
	Measures proposed to avoid or minimise any incompatibility are considered.	4.2.2, 4.3.5, 4.4.4
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	
	Measures taken by the applicant to avoid or minimise any incompatibility are considered.	4.2.2, 4.3.5, 4.4.4
	The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	4.8.3
14: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:	
	- impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	4.2
	- impacts on threatened species and biodiversity are avoided or minimised; and	3.6
	- greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	Appendix 4
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.7
16: Transportation	The following transport related issued are considered.	
	- The transport of some or all of the materials from the site by means other than public road.	4.5.2
	- Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	2.8.2
	- The preparation of a code of conduct for the transport of materials on public roads.	4.5.2
17: Rehabilitation	The rehabilitation of the land affected by the development is considered including:	
	- the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	2.12
	- the appropriate management of development generated waste;	2.7
	- remediation of any soil contaminated by the development; and	Not Applicable
	- the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.12

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Section 4
Environmental Safeguards and Effects

Preamble

This section reviews those elements of the existing environment identified as potential constraints upon the proposed modification to existing operations at the Whitehaven CHPP and Rail Loading Facility. In each case, the environmental objectives are identified and the design and operational safeguards together with management procedures are described for managing the relevant environmental issues. Where appropriate, the continuation of existing monitoring programs, additions to these existing programs, or commencement of new monitoring programs are outlined. The environmental effects of the proposed modifications upon the local environment, assuming all proposed safeguards and procedures are adopted, are then reviewed.

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4.1 SOIL RESOURCES

4.1.1 Objectives

While not identified as a major constraint on the proposed modification, the Applicant would maintain the following objectives in the management soil resources.

- To minimise areas of disturbance and retain any topsoil for rehabilitation.
- To manage soil stockpiles to minimise erosion potential and maximise potential benefits for site rehabilitation.

4.1.2 Operational Safeguards and Management Procedures

Soil would only be stripped from the footprint of the two additional fine reject ponds (RP-7 and RP-8), two additional settlement ponds (SP-6 and SP-7) and the associated perimeter drains. In order to ensure the above soil management objectives are satisfied, the following operational safeguards would be implemented.

- Topsoil and subsoil would be stripped separately, to depths of 25cm and approximately 45cm respectively.
- The stripped soil would be immediately transferred for use in the construction of a perimeter bund around the fine reject ponds / settlement ponds footprint, a distance of approximately 1 100m. Based on the available soil resources to be stripped (9 800m^3 of topsoil and approximately 17 700m^3 of subsoil), and to minimise the potential for erosion, the bund would be constructed with the following parameters.
  - Height = 3m.
  - Base width = 12.5m.
  - Top width = 3.5m.
  - Internal batter slope = 1V:1H (45^o).
  - External batter slope = 1V:2H (30^o).

  The subsoil would be used to construct the internal bulk of the bund with topsoil spread with a thickness of approximately 50cm over the top (see **Figure 2.2**).
- The perimeter bund would be immediately sown with a cover crop to maintain bund stability and promote biological activity of the soil.
- Prior to the establishment of a vegetative cover, sediment fencing would erected immediately downstream of the bund to remove the suspended sediment from water flowing off the bund.
- Based on the volume of topsoil stripped and respread over the perimeter bund, there would be approximately 4 000m^3 of additional material not required for use in the construction of the bund. This material would be stockpiled for future use with the stockpiles <2m in height and with batter slopes <2V:1H adjacent to the previous soil stockpiles northeast of RP-7 and RP-8.

4.1.3 Environmental Effects

Assuming the proposed operational safeguards and management procedures are implemented, the soil stripped and used in the construction of the new bund wall around Fine Reject Ponds RP-7 and RP-8, would be of no less quality and value for future agricultural activities over the rehabilitated final landform.

4.1.4 Monitoring

No monitoring of soil resources would be required, although the stability of the bund wall would be regularly inspected until a cover of vegetation is established.

4.2 WATER RESOURCES

4.2.1 Objectives

Up to 50ML of additional water would be required as part of the proposed modification, ultimately leading to an increase in the volume of potentially "dirty" water, ie. water containing elevated concentration of suspended solids, or potentially "contaminated" water, ie. water containing elevated concentrations of other pollutants such as hydrocarbons, requiring management within the Project Site. The Applicant would continue to manage water resources on and adjacent to the Project Site with the following objectives.

- To segregate "clean", "dirty" and possibly "contaminated" water flows.
- To contain sediment-laden water within the disturbed area of the Project Site.
- To minimise erosion through uncontrolled drainage of water.
- To avoid negative impacts on local groundwater quality or quantity.
- To ensure all site activities are undertaken at an elevation so as not to be affected by the 1 in 100 ARI flood level of the Namoi River.

Acknowledging that the surface and groundwater used by the Applicant is a valuable resource to neighbouring property owners, and the ecological integrity of the Namoi River catchment as a whole, the Applicant maintains the following additional objectives.

- To ensure the water management systems employed within the Project Site do not adversely affect downstream water resources or users in terms of either quality or quantity, that the ecological integrity of the catchment is maintained, and that any water leaving the Project Site complies with the appropriate DECC criteria.
- To rehabilitate the Project Site such that the water that drains from it when the Whitehaven CHPP and rail loading operations cease is non-polluting.

4.2.2 Operational Safeguards and Management Procedures

4.2.2.1 Potential Sources of Water Pollution

The sources of water pollution from the ongoing and proposed activities within the Project Site are as follows.

(i) Surface runoff from ROM coal and coal product stockpiles.

(ii) Runoff from hardstand areas including roads, Coal Preparation Plant and the main office.

(iii) Overflow, or uncontrolled discharge, from the fine reject ponds.

(iv) Runoff from areas disturbed in advance of the construction of RP-7, RP-8, SP-6 and SP-7.

(v) Runoff from the Fine Reject Ponds RP-7 and RP-8 perimeter bund awaiting establishment of a cover crop.

(vi) Runoff from stockpiles of excess topsoil.

(vii) Fine reject leachate migration to groundwater.

(viii) Leakage or spillage of hydrocarbons.

Suspended solids, ie. principally silt, clay or coal particles in water and hydrocarbons are therefore likely to be the major sources of pollution.

4.2.2.2 Impact Assessment Criteria

The quality of surface water discharged from the Project Site would be assessed against DECC guidelines for pH, suspended solids and oil and grease as identified in **Table 4.1**.

Table 4.1
Discharge Limits – Surface Water

Parameter	50th Percentile Limit	70th Percentile Limit	100th Percentile Limit
pH	-	-	6.5 to 8.5
Total Suspended Solids (mg/L)	20	35	50
Turbidity (NTU)	-	-	50
Oil and Grease (mg/L)	-	-	10

The acceptability of any decrease in the quantity of clean water available downstream of the Project Site would be assessed against the maximum dam capacity for the Project Site. The maximum dam capacity for the Project Site was determined in the following manner.

Maximum Dam Capacity = Catchment Area (ha) x Multiplier Value [1]
= 72.3 x 0.07
= 5.1ML

[1] The calculation is based on the Department of Infrastructure, Planning and Natural Resources document *Rural Production and Water Sharing Landholders Information Package (1999)*

As noted in Section 3.4.1.1, the quality of groundwater available from the alluvial aquifer is good with the majority of registered bores providing moderate to high yields. Impacts on groundwater are considered unlikely, with assessment criteria based on any trend in decreasing water quality or yield.

4.2.2.3 Management of Water Quality

Table 4.2 lists the chemical analyses of a range of water sources used on site for both washing coal and dust suppression. Typically, the quality of water used within the CHPP circuit and fine reject system has an electrical conductivity of approximately 3 500µS/cm. The maintenance of the salinity level in the water used on site is achieved through dilution of water from the finishing pond with water from the Namoi River and Main Storage Dam. Both of these sources typically constitute approximately two-thirds of the make-up water used on site.

Table 4.2
Water Used for Dust Suppression / CHPP Operations

Analyte	Bore GW 037959	Main Storage Dam	Namoi River Pump	Finishing Pond	First Polishing Pond	Final Polishing Pond
pH	7.89	7.87	8.10	8.48	8.49	8.32
Electrical Conductivity	3 500	1 340	600	3 840	2 790	3 080
Suspended Solids	-	16	101	27	9	48
Total Alkalinity (as $CaCO_3$)	345	130	184	155	213	179
Sulphate	508	198	41	959	648	737
Chloride	740	186	40.7	608	385	466
Calcium	190	57	42	116	96	95
Magnesium	132	40	21	114	82	91
Sodium	394	139	36	577	408	452
Potassium	2	8	4	25	20	21
Oil and Grease	-	<10	<5	<5	<5	<5

Apart from the interaction between the coal and the water used during washing, the quality of water is only influenced by the addition of small quantities (30g/tonne) of two flocculants namely, Hi-Tex 82230 and Nalkat (R) 7607. Neither are hazardous substances. In reality, these two chemicals have negligible effects on the quality of water used on site.

Figure 4.1 identifies the major water management structures that would control the drainage of surface water over, around and from the Project Site. The majority of these structures are already in use and are effectively managing the drainage and storage of water.

The principal water management structures for capturing and storing water which flow across disturbed areas on the Project Site are as follows.

- Dirty water drains (DWD) – to intercept potentially sediment-laden water from the hardstand surfaces, roads and stockpile areas of the Project Site, as well as the water seeping from the fine reject ponds, and direct it to the settlement ponds.
- Settlement ponds (SP) – for the detention and treatment of potentially sediment-laden water prior to its discharge to natural drainage lines or the Main Storage Dam.

The principal water management structures to divert and / or store clean water flows are as follows.

- Clean water drains (CWD) – to divert clean water away from areas of disturbance, thereby minimise the volume of potentially sediment-laden water requiring treatment, and direct water discharged from the settlement ponds to clean water storage.
- Clean water dams – namely the fresh water dam, recovery pond and Main Storage Dam (see **Figure 4.1**), for the containment of "clean" water settlement ponds.

Clean Water Diversion and Storage

A clean water drain (CWD-1) diverts water from the south around the Fine Reject Ponds RP-1 to RP-6 and enter the 7ML capacity fresh water dam. Water discharges from the fresh water dam and flows via a box culvert under the North-western Railway Line and a clean water drain (CWD-2) located between Coal Stockpiling Area A and Fine Reject Ponds 7 and 8. CWD-2 incorporates a low flow diversion weir comprising two 300mm pipes and a gate which enables flows within the drain to be directed via CWD-4 to the main storage dam or to pass directly to the Namoi River via CWD-3.

The Main Storage Dam has a storage capacity of 20ML and accepts both clean water from CWD-4 and potentially dirty water from several settlement ponds. For this reason, it is considered to have a pollution control function and is not considered as part of the maximum dam capacity of the Project Site. The capacity of the dam is sufficient, however, to ensure that adequate settlement time is provided for the water prior to discharge to the Namoi River catchment (via CWD-5).

Water seeping from the Fine Reject Ponds RP-1 to RP-6 enters a polishing pond, where any remaining suspended coal fines is allowed to settle. The clean water then overflows into the recovery pond before it is then pumped to the Coal Preparation Plant via an underground water pipe for washing the coal Water seeping from the reject ponds RP-7 and RP-8 would flow into two new settlement ponds (SP-6 and SP-7) from where it would be pumped to the dirty water drain intercepted by SP 1 and SP 2 before reporting to the Main Storage Dam. The settled water would be pumped either to the Coal Preparation Plant for coal washing or to the Namoi River catchment via CWD-3.

Dirty Water Capture, Storage and Settlement

From an area in the vicinity of Coal Stockpiling Area A, the hardstand of the Project Site is cambered to the northwest and all potentially sediment-laden water flows to dirty water drain 1 (DWD-1), located along the inside of the internal road skirting the perimeter of the hardstand surface. The water is directed to the north within DWD-1, and is discharged to either Settlement Pond 2 (SP-2) via DWD-2 or SP-1 via DWD-3. Both settlement ponds have a capacity of 0.66ML. The settled water then flows from SP-1 to the Main Storage Dam via DWD-4.

To the east of Coal Stockpiling Area A, the hardstand is cambered to the southeast, with the potentially sediment-laden water captured by DWD-5. DWD-5 is located along the southeastern and eastern perimeter of the hardstand surface and discharges water directly to SP-1.

Water is designed to seep from Fine Reject Ponds RP-1 to RP-6 into two settlement ponds (SP-4 and SP-5) before discharging into the polishing pond and recovery pond for re-use through the Coal Preparation Plant. In a similar fashion, Fine Reject Ponds RP-7 and RP-8 have been designed such that seeping water flows into two new settlement ponds (SP-6 and SP-7). The settled water would be pumped either to the Coal Preparation Plant for coal washing or to the Namoi River catchment via CWD-3.

Water used within the truck wash would be passed through a vegetated drain to filter sediment from the sediment-laden water, before being diverted to SP-2, SP-1 and the Main Storage Dam via DWD-6. A final dirty water drain (DWD-7) captures any dirty water runoff from around the main office and car park and discharges it to a well grassed area upstream of the Main Storage Dam.

Prevention of Surface or Groundwater Contamination

The following operational safeguards would be continued to be adopted to prevent the contamination of surface or groundwater by hydrocarbons or coal fines leachate.

- All fuel and oil would continue to be stored within a concrete bunded fuel storage with a capacity of more than 22 000L. This capacity is >110% of the 20 000L diesel fuel tank within the bund.
- The fine reject ponds would continue to be regularly cleaned of consolidated fine reject, reducing the time available for leachate to seep into the ground.
- The floor of each fine rejects pond would be compacted to achieve a permeability of 1 x 10^{-9}m/s for a thickness of at least 0.9m.
- The floor and walls of the settlement ponds would similarly be compacted to achieve a permeability of 1 x 10^{-9}m/s.

4.2.2.4 Maintenance of Water Availability and Environmental Flows

Clean water drains CWD-2, CWD-3 and the low flow diversion weir would ensure that during heavy rainfall events, environmental flows to the Namoi River are maintained. The low flow weir also provides the Applicant with the option of diverting all water away from the Main Storage Dam and to the Namoi River during periods of drought.

Notably, the capacity of the fresh water dam (approximately 4ML) is less than the maximum dam capacity calculated in Section 4.2.2.2. Therefore a licence for this structure is not required under Part 5 of the *Water Act 1912*.

4.2.2.5 Flooding Controls

As identified on **Figure 3.5**, the northern part of the Project Site is located within the 1 in 100 ARI flood-line. In order to safeguard against the pollution of flood waters with coal fines, hydrocarbons or other contaminants, all stockpiling, storage and processing activities are located at elevations above the flood-line.

4.2.2.6 Drainage of the Rehabilitated Landform

Two drainage lines would be retained in the final rehabilitated landform (see **Figure 2.5**). The Siding Access Road and alignment of the conveyor to the rail load-out bin would provide a rough catchment divide for the two drainage lines. The first would generally follow the alignment of CWD-1, CWD-2 and CWD-3, accepting water flowing from south of the Project Site, as well as the area of the Project Site to the east of Coal Stockpiling Area A and the rail load-out bin conveyor. This drainage line would discharge directly to the Namoi River after passing through the retained fresh water dam.

The second drainage line, accepting water from west of the existing locations of Coal Stockpiling Area A and the rail load-out bin conveyor, would follow the alignment of DWD-1 and DWD-2 to the Main Storage Dam (to be retained in the final landform) before discharge to the Namoi River.

4.2.3 Environmental Effects

No adverse effects on local water quality are anticipated for the following reasons.

- All dirty water would be diverted to settlement ponds before discharge to the Main Storage Dam. In the unlikely event of the Main Storage Dam overflowing, sufficient settlement time would have been provided to ensure suspended sediment concentration meets the nominated criteria of 50mg/L. This assessment is supported by the operational history of the dam to date.
- Hydrocarbon products would be stored securely within a concrete bunded area.

Environmental flows and access to water by downstream land owners would not be adversely affected given:

- the diversion of clean water around the Fine Reject Ponds RP-1 to RP-6 and other areas of the Project Site; and
- the operation of a low flow diversion weir at the end of CWD-1.

The location of all activities above the 1 in 100 year ARI flood-line would ensure that the incidence of flooding would not result in downstream contamination of the Namoi River.

The proposed final landform provides for two drainage lines, the first of which would carry the clean water flows of the Project Site and discharge directly to the Namoi River. The second which would include the predominantly dirty water flows of the Project Site would discharge to the retained Main Storage Dam to ensure suspended sediment levels would continue to comply with the nominated criteria following completion of operations at the Whitehaven CHPP.

No impact on local groundwater quality or quantity is anticipated, given the relatively small annual volumes of water that would be required (up to 75ML) and intermittent nature of use.

4.2.4 Monitoring

4.2.4.1 Surface Water

It is proposed that water within the Main Storage Dam would be sampled on a quarterly basis to establish the quality with respect to the nominated quality criteria. Data from this monitoring will provide the Applicant with an understanding of the variables influencing water quality to ensure any controlled discharges from the dam do not contravene the *Protection of the Environment Operations Act 1997*. In the event there needs to be a controlled discharge from the dam, the Applicant would first sample the water to ensure it is within the criteria nominated on the Environment Protection Licence. It is worthy of note that only a single discharge has occurred from the Main Storage Dam since the Applicant has operated on the Project Site (4 July 2005) and on that occasion the results of water quality analyses recorded the following results.

- pH – 7.8
- Electrical conductivity – 1 270µS/cm
- Total Suspended Solids – 7mg/L
- Oil and Grease – <2mg/L

The results suggest water in the Main Storage Dam is slightly brackish but otherwise of good quality.

4.2.4.2 Groundwater

The Applicant will construct groundwater piezometers on the northern and southern sides of the fine reject ponds (see Figure 2.2) to monitor the quality of groundwater beneath the fine reject ponds and the settlement ponds. Measurements of groundwater quality (pH and electrical conductivity) will be undertaken quarterly.

4.3 NOISE

4.3.1 Introduction

The following subsection has been prepared by Spectrum Acoustics, commissioned by R.W. Corkery & Co. Pty. Limited on behalf of Whitehaven Coal Mining Pty Ltd to undertake the noise assessment of the proposed modification. This section focuses upon on-site noise levels. The evaluation of off-site noise attributable to rail movements is discussed in Section 4.5.3.3.

4.3.2 Noise Criteria

4.3.2.1 Construction Noise

Construction of additional infrastructure to support the modified operations (mainly the additional reject ponds east of the CHPP) is expected to take more than four weeks but less than six months. The DECC *Environmental Noise Control Manual* (ENCM) recommends that construction activities of this duration should not produce noise levels more than 10dB above the background noise level at potentially affected receivers. The applicable construction noise criteria at Residences E, F and G during the period 7:00am to 6:00pm (Monday to Friday) and 7:00am to 1:00pm (Saturday) would be 43dB(A).

4.3.2.2 Operational Noise

Criteria for operational noise are set via the INP where two separate potential noise impacts are considered. The 'intrusive' criteria aim to limit the impacts from an individual development by limiting $L_{Aeq,(15\ minute)}$ emissions to a value of 'background + 5dB'. The amenity criteria aim to limit the overall noise impact from the cumulative effects of multiple developments. The DECC usually requires both the intrusive and amenity criteria to be assessed, although in areas with low or negligible noise from other industries, only the intrusive criteria apply.

For the current project, the relevant criteria are the intrusive criteria as summarised in **Table 4.3**.

Table 4.3
Operational Noise Criteria, dB(A),$L_{eq(15\ minute)}$

Residence *	Day	Evening	Night
E (Wilkinson)	38	37	35
F (Jaeger)	38	37	35
G (Rankin)	38	37	35
* See **Figure 3.3** (Amended) for Residence Location			

Night time operations also need to be assessed for potential disturbance to sleep. The DECC recommends that sleep disturbance may become an issue if the maximum[2] noise level from a development exceeds the background level by more than 15dB, when measured at a bedroom window. Based on a night time background level of 30dB(A),L_{90} the applicable sleep disturbance assessment criterion is 45dB(A),L_{max}.

4.3.3 Meteorology

Noise modelling is required under the INP to consider noise enhancing meteorological conditions such as winds and temperature inversions.

An assessment of BoM 9.00am and 3.00pm wind roses from Gunnedah suggests that the predominant directions for winds are southeasterly in warmer months and northwesterly in cooler months. These general trends are also reflected in the 2006/07 wind roses in the Whitehaven AEMR and the wind roses used by Heggies Associates for the Sunnyside Mine air quality assessment. These wind directions were initially adopted for the present assessment as they represented worst case for receivers to the northwest (A, C) and southeast (I, H) of the site. The actual assessable wind directions were adopted to provide an accurate assessment of noise levels at other receivers under prevailing conditions.

A full analysis of wind vectors up to 3 m/s has recently been conducted by Spectrum Acoustics using the full 2002-2007 10-minute data set from Gunnedah Airport and the assessable wind directions in accordance with the INP are shown in **Table 4.4**.

Table 4.4
Summary of Assessable Wind Directions

Season	Winds greater than 30% up to 3m/s (vector sum)
Summer	--
Autumn	ENE (36.8%), SSW (35.3%)
Winter	SSW (36.9%), ENE (34.9%)
Spring	SSW (30.3%)

Temperature inversions are also likely to occur frequently throughout the cooler months and, since the proposal (excluding coal truck movements) is to operate 24 hours per day, both winds and inversions have been considered in the assessment of worst case noise emissions. Although not required under the INP, it is known that nocturnal inversions may form in the evening and persist beyond 7.00am in cooler months away from coastal areas. Inversion conditions have therefore been considered in the assessment of daytime and evening operational activities.

[2] The measurement parameter is formally the $L_{A1(1\ minute)}$ which is essentially equal to the L_{Amax} over a 15 minute period.

4.3.4 Noise Sources And Modelling

Measurements were conducted on site during August 2007 and February 2008 to measure the noise emissions from the various mobile and static plant on site. Calculated sound power levels are summarized in **Table 4.5**, with data for the dozer and front-end loader being an L_{Aeq} level over a full push/reverse cycle at the coal stockpile. Levels for the coals trucks are based on the total truck movements for 2008 as presented in **Figure 2.3** and calibrated to previous actual truck noise $L_{Aeq\ (15\ minute)}$ measurements on site. Six mobile truck sources and two dumping sites (at the existing and proposed ROM stockpiles, each attended by a front-end loader) were included in the Environmental Noise Model (ENM) of the site. All site conveyors were modelled as 78dB(A) per lineal metre based upon measurements taken of an uncovered conveyor of comparable belt width at 2m from an operating coal mine in the Hunter Valley. Measurements of train loading activities at the Whitehaven Rail Loading Facility were undertaken during a period when a 42 wagon train was being loaded. It was recognized the individual component noise levels measured would be identical for a 72 wagon train.

Octave band levels in **Table 4.5** are expressed as dB (linear) and the total is A-weighted, as is the custom.

Table 4.5
Measured Noise Levels of On-site Mobile and Fixed Plant

Source	dB(A)	Octave band centre frequency, Hz							
		31.5	63	125	250	500	1k	2k	4k
CHPP east and west walls	100	105	103	100	99	97	95	93	87
CHPP south wall	102	103	103	98	100	99	98	96	90
CHPP north wall	101	107	105	99	98	96	97	95	89
CAT 998G FEL	107	110	113	109	106	103	101	98	94
D9 dozer (L_{Aeq})	110	113	115	113	109	109	106	104	98
D9 dozer (L_{max})	118	118	123	120	119	118	112	107	103
First ROM screen	103	104	99	100	98	99	98	96	91
Conveyor drive/screens	103	99	99	100	99	99	98	96	90
Mobile trucks ($L_{Aeq(15\ min)}$)	95	98	101	99	94	89	89	88	84
Truck dumping (L_{Aeq})	98	96	95	97	95	94	93	90	88
Truck dumping (L_{max})	114	112	115	117	114	112	111	105	100
Loading train (L_{Aeq})	103	95	95	93	94	96	97	97	96
Loading train (L_{max})	124	113	104	107	114	119	121	119	117
Filling coal hopper[1]	107	108	102	111	104	104	103	98	93
2 x 90 class loco's idling	98	90	90	88	90	92	93	92	84
2 x loco's moving slowly	108	101	99	98	100	102	103	102	98

[1] At top of hopper, approximately 20m above ground

Figure 4.2 presents the location of the static and mobile equipment on site incorporated in the noise model for the noise assessment. The noise model incorporated the following noise sources.

- Coal Handling and Processing Plant (CHPP).
- Shaker Screen.
- ROM Coal Stockpiling Area (1x Truck & 1x Front-end Loader).
- Coal Stockpiling Area A (2x Dozers).
- Conveyor Drive and Conveyors.
- Train Loading and Filling Bin.
- Mobile Screening Plant.
- Coal Stockpiling Area B (1x Truck & 1x Front-end Loader).
- Coal Trucks on Site.

The placement and number of items of equipment on **Figure 4.2** represents the maximum level of site activity.

4.3.5 Design and Operational Safeguards

The principal design and operational safeguards to be adopted to achieve the predicted noise levels would be as follows.

1. All equipment would be properly maintained to ensure the sound power level from each item of equipment remains equal to or less than the level listed in **Table 4.3**.
2. Appropriate dozer track plate pads would be sourced and fitted to dozers to ensure the mechanical noise created is not excessive.
3. The dozer would only be operated in first gear when reversing on the coal stockpiling areas between 10:00pm and 7:00am. Site measurements have confirmed that the maximum track noise level while reversing in first gear is approximately 7dB quieter than when reversing in second gear.
4. Where possible, the dozer would operate on the ‘shielded’ (east) face of the produce coal stockpile under adverse conditions to minimise noise emissions to the nearest receivers.

5. The research and development program undertaken with Westrack has already achieved the reduction of high frequency and related noise on the Company's D9 Dozer.
    i. Engine noise has been reduced through the use of a false bonnet.
    ii. Neoprene pads to reduce track noise when in reverse (trial currently underway).
    iii. Neoprene sleeves over the idler and drive sprockets.
6. All dozers operating within Coal Stockpiling Areas A and B are only operated in first gear when reversing – reducing noise levels by up to 7dB(A).
7. All mobile earthmoving equipment is fitted with the mid-frequency "Squashed Duck" reversing alarms.
8. All conveyors are now fitted with variable frequency start-up equipment to enable the conveyor belts to gradually build up speed before use.
9. The Whitehaven Rail Loop is inspected quarterly by the Company's maintenance contractor with all repairs / improvements undertaken as soon as practicable to ensure all components and related indirect impacts (eg. squeaks) are avoided, whenever possible.

4.3.6 Predicted Site Noise Levels

4.3.6.1 Construction Noise

The main construction activity associated with the project, in terms of potential noise impacts would be the earthworks at the proposed reject ponds east of the CHPP. In order to assess noise impacts, a source representing a small excavator and a road-going tip-truck (combined sound power level of 116dB(A)) was located 400m east of the CHPP. Predicted noise levels are summarized in **Table 4.6**.

Table 4.6
Predicted Construction Noise Levels, dB(A), $L_{10(15min)}$

Receiver	Neutral	ENE wind	SSW wind	Criterion[2]
E (Wilkinson)	38	35	40	43
F (Jeager)	34	31	35	43
G (Rankin)	28	25	30	43

4.3.6.2 Operational Noise

Predicted noise levels at non project-related residences (excluding unoccupied and derelict houses) are summarized in **Table 4.7**. Although non project-related, calculations were also performed for "Olive View" (D) to compare model predictions with previous measurements taken at this location by Spectrum Acoustics. Worst case results differed by less than 2dB, with the predicted levels being marginally higher than measured levels.

The noise modelling undertaken for the noise sources depicted on **Figure 4.2**, incorporates truck movements from the three northern mines (Whitehaven/ Tarrawonga/ Belmont) and the proposed Sunnyside Mine to the southwest. The predicted noise levels attributed to the entire operation, ie. including truck movements from the Sunnyside Coal Mine and all train loading activities are presented in **Tables 4.7** and **4.8**.

Table 4.7
Predicted Operational Noise Levels, dB(A),$L_{eq(15min)}$

Residence [1]	Neutral	NW wind	SE wind	Inversion	Criterion[2]
E (Wilkinson)	30	33	28	34	35
F (Jaeger)	28	33	25	33	35
G (Rankin)	25	30	23	30	35

[1] See **Figure 3.3 (Amended)** for Residence Location
[2] Noise levels are assessed against the critical night-time criterion

Table 4.8
Predicted Operational Noise Levels – Day / Evening with Coal Trucks

Receiver	Neutral		ENE Wind		SSW Wind		Inversion		Criteria
	With Trains	No Trains	With Trains	No Trains	With Trains	No Trains	With Trains	No Trains	
E (Wilkinson)	34	30	31	28	36	33	37	34	37
F (Jaeger)	33	30	30	28	35	33	37	34	37
G (Rankin)	30	25	27	24	31	28	34	30	37

Figures 4.3 and **4.4** present noise level contours for the day/ evening operations with coal trucks, with and without coal loading (ie. relating to **Table 4.6**).

Figures 4.5 and **4.6** present noise level contours for night-time operations with and without train loading activities (ie. relating to **Table 4.7**).

Table 4.9
Predicted Operational Noise Levels – Night-time Without Coal Trucks)

Receiver	Neutral		ENE Wind		SSW Wind		Inversion		Criteria
	With Trains	No Trains	With Trains	No Trains	With Trains	No Trains	With Trains	No Trains	
E (Wilkinson)	33	30	30	26	35	31	36	33	35
F (Jaegar)	32	29	30	25	34	30	36	32	35
G (Rankin)	29	25	26	22	30	26	33	29	35

4.3.6.3 Sleep Disturbance

ENM point calculations were performed to determine the L_{Amax} noise levels from the major sources considered in **Table 4.4**, namely track noise from a dozer on the coal stockpile and tailgate bangs from coal trucks unloading. These have been identified as the major impact noise sources on site. **Table 4.10** shows the predicted maximum noise levels at residential receivers.

Table 4.10
Predicted Maximum Noise Levels, dB(A),L_{max}

Residence[1]	Neutral	NW wind	SE wind	Inversion	Criterion
E (Wilkinson)	37	42	35	43	45
F (Jaeger)	37	42	35	42	45
G (Rankin)	36	38	32	38	45

[1] See **Figure 3.3 (Amended)** for Residence Location
[2] Project-related Residence

4.3.7 Monitoring

The Applicant has commissioned a total of four independent noise monitoring reports since the CHPP commenced operations. On all occasions, the combined noise level of all site activities satisfied the nominated noise criteria at the relevant residences.

The Applicant would continue to commission an annual independent noise compliance assessment to demonstrate all day time and night time criteria are being satisfied. Monitoring would be undertaken, with the permission of land owners, at Residences E, F and G.

4.4 AIR QUALITY

4.4.1 Introduction

The following subsection has been prepared by Heggies Pty Ltd (Heggies), commissioned by R.W. Corkery & Co. Pty Limited, on behalf of Whitehaven Coal Limited (WCL), to undertake an air quality and greenhouse gas assessment for the proposed modification. Relevant aspects of the proposed modification to this air quality assessment include the increased use of Coal Stockpiling Area B and two additional conveyors proposed to enable movement of coal to/from the main conveyor unit which leads to the rail load-out bin.

4.4.2 Assessment Methodology

4.4.2.1 Introduction

This assessment was conducted in accordance with the NSW Department of Environment and Climate Change (DECC) *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales*, (2005) (hereafter, "the AMMAAP").

A greenhouse gas assessment of the Project has also been undertaken within this assessment. Total annual emissions of CO_2-Equivalent resulting from the proposed modification have been assessed and compared with estimates of total Australian greenhouse gas emissions for the baseline year 1990 and against NSW greenhouse gas emissions for year 2005.

4.4.2.2 Background Air Quality Environment for Assessment Purposes

For the purposes of assessing the potential air quality impacts of the proposed modification, an estimate of background air quality parameters is required. For each pollutant, the maximum background concentration has been selected, for each relevant averaging period.

A discussion of the background PM_{10} and dust environment in the vicinity of the Project Site has been given in Section 3.8.2. This conservatively high estimate of background concentration has been used as per Section 5 of the AMMAAP.

Based on the data and discussion provided in Section 3.6.2, the site-specific background air quality levels adopted for this assessment are presented in **Table 4.11**. The PM_{10} background levels were based on concentrations recorded at Tamworth for 2005.

Table 4.11
Background Air Quality Environment for Assessment Purposes

Air Quality Parameter	Averaging Period	Assumed Background Level
TSP	Annual	33µg/m^3
PM_{10}	24-Hour	Daily Varying
	Annual	16.5µg/m^3
Dust	Annual	<2g/m^2/month

It is noted that the PM_{10} sub-set is typically approximately 50% of total suspended particulates (TSP) in the ambient air in regions where road traffic is not the dominant particulate source, such as rural areas (USEPA, 2001). In the absence of monitoring data for TSP, the annual average TSP concentration for the region may therefore be derived by multiplying the annual average PM_{10} concentration by a factor of two.

To estimate a background concentration of annual TSP, this report has taken the annual average PM_{10} records at Tamworth for 2005 (16.5µg/m^3), and used the above multiplier to derive the annual average TSP concentration. This corresponds to a background TSP concentration of 33µg/m^3.

4.4.2.3 Air Quality Goals

Goals Applicable to Suspended Fine Particulate Matter

Emissions of PM_{10} and $PM_{2.5}$ particles are considered important pollutants in terms of impact due to their ability to penetrate into the respiratory system. In the case of the $PM_{2.5}$ category, recent health research has shown that this penetration can occur deep into the lungs (NSW DEC, 1998). Potential adverse health impacts associated with exposure to PM_{10} and $PM_{2.5}$ include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

One of the difficulties in dealing with air quality goals governing fine particles such as PM_{10} and $PM_{2.5}$ is that the medical community has not been able to establish a threshold value (for either PM_{10} or $PM_{2.5}$) below which there are no adverse health impacts.

The NSW PM_{10} assessment goals as expressed in the DECC Approved Methods are:

- A 24-hour maximum of 50µg/m^3; and
- An annual average of 30µg/m^3.

The 24-hour PM_{10} reporting standard of 50µg/m^3 is numerically identical to the equivalent National Environment Protection Measure (or NEPM) reporting standard except that the NEPM reporting standard allows for five exceedances per year. These NEPM goals were developed by the National Environmental Protection Council (NEPC) in 1998 to be achieved within 10 years of commencement.

In December 2000, the NEPC initiated a review to determine whether a new ambient air quality goal for particulates of 2.5 microns or less in aerodynamic diameter ($PM_{2.5}$) was needed in Australia, and the feasibility of developing such a goal. The review found that:

- there are health effects associated with fine particles;
- the health effects observed overseas are supported by Australian studies; and
- fine particle standards have been set in Canada and the USA, and an interim goal proposed for New Zealand.

The review concluded that there is sufficient community concern regarding $PM_{2.5}$ to consider it an entity separate from PM_{10}.

As such, in July 2003 a variation to the Ambient Air Quality NEPM was made to extend its coverage to $PM_{2.5.}$ This document references the following goals for $PM_{2.5}$.

- A 24-hour maximum of 25µg/m^3.
- An annual average of 8µg/m^3.

Although the NSW DECC does not have specific air quality goals related to $PM_{2.5}$, it was decided to include a semi-quantitative assessment of likely $PM_{2.5}$ concentrations attributable to the Proposed modification, based on the model results for PM_{10} concentrations. This approach has been adopted in this assessment.

Goals Applicable to Total Suspended Particulates (TSP)

The annual average goal for Total Suspended Particulates (or TSP) is given as 90µg/m^3, as recommended by the National Health and Medical Research Council (NHMRC) at their 92nd session in October 1981. It was developed before the more recent results of epidemiological studies suggested a relationship between health impacts and exposure to PM_{10} concentrations.

As discussed in Section 4.4.2.2, since in rural areas the PM_{10} particle size fraction is typically of the order of 50% of the TSP mass, the goal is consistent with an annual PM_{10} goal of approximately 45µg/m^3. Thus, the historical NHMRC goal may be regarded as less stringent than the newer DECC PM_{10} goal of 30µg/m^3 expressed as an annual average.

Therefore, as the annual TSP goal is seen to be achieved if the annual PM_{10} goal is satisfied, TSP has not been considered further in this report.

Nuisance Impacts of Fugitive Emissions

The preceding sections are concerned in large part with the health impacts of particulate matter. Nuisance impacts also need to be considered, mainly in relation to dust. In NSW, accepted practice regarding the nuisance impact of dust is that dust-related nuisance can be expected to impact on residential areas when annual average dust deposition levels exceed 4g/m^2/month.

In order to avoid dust nuisance, the DECC has developed assessment goals for dust fallout. **Table 4.12** presents the allowable increase in dust deposition relative to the ambient levels.

Table 4.12
DEC Goals for Allowable Dust Deposition

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2g/m^2/month	4g/m^2/month

Source: DECC Approved Methods 2005

As the ambient dust deposition level has been assumed to be less than 2g/m^2/month (see Section 3.6.2), the maximum increase in deposited dust level would be the governing goal for the proposed modification.

4.4.3 Atmospheric Dispersion Modelling

4.4.3.1 Methodology

The atmospheric dispersion modelling carried out in the present assessment utilises the Ausplume Gaussian Plume Dispersion Model software (Version 6.0) developed by the EPA (Victoria).

Ausplume is the approved dispersion model for use in the majority of applications in New South Wales. Default options specified in the Technical Users Manual (EPA Victoria, 2000) have been used, as per the AMMAAP.

4.4.3.2 Dispersion Meteorology

Details of the regional climate, taken from meteorological observations from Gunnedah Pool AWS are presented in Section 3.2.

The Air Pollution Model (TAPM) software, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), was used to assist in simulating the meteorology of the Project Site. TAPM is a prognostic model which may be used to predict three-dimensional meteorological data.

The model predicts wind speed and direction, temperature, pressure, water vapour, cloud, rain water and turbulence. The program allows the user to generate synthetic observations by referencing databases (covering terrain, vegetation and soil type, sea surface temperature and synoptic scale meteorological analyses) which are subsequently used in the model input to generate site-specific hourly meteorological observations, with no local inputs required.

Additionally, the TAPM model may assimilate wind observations so that they can optionally be included in a model solution. The wind speed and direction observations are used to realign the predicted solution towards the observation values. This function of accounting for actual meteorological observations within the region of interest is referred to as "data assimilation".

In order to provide concurrent observations with the daily varying background air quality data used in the assessment, TAPM was used to generate a 2005 meteorological data set, using the data assimilation option to incorporate observations from the nearest Bureau of Meteorology (BoM) weather station, located at Gunnedah Airport (Station no. 055202), approximately 5km east of the Project Site.

Direct measurements (wind speed, wind direction and temperature) from the Gunnedah Airport Automatic Weather Station (AWS) were then used in generating the Ausplume meteorology file used in the assessment. Indirect measurements (sigma theta, stability class, mixing height) were sourced from data generated by TAPM.

Atmospheric stability refers to the tendency of the atmosphere to resist or enhance vertical motion. The Pasquill-Turner assignment scheme identifies six Stability Classes, "A" to "F", to categorise the degree of atmospheric stability. These classes indicate the characteristics of the prevailing meteorological conditions.

Stability Class "A" represents highly unstable conditions that are typically found during summer, categorised by moderate winds and convective conditions. Conversely, stability class "F" relates to highly stable conditions, typically associated with clear skies, light winds and the presence of a temperature inversion. Classes "B" through to "E" represent conditions intermediate to these extremes.

Measurements of incoming solar radiation and wind speed were used to assign atmospheric stability to the records for each hour of the year. The resulting annual distribution of atmospheric stability categories for the Project Site is shown in **Figure 4.7**.

The results indicate a high frequency of conditions typical of Stability Class "D" throughout the year. This is indicative of neutral conditions, conducive to a moderate level of pollutant dispersion due to mechanical mixing.

Appendix 2 illustrates the seasonal variation in atmospheric stability class at the Whitehaven CHPP. The frequency distribution of stability class indicates that stability class "D" dominates throughout the year at the project site.

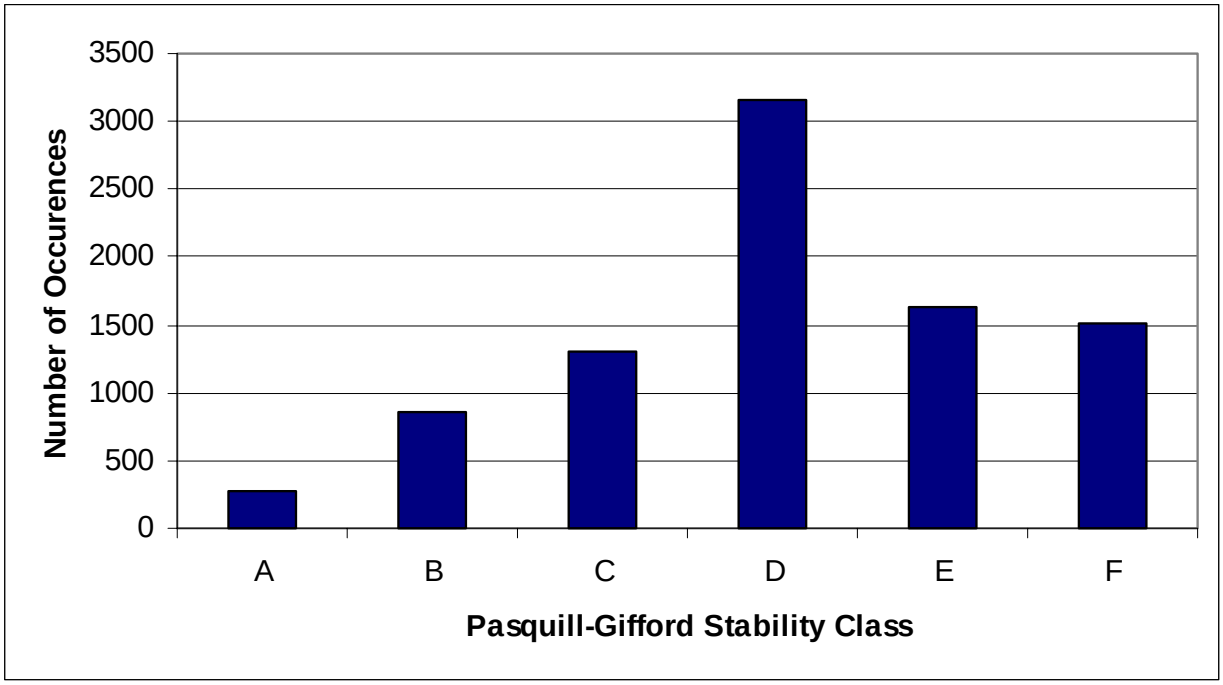

Figure 4.7
Annual Stability Class Distribution for the Project Site

4.4.3.3 Site Topography

Section 3.1.1.2 describes in detail the topography of the Whitehaven CHPP and surrounding area. The Project Site has an elevation of approximately 280m AHD at the southern boundary, grading to approximately 270m AHD at the northern site boundary. The surrounding area is similarly flat in nature.

In view of the foregoing, the topography of the area has not been considered in the atmospheric dispersion model, as significant impacts on modelled concentrations at the sensitive receptors identified will not be seen with the inclusion of such uncomplicated near-field topography.

4.4.3.4 Modelling Scenario

The modelling scenario chosen for this assessment was selected considering the following factors.

- Location of coal stockpiles.
- Location of screening and crushing activities.
- Operation of stockpile management activities.
- The proximity of these factors to the closest non project-related residences.

The scenario chosen aims to be representative of worst case conditions present during a site operational year and incorporates the operation of the Project Site including movement of coal via conveyor, movement of coal by front-end loader, tertiary crushing activities, loading product coal to trains and wind erosion from coal stockpiles (Coal Stockpiling Areas A and B, ROM stockpiling area, coarse rejects area and screened products stockpiling area.). While recognising that throughput would not exceed 4.5Mtpa, in the interest of conservatism, an average throughput of 5.1Mtpa was assumed for this scenario.

4.4.3.5 Emission Factors

A review has been carried out of the particulate-generating activities occurring at the Project Site and likely to continue. The following activities (where applicable) have been included in the particulate emissions inventory.

- Movement of coal by conveyor.
- Stockpile management by front-end loader.
- Tertiary crushing.
- Loading of coal to trains.
- Wind erosion of stockpiles (Coal Stockpiling Areas A and B, ROM stockpiling area, coarse rejects area and screened products stockpiling area).

Table 4.13 presents the emission factors used for the key atmospheric pollutants used in the dispersion modelling carried out for this report. These relate to emissions expected under normal operating conditions. The ratio of the PM_{10} fraction of the total particulate emission (used to predict dust deposition) ranges from 50% (eg wind erosion) down to 25% (eg wheel-generated dust). The proportion of the PM_{10} fraction for each activity was derived primarily from the National Pollutant Inventory document, Emission Estimation Technique Manual for *Mining, Version 2.3*, (EETMM) (Environment Australia, 2001).

Table 4.13
Particulate Emission Factors for Air Quality Dispersion Modelling

Activity	Total Particulate Emission Factor[1]	PM_{10} Emission Factor	Emission Factor Units
Front-end Loader on coal	0.016	0.008	kg/t
Tertiary Crushing Plant	0.03	0.01	kg/t
Loading Stockpiles	0.004	0.0017	kg/t
Loading to Trains	0.0004	0.00017	kg/t
Miscellaneous Transfer Points (conveyor drops)	0.0004	0.0002	kg/t
Note 1: Total Particulate emission factor is used to derive the rate of dust deposition			

In general, emission factors have been used as contained in Table 1 of the EETMM. Where the moisture content of materials at the site was not adequately reflected within the default emission factors contained in Table 1 of the document, the equations given in the same table were used to derive representative emission factors. Emission factors for the following plant and equipment were derived using this method:

- front-end loader; and
- miscellaneous transfer points (conveyor drops).

Wind Erosion

Wind erosion from exposed surfaces has been estimated using the USEPA AP-42 Emission Factor for wind erosion (Chapter 13, Section 13.2.5 Industrial Wind Erosion).

The threshold friction velocity is an important parameter which is required in the estimate of wind erosion from both "limited" and "unlimited" erosion potential sites. Threshold friction velocity u_{*t} is the friction velocity at which wind erosion is initiated.

When the actual friction velocity at the site is greater than the threshold friction velocity, wind erosion can be expected, however, when the threshold friction velocity is equal to or greater than the actual friction velocity at the site then wind erosion will not occur.

The threshold friction velocity for the site was determined from the modelled relationship proposed by Marticorena & Bergametti (1995) based on the relationship between erosion threshold and aerodynamic roughness length. The roughness height was determined by taking 1/30 of the diameter of the particles on the bed surface (Bagnold, 1941).

The friction velocity was determined from the following expression:

$$u^* = A\, u_{10}$$

where A is a function of the roughness height (Z_o) and U_{10} is the wind speed measured at a height of 10m. Assuming a typical surface roughness height of 0.5cm, A is given as 0.053.

Mean atmospheric wind speeds are not generally sufficient to sustain wind erosion from flat surfaces and estimated emissions should be related to the gusts of highest wind. The variable that best reflects the magnitude of wind gusts is the fastest mile of wind. Fastest mile of wind is not routinely recorded by the Bureau of Meteorology. An alternative approach is to use a "gust factor" to convert hourly wind speed data to the fastest mile of wind. The fastest mile of wind has been shown to range from 1.18 to 1.27 times the hourly wind speed (Krayer & Marshall (1992) as cited in SKM (2005)).

The erosion potential from exposed surfaces is then calculated using the US-EPA AP42 (2006) equation:

$$P = 58 (U^* - Ut^*)^2 + 25 (U^* - Ut^*)$$

Where,

P = erosion potential (g/m^2)
U* = friction velocity (m/s)
Ut* = threshold friction velocity (m/s)
(P = 0 for U*<=Ut*)

4.4.3.6 Emission Inventory for the Proposed Operation

Appendix 3 provides details of the emission inventory associated with the modelled scenario for the Project using the emission factors given in **Table 4.11**.

The emission inventory has been derived to reflect the worst-case scenario for airborne emissions over a 24 hour period, and mean average operational conditions for annual assessments.

The following assumptions were made in compiling the emissions inventory for the proposed modification.

- The total annual throughput of coal, delivered from the Tarrawonga, Whitehaven, Belmont (proposed) and Sunnyside (proposed) mines, at the Project Site is assumed to be 5.1Mtpa. It is recgnised that this is a conservative estimate with actual throughout being closer to 4.5Mtpa.
- Operations are assumed to be undertaken over 350 days per year, 24 hours per day.

- 30% of the hourly throughput of coal is assumed to be moved by front-end loader in stockpile management activities.
- Two drop points from the conveyor have been assumed; one onto Coal Stockpiling Area A from the Coal Preparation Plant, and one onto Coal Stockpiling Area B.
- Trucks delivering coal to the Project Site are assumed to operate on sealed roads with road silt loadings effectively controlled through sweeping and/or wet suppression and therefore not a significant source of particulate resuspension. Trucks delivering coal to the Project Site have not been considered further within this air quality assessment.
- Moisture content of the coal is assumed to be 7% although the moisture content in the washed coal is typically 10% to 12% in Coal Stockpiling Area A.
- The fine reject ponds would not be a source of dust given the high moisture content in the fine rejects (at least 20%).
- Dozers are only used on the upper surface of coal in Coal Stockpiling Area B following a period of water spraying from the three elevated sprinklers above the stockpile area.
- Average wind speeds at the Project Site have been calculated to be 4m/s.
- Any emission factors taken from Table 2 of "Emission Estimation Technique Manual for Mining, Version 2.3" were assumed to be for High Moisture Content Ore (a moisture content of 4% or greater by weight).
- The closest receptors chosen for the modelling assessment are:
    - Residence A (Southorn)
    - Residence B (Tibbs)
    - Residence C (Guillaumier)
    - Residence E (Wilkinson)
    - Residence F (Jaeger)
    - Residence G (Rankin)
    - Residence K (Finlay & Hunt)
    - Residence J (Kent & Denham)

Each of the above residences are shown on **Figures 4.8** to **4.9**.

4.4.4 Operational Controls, Safeguards and Management Measures

4.4.4.1 Air Quality

The following management measures, currently or proposed to be implemented on the Project Site, have been assumed during the dispersion modelling exercise.

- The tertiary crushing plant operates with water sprays and hooded cyclones to suppress dust emissions. Therefore an emission control / reduction factor of 50% (water sprays) and 65% (hooded chutes) have been applied to the emissions of TSP and PM_{10} from the crushing plant as per Table 3 of the AMMAAP.
- A 50% emission reduction factor for water sprays has been applied to emissions generated from loading of stockpiles as per Table 3 of the AMMAAP.
- Train loading is an enclosed process. Therefore, a 70% reduction in emissions is assumed due to the enclosure as per Table 3 of the AMMAAP.
- Water sprays operate on all stockpiles at the Whitehaven CHPP site. Therefore, a 50% reduction factor has been applied to wind erosion emissions from all stockpiles as per Table 3 of the AMMAAP.
- The front-end loader is working on the stockpiles which are managed with water sprays. A 50% emission reduction factor for water sprays has been applied to emissions from this source as per Table 3 of the AMMAAP.

4.4.4.2 Greenhouse Gas

The following methods would be adopted, as far as practicable, to assist in the reduction of greenhouse gas emissions from operations at the Project Site.

Diesel Consumption

- Optimise and schedule vehicle operations to reduce fuel consumption.
- Maintain engines according to manufacturers' guidelines and keep tyres at optimum pressure to maximise fuel efficiency.
- Reduce vehicle idling time.
- Consider the use of alternative fuels, such as biodiesel, for mobile plant.

4.4.5 Air Quality Assessment Results

4.4.5.1 Dust Deposition

Table 4.14 presents the results of the Ausplume predictions for dust deposition using the emission rates documented in **Appendix 3**. The results show the mean average monthly dust deposition predicted at the residences surrounding the Project Site over a one-year time frame. As detailed in Section 4.4.2.2, it has been assumed that the background level of dust deposition is <2 g/m^2/month for the nearest residences and therefore the incremental increase in dust deposition becomes the governing criterion for the assessment (refer **Table 4.12)**. A contour plot of the modelled incremental increase in dust deposition attributable to the proposed modification is presented in **Figure 4.8** with incremental dust deposition rates predicted for identified sensitive receptor sites summarised in **Table 4.14**.

Table 4.14
Incremental Dust Deposition at Nearest Residences

Residence *	Dust - Annual Average (g/m^2/month)	
	Increment Increase attributable to the Proposed Modification	Project Goal
A (Southorn)	0.5	2.0
B (Tibbs)	0.2	2.0
"Cedar Vale" (Burns)**	0.2	2.0
D#	0.1	2.0
E (Wilkinson)	0.1	2.0
G (Rankin)	0.1	2.0
J (Kent & Denham) #	0.2	2.0
K (Finlay & Hunt) #	0.2	2.0

* See **Figure 3.3 (Amended)** for Residence Location
** No residence is located on this lot at present although the owners have plans to construct a residence on this lot.
# Project-related Residence by virtue of either an agreement between the landowner and the Applicant or the land is owned by the Applicant.

Table 4.14 records that the predicted incremental annual average dust deposition associated with the proposed modification would be less than 0.5g/m^2/month, at all the nearest non project-related residences. As such, levels of dust deposition are predicted to satisfy the Project goal (incremental increase of less than 2g/m^2/month at all residences).

4.4.5.2 PM_{10} (24-Hour Average)

Table 4.16 presents the results of the Ausplume predictions for 24-hour PM_{10} concentrations using the emission rates given in **Appendix 3**.

As detailed in Section 3.6.2.3, it has been assumed that background levels of PM_{10} vary on a daily basis. These background levels have been incorporated into the model, however, elevated existing PM_{10} concentrations within the background file, already exceed the impact assessment criteria on two occasions, ie. 2 February 2006 and 9 February 2006.

Table 4.15
Whitehaven CHPP Maximum Predicted Incremental 24-hour Average PM10 Concentrations at Identified Receptors

Residence	Maximum Incremental 24-hour Average PM_{10} Concentration (µg/m^3)
A	14.8
B	16.9
"Cedar Vale"	33.7
D	11
E	12.7
F	14.3
J	19.9
K	29.8

Additionally, it is important to recognise the contribution of vehicle traffic to ambient concentrations of fine particulates. Recent studies of differing Australian airsheds have been carried out for the National Pollutant Inventory. The percentage contribution of motor vehicle PM_{10} emissions to the total ambient PM_{10} concentrations within the airshed of focus are detailed for each study. A summary of these percentage contributions is given in **Table 4.18**.

Table 4.18
Percentage Contribution of Motor Vehicles to Total PM_{10} - Australian Airsheds

NPI Study Title	Airshed of Interest	% of PM_{10} Attributable to Vehicles
NPI Summary Report: Adelaide and Regional Airsheds 1998 - 1999	Adelaide	8
	Regional South Australia	2
NPI Summary Report of Fifth Year Data 2002 - 2003	South East Queensland	10
NPI Summary Report of Sixth Year Data 2003 - 2004	Port Phillip	18

The airsheds reported in **Table 4.18** represent a varied range of land-use types, from industrial (Port Phillip) to semi-rural (Regional South Australia). An average of these values have been used to determine the percentage contribution of motor vehicular emitted PM_{10}, stated as follows.

- PM_{10} from vehicles may contribute in the order of 9.5% to the total emission inventory of PM_{10}.

Finally, the size distributions of particles from diesel truck exhaust are quoted by Watson et al (2000) as the following.

- Approximately 96% of PM_{10} from diesel combustion would be emitted as $PM_{2.5}$.

A simple calculation based on the above assumptions, combined with the maximum predicted PM_{10} concentrations in **Table 4.16** and **Table 4.17** above (49.1µg/m^3 and 18.1µg/m^3 respectively), indicates that, inclusive of the activities on the Project Site:

- 24-hour average $PM_{2.5}$ are predicted to be of the order of 10.5 µg/m^3, thus satisfying the 24-hour average goal for $PM_{2.5}$ of 25µg/m^3; and

Annual average $PM_{2.5}$ are predicted to be of the order of 5.0µg/m^3, thus satisfying the annual average goal for $PM_{2.5}$ of 8µg/m^3.

4.4.5.5 Greenhouse Gas Assessment

The modified operations at the Project Site would continue to generate greenhouse gas emissions. This assessment of greenhouse gas emissions from the Project Site has been conducted in accordance with the methodologies established in a number of policies and guidelines, which are detailed in **Appendix 4**.

It should be noted that there are three greenhouse gas emission scopes, which are defined as follows.

- Scope 1 emissions are those which result from activities under a company's control or from sources which they own. (eg on-site generation of electricity, on-site diesel combustion).
- Scope 2 emissions are those which relate to the generation of purchased electricity consumed in its owned or controlled equipment or operations.
- Scope 3 emissions are defined as those which do not result from the activities of a company although arise from sources not owned or controlled by the company. (eg off-site transportation of purchased fuels, the use of sold products and services).

Thus, project-related greenhouse gas sources include the:

- combustion of diesel fuel at the CHPP (Scope 1); and
- emissions associated with the consumption of purchased electricity (Scope 2).

It should be noted that diesel fuel is consumed during the transportation of coal from the mines (Tarrawonga, Belmont, Whitehaven and Sunnyside) to the Whitehaven CHPP. The consumption of this fuel and the related greenhouse gas emissions have been assessed as part of the air quality assessments for the individual mines. Therefore, in order to avoid double counting of emissions, the use of diesel fuel in the transport of coal from the mines to the CHPP has not been assessed further within this report. However, haul truck movements within the

CHPP are included within this assessment. Additionally, Scope 3 emissions (the use of sold products, ie. coal combustion) have also been assessed during the air quality assessments for the individual mines and are not accounted for within this assessment.

Carbon dioxide (CO_2) is produced during fuel combustion as a result of the oxidation of the fuel carbon content. CO_2 makes the largest contribution to greenhouse gas emissions from fuel combustion as approximately 99.5% of natural gas is oxidised during the combustion process (AGO, 2005).

Other greenhouse gases emitted as a result of operations at the Project Site may include carbon monoxide (CO), methane (CH_4), oxides of nitrogen (NO_X) and non-methane volatile organic compounds (NMVOCs). These are produced by incomplete fuel combustion, reactions between air and fuel constituents during fuel combustion, and post-combustion reactions. Fugitive emissions of NMVOCs may also be expected due to fuel evaporation.

In accordance with the Australian Greenhouse Office document *AGO Factors and Methods Workbook – December 2006* (AGO, 2006) (hereafter AGO Workbook), the greenhouse gas emissions that are required to be calculated for the proposed modification are direct (Scope 1)

emissions relating to on-site fuel combustion, and indirect (Scope 2) emissions resulting from the purchase and consumption of electricity. There are not envisaged to be any indirect (Scope 3) emissions associated with operations on the Project Site which are not accounted for in other greenhouse gas assessments.

For comparative purposes, non-CO_2 greenhouse gases are awarded a "CO_2-equivalence" based on their contribution to the enhancement of the greenhouse effect. The CO_2-equivalence of a gas is calculated using an index called the Global Warming Potential (GWP). The GWPs for a variety of non-CO_2 greenhouse gases are contained within Table 23 of the AGO Workbook. The GWPs of relevance to this assessment are:

- **Methane (CH_4)**: GWP of 21 (21 times more effective as a greenhouse gas than CO_2); and
- **Nitrous Oxide (N_2O)**: GWP of 310 (310 times more effective as a greenhouse gas than CO_2).

The short-lived gases such as CO, NO_2, and NMVOCs vary spatially and it is consequently difficult to quantify their global radiative forcing impacts. For this reason, GWP values are generally not attributed to these gases nor have they been considered further as part of this assessment.

An assessment of the predicted greenhouse gas emissions from the operation of the Project Site has been undertaken for each of the aforementioned sources and is outlined below.

It is noted that the scope of this greenhouse gas assessment is to account for emissions directly related with the operation of the CHPP including the proposed modification.

Information of fuel and electricity use is available for the financial year 2006/2007. Potential greenhouse gas emissions due to the proposed upgrade to the Whitehaven CHPP are required. A factor has been applied to fuel and electricity use for estimation of post-upgrade use. This factor has been calculated based on the current and proposed CHPP throughput. Thus, all fuel and electricity consumption data has been multiplied by 1.65 (5.1Mt / 3.1Mt) to derive a post-upgrade fuel and electricity usage.

Diesel Combustion (Scope 1)

The primary fuel source for on-site equipment and trucks is Automotive Diesel Oil (ADO). For the financial year 2006/2007 ADO consumption was 327 850L. An estimate of the fuel usage for a post-upgrade year is 540 952L (327 850L x 1.65).

The annual emissions of CO_2 and other greenhouse gases from this source have been estimated using Table 3 of the AGO Workbook (AGO, 2006). It has been assumed that the energy content of ADO is 38.6MJ/L (AGO, 2006).

A summary of the predicted annual emissions is provided in **Table 4.19**.

Table 4.19
Predicted Annual Greenhouse Gas Emissions from Diesel Fuel Combustion

Diesel Consumption (kL)	Energy Content (MJ/kL)	Emission Factor (kg CO_2-e/GJ)	Greenhouse Gas Emissions (t CO_2-e)
540.9	38.6	69.8	1 457

Electricity Use (Scope 2)

Electricity would continue to be used to power the CHPP (crushing and screening activities, office buildings etc.). The annual electricity consumption at the Project Site was 3 218MWh during the financial year 2006/2007. An estimate of the electricity usage for a post-upgrade year is 5 310MWh (3 218MWh x 1.65).

An estimate of the annual emissions of carbon dioxide from the consumption of electricity has been derived using the AGO Workbook's emission factor of 1.068 kg CO_2-equivalent/kWh.

A summary of the predicted annual emissions is provided in **Table 4.20**.

Table 4.20
Predicted Annual Greenhouse Gas Emissions from Electricity Consumption

Electricity Consumption (MWh)	Emission Factor (kg CO_2-e/kWh)	Greenhouse Gas Emissions (t CO_2-e)
5 310	1.068	5 671

Total Annual Greenhouse Gas Emissions

A summary of the predicted greenhouse gas emissions resulting from all operations at the Whitehaven CHPP during a post-upgrade year are presented in **Table 4.21**.

Table 4.21
Predicted Total Annual Greenhouse Gas Emissions from the Modified Proposal

Source	Predicted Emissions (t CO_2-e)
Diesel Usage	1 457
Electricity Consumption	5 671
Total	**7 128**

As shown in **Table 4.21**, the total estimated annual emissions of CO_2-Equivalent as a result of operations at the Project Site are likely to be of the order of 7 128 t of CO_2-Equivalent per annum. Over the Project lifetime of 15 years (based on a licence approval to year 2022) emissions of CO_2-Equivalent are estimated to be in the order of 106 920t. When compared with each unit of production (Mt), emissions of CO_2-Equivalent are estimated to be in the order of 1 397t/Mt of coal processed.

Greenhouse gas estimates are assessed relative to 1990 baseline levels for reporting purposes. The AGO (2006) estimates that in 1990, Australian greenhouse gas emissions totalled 551.9 Mt CO_2-equivalent. A comparison of the predicted emissions with the 1990 national estimate demonstrates that operations would represent an annual increase of approximately 0.001% of the total baseline Australian emissions.

Emissions of greenhouse gases in NSW during 2005 amounted to a total of 158.2Mt CO_2-equivalent (AGO, 2007). A comparison of the predicted emissions due to the proposed operations with NSW emissions in 2005 demonstrates that operations would represent an annual increase of approximately 0.004%.

4.4.6 Discussion and Conclusions

Modelling of fugitive dust emissions was undertaken to determine the resulting air quality impacts of the proposed modifications to the facility and increased throughput.

Atmospheric dispersion modelling predictions of fugitive emissions from the Project Site were undertaken using the Ausplume Gaussian Plume Dispersion Model software developed by EPA (Victoria).

These predictions indicate that, provided the specific design and operational safeguards documented within this report are implemented, particulate matter and dust deposition attributable to operations on the Project Site would remain within the current NSW DECC (and NEPM) air quality goals at all surrounding residences. The maximum 24-hour PM_{10} concentration is predicted to be below the project criteria of 50µg/m^3 at 49.1µg/m^3 with annual average PM_{10} predicted to be below the project criteria of 30µg/m^3 at 18.1ug/m^3. Modelling of dust indicates that at the closest residence, dust deposition rates are predicted to be 0.5g/m^2/month, well below the NSW DECC criteria of 2g/m^2/month.

Greenhouse gas emissions due to operations at the CHPP (electricity use and diesel combustion) have been assessed as part of this air quality assessment. A comparison of the predicted emissions with the Australian 1990 estimate demonstrates that proposed operations would represent an annual increase of approximately 0.001 % of the total baseline Australian emissions. Comparison with NSW emissions in 2005 demonstrates an annual increase of 0.004%.

4.4.7 Monitoring

The Applicant intends to continue its existing program of deposited dust monitoring. It is also proposed to install (subject to availability of 240v power) two PM_{10} high volume samplers at locations north and south of the Project Site (see **Figure 4.11**).

4.5 TRANSPORTATION AND TRAFFIC

4.5.1 Objectives

The Applicant would manage the proposed modification to operation of the Whitehaven CHPP and Rail Loading Facility to meet the following objectives for product transportation.

- Noise generated by the road delivery of coal to the Project Site would be within DECC criterion levels.
- The delivery of ROM coal to the Project Site would not adversely affect other road users or result in an increased safety risk.
- Noise generated by the delivery of coal via the North-western and Main Northern Railway Lines would be within DECC criteria
- The delivery of product coal would not adversely affect the amenity of neighbouring land owners or residents of Gunnedah.

It is noteworthy that coverage of transportation and traffic issues in this section focuses on the Project Site itself as matters relating to off-site traffic related impacts are the subject of documentation for each mine supplying coal to the facility.

4.5.2 Operational Safeguards and Management Procedures

4.5.2.1 Road Transportation of ROM Coal

Operational safeguards and management procedures for the road transportation of ROM coal from the various mines supplying the Whitehaven CHPP and Rail Loading Facility are provided in the relevant approvals, transport management documents, statements of commitments and/or environmental assessment documents for each mine. A summary of the safeguards, controls and management measures incorporated into road transport management and relevant to the transportation activities on the Project Site is as follows.

(i) The Whitehaven CHPP would only receive coal from approved mining projects, which have specified and assessed the environmental impacts of delivery to the Project Site.

(ii) Drivers would be required to operate in accordance with the Applicant's Transport Policy and Code of Conduct. The Policy and Code identifies aspects such as travelling speeds, general behaviour, avoidance of exhaust brakes, load coverage, complaints and disciplinary procedures. The Policy and Code would apply to all employee and contractor-owned vehicles.

(iii) All coal and reject transportation would be restricted to the nominated hours of operation for the relevant mine.

(iv) Applying a covered load policy to all trucks transporting coal from the supplying mine and back-loading reject from the Whitehaven CHPP.

(v) Ensuring all trucks transporting coal are well maintained and that the drivers act in a courteous manner at all times. Trucks assessed to be unroadworthy or not carrying covers would not be loaded.

(vi) Ensuring mud is not tracked onto the Kamilaroi Highway during periods when mud can be collected on truck tyres on the Project Site.

(vii) Routine liaison with local residents to ensure their satisfaction with all aspects of changed traffic conditions.

The Applicant's principal contractor is also currently upgrading the truck fleet used to transport coal between all mines and the Project Site[3]. The upgraded trucks would have the following specifications designed to improve safety, reduce noise and improve the amenity of property owners adjoining the transport routes.

- All units are purpose-built side-tipping B-Double combinations designed specifically for on-road coal haulage.
- The prime mover specification including model, motor size, differential ratios and gearbox selection have all been specifically engineered to comply with emission and noise criteria.
- The trucks are speed limited to maximise operational efficiency whilst optimising fuel economy, tyre wear and vehicle maintenance and minimising engine noise.
- The B-double trailer units are on airbag "road friendly suspension" (System Approval No. RF2108).
- All units are fitted with electronic management systems including GPS, enabling reporting on speed breaches, accident investigation and other incidents.
- All units have the engine compression brakes (Jake brakes) disabled to reduce noise.
- All units have the cruise control system disabled to ensure driver remains focused on the road and conditions.
- All units are fitted with the Optalert driving system to reduce the potential for drivers falling asleep.
- Units are not fitted with high powered driving lights.
- Electronic windows fitted to passenger side of prime-movers to allow drivers to open/shut window without leaning across the cab.

4.5.2.2 Rail Transportation of Product Coal

Operational safeguards and management procedures for the loading of product coal to rail wagons from the Whitehaven Rail Loading Facility would not vary from those currently in place and would be undertaken strictly in accordance with the development consent and environment protection licence.

[3] It is noted that complete upgrade of the truck fleet of the northern mines would be dependant on the approval of 24 hour operations to and from the Belmont Coal Mine.

The Applicant is committed to ensuring that the continuation of use of the Whitehaven Rail Loading Facility and increases to the number of trains using the North-west and Main Northern Railway Lines are in line with local and State government guidelines or policies, accepted industry standards and reasonable community expectations. In order to reduce the frequency of rail movements from the Project Site, the Applicant is committed to the use of 72 wagon trains (which have an increased capacity over the currently used 42 wagon trains). However, to ensure that impacts on road traffic congestion through Gunnedah is minimised, the Applicant would only commence the use of the increased capacity trains once the Gunnedah bypass line is constructed. The Applicant expects the Gunnedah bypass line will be operational by February 2008.

Other than the proposed reduction in rail movements (beyond February 2008), there are few safeguards that can be implemented on the movement of rail wagons once loaded. This notwithstanding, the Applicant intends to maintain communication with local residents, landholders and Gunnedah Shire Council to ensure any negative impacts on amenity or lifestyle would be ameliorated as efficiently as possible.

4.5.3 Environmental Effects

4.5.3.1 Road Traffic

The proposed modification does not provide for any variation to approved road transport operations between the mines supplying the Whitehaven CHPP or location of coal reject emplacement. Therefore, assuming the safeguards and management measures proposed for each of these mining operations are implemented (see Section 4.5.2.1 for a summary of these), the proposed modification would have no additional impact on road safety, congestion or pavement conditions.

4.5.3.2 Train Movements

While 42 wagon trains are used for the transportation of product coal (ie. until February 2008), the increase in coal despatch proposed would require 1 320 trains per year, an increase of 610 trains per year or almost 2 per day (on average). Considering the existing use of the North-western Railway Line between Gunnedah and the Main Northern Railway Line (see Section 3.8.1.2), the proposed increase in coal despatched from the Whitehaven Rail Loading Facility would increase the average daily number of trains to approximately 11 return journeys (with this increasing during heavy grain seasons when the number of grain carrying trains may increase by 2 or 3 times).

This increase, is relatively insignificant when considering the current pass-by time of each 42 wagon train (travelling at an average speed of 20km/hr) is <2 minutes or cumulatively less than ½ hour every 24 hours. Furthermore, the period of level crossing closure associated with the train pass-bys is unlikely to create significant traffic congestion within Gunnedah, given the visibility of the rail line from the approach section of the most heavily used crossing roads (New and Marquis Streets – see **Figure 3.10**) provides significant forewarning of crossing closure with a nearby and easily accessed alternative overpass of the rail line (Oxley Highway - see **Figure 3.10**).

With the transportation of coal from the Whitehaven Rail Loading Facility and other projects using the rail network using 72 wagon trains, the number of rail movements on the North-western railway Line would reduce. The Whitehaven Rail Loading Facility alone would only increase rail movements from 710 trains per year to 745 trains per year whilst despatching almost twice the current amount of coal, with other coal projects likely to also decrease the number of rail movements required by using the increased capacity 72 wagon trains. The issue of traffic congestion within Gunnedah would also be eliminated after February 2008 as the proposed pass-by of Gunnedah would be operational allowing the longer trains to travel at 60km/hr through the existing level crossings within the town.

4.5.3.3 Rail Noise and Vibration

With an increase in the number of train movements, there would be a corresponding increase in noise and vibration levels at residences along the rail line. However, it is noteworthy, that since late 2007, when the Applicant completed the extension of the parallel approach line to the Whitehaven Rail Loop by approximately 260m to facilitate 72 wagon trains entering the rail loop, noise levels attributable to operational procedures have been reduced. Prior to the modification of the rail loop, the previous approach procedures involved trains stopping at the points entering the loop to allow the train crew to manually activate the points and then proceed onto the Whitehaven Rail Loop and stop a second time to allow the points to be closed to allow clear passage for the main North-west Railway Line. This procedure is no longer necessary as the points are now automated and the entry onto the Whitehaven Rail Loop is not impeded which therefore avoids a number of stop - start movements and the related noise associated with this activity.

Noise

The Australian Rail Track Corporation (ARTC) operates the North-western Railway Line and Main Northern Railway Line under Environment Protection Licence (EPL) 3142. EPL 3142 does not contain environmental noise limits but states the objective of progressive reduction of noise levels from rail lines through Pollution Reduction Programs (PRPs).

Condition U1.1 of EPL 3142 provides the following goals to work towards in developing a PRP:

$L_{eq,\ (15\ hour),\ day}$	-	65dB(A)
$L_{eq,\ (9\ hour),\ night}$	-	60dB(A)
$L_{max\ (24\ hour)}$	-	55dB(A)

These criteria would be considered for the assessment of cumulative train noise levels resultant from the operation of the Project and other local coal mines. The L_{max} criterion is considered to apply to pass-by levels of moving trains and not to horns, which must be sounded near crossings for safety purposes.

Spectrum Acoustics measured the noise generated by a train pass-by in the rear yard of a Barber St, Gunnedah, property at approximately 20m from the rail line on 12 December 2006. The L_{eq} noise level measured over a period of 83 seconds was 72.3dB(A) with a measured L_{max} noise level of 79dB(A). These measured parameters provide for the following criteria based noise levels.

$L_{eq, (9\ hour), night}$ - 46.4dB(A)
$L_{eq, (15\ hour), day}$ - 44.2dB(A)
$L_{eq, (9\ hour), (24hr)}$ - 42.2dB(A)

The predicted level of 42.2dB(A),$L_{eq(24\ hr)}$ is almost 15dB below the DECC criterion of 55dB(A),$L_{eq(24\ hr)}$.

The North-western Railway Line and Main Northern Railway Line could realistically carry up to eight coal trains per day. Assuming the unlikely worst case that all eight trains (ie. 16 movements) could occur in the day or the night, the predicted cumulative coal train noise levels are as presented in **Table 4.21**.

Table 4.22
Predicted Worst Case Cumulative Train Noise Levels

Period	Noise Level (12 Train Movements) (dB(A), L_{Aeq})	Criteria (EPL 3142)
Night: L_{Aeq} (9 hr)	47.6	60
Day: L_{Aeq} (15 hr)	45.4	65
Source: Spectrum Acoustics		

Again, with the line carrying coal trains at full capacity, the resulting noise levels would be below the noise criteria of EPL 3142, held by ARTC.

Vibration

Vibration criteria for this assessment were obtained from the DECC publication "Assessing Vibration: A Technical Guideline" (AVTG, 2006). Based on the assumption that train-induced ground vibrations are typically at frequencies greater than 10Hz, AVTG (2006) suggests the maximum allowable vibration velocity to ensure personal comfort levels are not exceeded is 2.82mm/s (DECC, 2006).

Vibration levels from laden and unladen coal trains have been widely studied in the Hunter Valley. A thorough assessment conducted in 1997 (*Noise and Vibration Assessment, Jerrys Plains Rail Spur, Wilkinson Murray Pty Limited*) found train vibration levels at 20m from the rail line to be considerably less than the 2.82mm/s criterion. In most train vibration measurements at this distance conducted by Spectrum Acoustics, the vibration logger was not triggered when set as low as 0.5mm/s. Train vibration levels associated with the additional train movements of the proposed modification would not result in vibration levels exceeding the nominated criteria.

4.5.4 Monitoring

No specific monitoring is proposed for road or rail transportation, although vehicle and train movements are logged as part of operations and could be reviewed to ensure compliance with the proposed maximum levels.

4.6 VISIBILITY

4.6.1 Objectives

The primary objective of the Applicant with regard to the visibility of the Project Site would be to minimise the visual intrusion of the activities undertaken on the Project Site.

4.6.2 Operational Safeguards and Management Procedures

The three component areas of the Project Site, located between the Kamilaroi Highway, Quia Road and the North-western Railway Line, are potentially visible from local vantage points and a number of local residences. The following provides information on visual mitigation provided for the most visible of structures and activities within the Project Site.

Coal Load-out Bin

The existing 30m high coal load-out bin and the associated conveyor structure are dominant features of the visual environment. The olive colour of the bin provides some visual mitigation given the local backdrop to the site provided by Black Jack Mountain and the vegetation adjacent to Quia Road. Also mitigating the visual intrusion of the rail load-out bin is the occurrence in the local area of other similar industrial features.

CHPP, Coal Stockpiles and Fine Reject Ponds

Notwithstanding that the CHPP structures and associated stockpiles are substantially lower than the existing load-out bin, and that land disturbance such as that associated with the construction of the fine reject ponds is consistent with the agricultural activities undertaken in the area, the Applicant would implement the following safeguards.

- Minimise the extent of new land disturbance consistent with operational requirements. No disturbance, other than that required for Fine Reject Ponds RP-7 and RP-8 and settlement ponds SP-6 and SP-7, would be required.
- Restrict the height of the fine reject pond walls to approximately 3m.
- Undertake tree screen plantings to the east of the newly constructed fine reject ponds and on the perimeter boundaries, where appropriate.
- Implement air quality controls as identified in Section 4.4.4.
- Maintain the site in a clean and tidy condition at all times.

- Restrict the use of night-lighting to periods of site operations. Outside these periods, the lights are turned off in accordance with a pre-programmed schedule. Limited sensors are also fitted to all substantial external lighting. The tower lights would be directed downwards onto the work area and not directly at any residence.

4.6.3 Environmental Effects

There would be very minimal change to the visual landscape as a consequence of the proposed modification to operations at the Whitehaven CHPP and Rail Loading Facility. The only noticeable changes would be the construction and operation of additional fine reject ponds, and the greater use of Coal Stockpiling Area B. The increased throughput would result on the external lighting being used more often.

Assuming the implementation of the mitigating measures proposed in Section 4.6.2, there would be no additional adverse impact on the visual amenity of the area surrounding the Project Site.

4.6.4 Monitoring

No monitoring would be required.

4.7 LAND USE

4.7.1 Objectives

As identified in Section 3.3.2, land ownership and land use pose a potential constraint on the proposed modifications in so far that any substantial changes to dust generation, the noise climate and visual amenity as a result of the proposed modification may adversely affect the surrounding land use(s) or amenity of the current (or future) land owners. In recognition of this potential constraint, the primary objective of the proposed modification, as it relates to land use, is to ensure there is no additional adverse impact(s) on ongoing land use on neighbouring properties.

A secondary objective of the proposed modification is to provide for the long term use of the site, beyond the decommission and rehabilitation of the Whitehaven CHPP and Rail Loading Facility, without adversely affecting land use or amenity.

4.7.2 Operational Safeguards and Management Procedures

Operational safeguards and management procedures designed to minimise impacts on other elements of the local environment that contribute to the amenity of surrounding land owners and viability of land uses have been discussed in previous sections as follows.

- Soil and water resources (Section 4.1.2 and 4.2.2).

- Air quality (Section 4.4).
- Noise (Section 4.3.4).
- Transportation (Section 4.5.2).
- Visibility (Section 4.6.2).

4.7.3 Environmental Effects

The previous assessments of environmental effects identified very minimal change to impacts on the various environmental issues which contribute to local amenity and land use. This has been verified through the operations of the facility over the past 5 years. The additional impact associated with the proposed modification on local land use is therefore assessed to be minimal.

4.7.4 Monitoring

While no monitoring is possible, the Applicant would continue to liaise with neighbouring property owners and/or residents to ensure that the operation of the Whitehaven CHPP and Rail Loading Facility continues to have minimal impact on local land use and amenity.

4.8 SOCIO-ECONOMIC SETTING

4.8.1 Introduction

The Applicant's principal objective is to provide a positive socio-economic benefit to the local and regional community as a result of operations at the Whitehaven CHPP and Rail Loading Facility and all of its coal mining and related ventures throughout the Gunnedah area.

This evaluation of the socio-economic affects of the increased throughput at the Whitehaven CHPP and Rail Loading Facility draws upon the description of the current socio-economic setting described in Section 3 and the Applicant's plans and commitments for its Gunnedah-based operations.

4.8.2 Management Approach

The Applicant maintains a policy of providing professional / technical training for members of the local community to achieve the required competency levels for positions at its various operations, as opposed to importing skilled personnel from established mining regions such as the Hunter Valley. This approach provides for a more stable workforce and limits the need for additional housing and services. The training offered by the Applicant for its employees ranges from typically one or two apprenticeships each year and various TAFE courses and university studies.

The Applicant has progressively increased its presence throughout the local Gunnedah community over the past 7 years as it has developed various projects and achieved sales for Gunnedah Coal. This increased presence has been reflected through its sponsorship of numerous local groups, events and activities. The Applicant encourages its employees to become involved with and contribute to local groups and activities.

The Applicant has also developed close working relationships with its suppliers, some of whom have recognised the Applicant's long-term commitment to the Gunnedah area and established businesses in the Gunnedah district.

4.8.3 Environmental Effects

The increased throughput at the Whitehaven CHPP and Rail Loading Facility reflects the Applicant's commitment to its business around Gunnedah. The Applicant's coal sales have increased to the point where further infrastructure is necessary to manage the increased coal production. The increased production would be matched with increased employment, Company spending and most importantly the growth of numerous other sectors in the Gunnedah area that can rely upon the boost in local spending. This growth is already evident in Gunnedah reflecting the community and business confidence in the positive economic impacts the re-introduction of coal mining is having and likely to have for many years to come.

The Applicant would continue to provide employment within the local community, both directly through the employment of project-related personnel, eg. operators, truck drivers, etc, and indirectly through the provision of ancillary services to the Whitehaven CHPP and Rail Loading Facility, eg. engineering contractors, maintenance personnel, cleaners. As noted in Section 2.11, the level of direct employment at the Whitehaven CHPP and Rail Loading Facility would increase from 15 to 20 persons. When considering the Applicant's various mining projects cumulatively, the Applicant would employ approximately 125 persons directly and up to 200 persons indirectly. Maintaining this level of significant local employment would be dependent on the proposed increased throughout in the quantity of coal processed and despatched from the Project Site.

The gradual re-introduction of coal mining to the Gunnedah area of the past 7 years and the Applicant's responsive corporate approach to the development of a professional and responsible workforce has been an important catalyst to the sustained rejuvenation of Gunnedah throughout this period. The impacts of the closure of the various mines and Gunnedah Abattoir in the late 1990s appear to have been overcome as various sectors have increased employment levels to re-establish previous employment levels. The confidence of private enterprise in the ongoing growth of Gunnedah is reflected by the recent increase in new home building and land subdivisions throughout Gunnedah.

Gunnedah is well established with a wide range of high quality community infrastructure and services attributable in part to the prosperous status of the town prior to the late 1990s. The re-introduction of the coal mining industry and increase in other sectors has been possible given the previous level of infrastructure and facilities within the town that all sectors have been able to utilise. The town is now at the point where the level of confidence is such that all sectors are benefiting from each other, albeit underpinned by coal mining industry.

The Applicant is committed to the Gunnedah district and as such intends to continue its wide range of support for community projects, local groups and activities, generally in accordance with a consistent set of criteria focussing upon the widest possible community benefit.

In conclusion it is assessed that the increased throughout at the Whitehaven CHPP and Rail Loading Facility and the related increase in mine production would provide both increased employment and spending to support the positive flow-on effects to the local and regional community. The Gunnedah community would benefit from the re-introduction of coal mining, particularly at a time when the agricultural sector is experiencing low periods attributable to the drought.

4.9 FIRE MANAGEMENT

4.9.1 Objectives

Experience has shown there to be a very low incidence of bushfires in either the agricultural or forested land in the vicinity of the Project Site. However, the Applicant is conscious of the need to ensure adequate fire controls are maintained so that its activities:

- do not increase the potential for fires on and surrounding the Project Site; and
- its own operation is safeguarded.

4.9.2 Operational Safeguards and Management Procedures

The Applicant already has in place a range of safeguards for the prevention and control of bush, equipment and spontaneous combustion fires at the Whitehaven CHPP and Rail Loading Facility which have been shown to be effective to date and would be maintained. These include:

- maintaining all earthmoving and coal handling equipment in good working order with efficient exhaust systems and spark arrestors;
- ensuring all mobile equipment is fitted with an integrated fire suppression system and appropriately-sized and approved fire extinguishers suitable for the control of flammable liquid and electrical fires. All heavy machinery would be fitted with two extinguishers and all light vehicles fitted with one extinguisher;

- installation of approved fire extinguishers at various locations around the CHPP including at the fuel bay and workshop, and the offices, crib rooms and bathhouses;
- maintenance of firebreaks around the Project Site;
- providing an automatic fire suppression system in the coal reclaim tunnel;
- restriction of vehicle movements to defined tracks within uncleared areas within the Project Site;
- access to the various CHPP water storages would be made available for fighting local fires;
- site personnel receive training in the use of appropriate fire fighting equipment;
- coal stockpile monitoring and management to minimise the potential for, and control of, any spontaneous combustion incidences; and
- the on-site water cart is set up for fire fighting with the Rural Fire Service fittings and a water canon.

4.9.3 Environmental Effects

Given the low likelihood for fire within the local environment, and the operational safeguards and management measures already implemented on the Project Site, the risk of fire initiating on the Project Site is considered to be very low. In the event of fire, the management measures for the Whitehaven CHPP and Rail Loading Facility would ensure that the risk of this posed to equipment and human life would be minimised.

4.9.4 Monitoring

Coal stockpiles would be regularly inspected for signs of smoking, smouldering or possible combustion. Should signs of combustion, or potential combustion be identified, the coal would be isolated and doused with water until all signs of combustion are removed.

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Section 5
Evaluation of the Modified Proposal

Preamble

This section concludes the document with an evaluation of the modified proposal to the operation of the Whitehaven CHPP and Rail Loading Facility, to enable an increase in the quantity of coal accepted, processed, loaded and despatched. This evaluation firstly assesses the modified proposal in terms of the biophysical and socio-economic considerations. It then assesses the proposed increase in throughput in the context of the principles of Ecologically Sustainable Development. The section concludes with a justification for the modified proposal on the basis of the biophysical socio-economic impacts and the consequences of not proceeding with the modification to the Whitehaven CHPP and Rail Loading Facility.

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5.1 INTRODUCTION

Schedule 2(6) of the *Environmental Planning and Assessment Regulation, 2000* requires this SoEE to evaluate and justify the modification to the operation of the Whitehaven CHPP and Rail Loading Facility in the manner proposed having regard to biophysical, economic and social considerations and the principles of Ecologically Sustainable Development. Section 5.2 evaluates the modified proposal considering the residual impacts on the biophysical and socio-economic environment, principally based on the assessments of impact set out in Section 4, and Section 5.3 presents an evaluation against the principles of ESD.

Section 5.4, which presents the justification of the project, revisits the predicted residual impacts on the biophysical environment, considers the socio-economic benefits which would be provided and assesses the consequences of not proceeding with the project.

5.2 EVALUATION OF THE RESIDUAL IMPACTS OF THE MODIFIED PROPOSAL

5.2.1 Biophysical Considerations

The modified proposal to the Whitehaven CHPP and Rail Loading Facility to enable an increase in throughput has been designed in such a manner so as to provide for the forecast production from the Gunnedah district mines and projected coal sales of the Proponent whilst minimising any increase in impact on the local environment or neighbouring properties. Following the implementation of a number of operational safeguards and controls, it has been determined that while some increase in environmental impact may occur, the level of these impacts fall well within specified criteria or reasonable community expectations.

The impacts on the biophysical environment considered of greatest significance are summarised as follows.

Noise

As a result of the increased throughput, it has been predicted that noise levels experienced at residences on neighbouring properties would increase marginally. However, assuming the implementation of the operational safeguards, controls and management measures discussed in Section 4.3.4, these noise levels are predicted to remain within the DECC nominated criteria for all operational and transport activities. It is likely that surrounding residents may hear activities on site of a night-time given it is planned to increase the number of nights when the CHPP will be operational. The Applicant would continue to monitor noise levels received at the potentially most affected residential locations to confirm compliance with the DECC nominated noise criteria.

Air Quality

The predicted incremental increase in air pollutant levels surrounding the Whitehaven CHPP and Rail Loading Facility were predicted by dispersion modelling, assuming maximum throughput under a range of potentially worst-case meteorological conditions and the adoption of a range of specific dust control measures. For the air pollutants considered, deposited dust, PM_{10} and $PM_{2.5}$, the predicted incremental increase in pollutant level was small and the total pollutant level remained below the existing criteria limit at all non-project related residences.

The predicted increase in greenhouse gas emissions attributable to the modified proposal was also considered and assessed relative to Australian 1990 and 2005 NSW baseline levels. A comparison of the predicted emissions with the 1990 national estimate demonstrates that operations would represent an annual increase of approximately 0.001% of the total baseline Australian emissions. A comparison of the predicted emissions due to the proposed operations with NSW emissions in 2005 demonstrates that operations would represent an annual increase of approximately 0.004%.

Traffic

The modified proposal does not provide for any variation to approved road transport operations between the Applicant's Gunnedah mines or location of coal reject emplacement and the Whitehaven CHPP. Rather, the transportation of either coal or coal reject is covered in the approach for each mining operation. Therefore, assuming the safeguards and management measures proposed for each of these mining operations are implemented, the modified proposal would generate only additional impact.

Coal would continue to be transported using 42 wagon (3100t capacity) trains until February 2008 after which 72 wagon (5400t capacity) trains would be used. The issue of traffic congestion within Gunnedah related to level crossing closure would be largely eliminated after February 2008 when the proposed pass-by of Gunnedah would be operational allowing the longer trains to travel at 60km/hr through the existing level crossings within the town. A maximum of 760 x 72 wagon trains would be despatched annually when full production is achieved. The number of trains despatched daily and those from other coal mining ventures in the Boggabri area would be well within the capacity of the North-western and Main Northern Railway line.

The impacts on all other aspects of the biophysical environment are unlikely to change as a result of the modified proposal.

5.2.2 Socio-economic Considerations

The impacts of the modified proposal on the socio-economic environment would be largely positive given the increase in employment opportunities, both direct (an increase from 15 to 20 on-site personnel) and indirect (the increased throughput would allow the supplying mines to produce at maximum rates and therefore employ the maximum number of operational and transport personnel, estimated to be up to 125 people directly and up to 200 people indirectly). The economic and social benefits of this level of employment would be felt through payment of wages, payments made to local and regional ancillary businesses and industries and the flow-on effect to other goods and service providers locally.

Economic benefits of the increased throughout at the Whitehaven CHPP and Rail Loading Facility would also flow onto the various levels of government through the payment of taxes, royalties and contributions to maintain local infrastructure.

It is not anticipated that the proposed increase in direct Whitehaven CHPP and Rail Loading Facility personnel would create any significant increase in pressure on local infrastructure as it is anticipated the additional staff would be drawn from the local community. It is also worthy of note that the Applicant has been a significant contributor to local community and charitable organizations, donating almost $50 000 in Gunnedah Shire and approximately $20 000 in Narrabri Shire in the past 12 months.

5.2.3 Conclusion

The modified proposal to the operation of the Whitehaven CHPP and Rail Loading Facility, as presented within this SoEE, has been designed to provide for the forecast production from the Gunnedah district mines and projected coal sales of the Applicant in both an efficient and environmentally responsible manner. It has been assessed that the modified proposal would not result in any impacts on the local environment outside the limits of accepted criteria and with minimal adverse impact on the surrounding environment.

5.3 EVALUATION AGAINST THE PRINCIPLES OF ECOLOGICAL SUSTAINABILITY DEVELOPMENT

5.3.1 Introduction

Ecologically Sustainable Development (ESD) is a concept which can be defined as development which uses, conserves, and enhances the community's resources in such a way that ecological processes are maintained and our existing and future quality of life can be improved. An alternative definition is "a development which aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations". This section of the SoEE has been prepared with reference to a range of documents including the draft Practice Guidelines for ESD in Environmental Impact Assessment prepared by the then Department of Urban Affairs and Planning, now Department of Planning.

While the production and sale of coal is a significant contributor to the current strong national economy and material well-being of Australians, coal-related industries do involve some degree of environmental disturbance. In the context of ESD, the issue of whether environmental impacts are irreversible or affect long term ecological sustainability is important. For this reason, it is the overall objective of the ESD process to ensure compatibility between the coal industry and the environment.

It is intended in this section to address how the modified proposal to the Whitehaven CHPP and Rail Loading Facility has been planned and would operate in a manner that is consistent with the principles of ESD. It is also necessary for the modified proposal to be prepared and evaluated with an approach that is consistent with the two main features of the National Strategy for Ecologically Sustainable Development (NSESD) namely:

(i) the need to consider in an integrated way the wider economic, social and environmental implications of our decisions and actions for Australia, the international community and the biosphere; and

(ii) the need to take a long term rather than a short term view when taking those decisions and actions.

ESD consists of the following four inter-related principles, as defined under Schedule 2(6) of the *Environmental Planning and Assessment Regulation 2000*:

- the precautionary principle;
- the principle of social equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing of environmental resources.

5.3.2 The Precautionary Principle

This principle states that "where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
- an assessment of the risk-weighted consequences of various options" (IGAE, 1992).

In order to satisfy this principle of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it. Considerable emphasis has been placed upon planning for the prevention or limitation of environmental harm.

Environmental safeguards, as discussed in Section 4 of the SoEE, are measures that have been planned with a comprehensive knowledge of the existing environment, previous experience and an appreciation of the potential impacts, to prevent or limit environmental degradation. After a full evaluation of the potential environmental impacts of the modified proposal, there are no activities or features for which there is a level of uncertainty in achieving an acceptable level of environmental performance. The procedures necessary to achieve good and responsible coal processing and rail loading practices are well known and have been demonstrated by the Applicant over the 5 years of operation at the Whitehaven CHPP and Rail Loading Facility (see Section 1.5.4).

It is considered that there are no irreversible features of the modified proposal with the exception of the depletion of a coal resource required for continued prosperity of the local and regional community.

Features of the local environment such as water quality, soil resources and air quality will be managed throughout the life of the Whitehaven CHPP and Rail Loading Facility such that they will be comparable before and at the completion and following decommissioning and rehabilitation of the Project Site.

It would remain a guiding principle for the Applicant to continue to be pro-active and anticipate problems rather than allow problems to develop.

5.3.3 Intra- and Inter-Generational Equity

The objective of this ESD principle is that "the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations" (IGAE, 1992). This principle is based on social equity for the current generation (intra-generational) and future generations (inter-generational).

Intra-generational equity requires that the economic and social benefits of the development be distributed appropriately among all members of the community. The modified proposal, and particularly the safeguards proposed with respect to noise, water, air, visibility, transportation and soil management, has been designed to ensure that no part of the community would be unacceptably disadvantaged. As discussed in Section 5.2.2, the economic benefits of the continued operation of the Applicant's coal projects, which are dependent on the continued operation of the Whitehaven CHPP and Rail Loading Facility, are and would continue to be widespread through the local economy as a result of direct and indirect employment (up to 325 positions locally), the flow-on effect to ancillary businesses and industries, as well as the flow-on effect created towards other goods and service providers as a result of the contribution to a vibrant local economy.

The non-material well-being or "quality of life" of existing and future residents in the vicinity of the Project Site would continue to be maintained throughout and beyond the life of the Whitehaven CHPP and Rail Loading Facility through implementation of safeguard measures to mitigate any environmental impacts and the planned rehabilitation of the Project Site on cessation of coal processing and loading activities.

5.3.4 Conservation of Biological Diversity and Ecological Integrity

Biological diversity or biodiversity describes life forms and is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity. Ecosystem integrity describes the condition of an ecosystem that is relatively unaltered from its natural state. For the purposes of this assessment, biodiversity is considered on the Project Site and its immediate surrounds.

The modified proposal would result in very minor disturbance to land previously cleared for agricultural activities. This, considered cumulatively with the minor additional impacts on the local noise and air quality environment, and no change to existing local surface water flows, indicates any impact on biodiversity and ecological integrity would be very minor. This minor impact would ultimately be mitigated through rehabilitation of the Project Site following cessation of coal processing and rail loading activities.

5.3.5 Improved Valuation and Pricing of Environmental Resources

This principle involves consideration of the materials proposed to be processed and loaded, and the surrounding environmental resources (e.g. air, water, land and living things) which may be affected. The valuation and pricing of the processed materials comprises the cost of mining, screening and rehabilitation costs, delivery costs and the final cost to Gunnedah rate payers.

The value placed by the Applicant on the environmental resources, other than the extracted resource, is evident through the commitments made and planning documented in this SoEE.

5.3.6 Conclusion

It has been assessed that the modified proposal would have minimal impact on the local environment, both now and in the future, and is consistent with the features which distinguish an ecologically sustainable approach to coal processing and transportation.

5.4 JUSTIFICATION OF THE MODIFIED PROPOSAL

5.4.1 Introduction

In assessing whether the development and operation of the modified proposal is justified, consideration has been given both to the predicted residual impacts on the local and wider environment and the potential benefits the project would have for the Applicant, residents of Gunnedah and Gunnedah Shire, NSW and Australia. This section also considers the consequences of the modified proposal not proceeding.

5.4.2 Assessment of Impacts and Benefits

The modified proposal would result in minor changes to the local environment, which with limited exception, would be effectively imperceptible to surrounding residents and property owners. For example, while the proposed increase in throughput would result in an increase in the emission of air pollutants, the incremental increase on current emission would be small and unlikely to be noticeable unless measured. Similarly, while additional water would be required, environmental flows through and beyond the Project Site would be maintained such that the availability of water to downstream users is not adversely affected.

A limited number of surrounding residents may notice some increase in noise levels, particularly at night-time although the levels would remain within DECC nominated criteria, and until the Gunnedah bypass line on the North-western Railway Line is upgraded, there may be an increase in the number of times each day (up to 2) that level crossings in Gunnedah are closed (for approximately 2 minutes).

These potential minor impacts are justified, however, when considered against the major economic benefit provide to the Gunnedah town and shire communities through the provision of well-paid stable employment, flow-on effects to local businesses and the annual contribution of the Applicant to the maintenance of local infrastructure and donations to local community and charitable organisations.

5.4.3 Consequences of not Proceeding with the Modified Proposal

The consequences of not proceeding with the modified proposal include the following.

(i) The Applicant would be restricted in the volume of coal it could mine from its current and future mines. Such an outcome would be contrary to the DPI (MR) and the Proponent's objective to maximise resource utilisation.

(ii) The opportunity to create an additional 5 jobs at the Whitehaven CHPP and Rail Loading Facility would be foregone.

(iii) The opportunity to maximise employment levels (up to 325 jobs) at the Applicant's Gunnedah mines and through transport activities would be foregone.

(iv) The disposable wages for the additional full-time and part-time workforce would be foregone, a substantial proportion of which would be spent in the Gunnedah LGA.

(v) The payment of taxes on the employment of additional personnel for the life of the Whitehaven CHPP and Rail Loading Facility would not eventuate.

(vi) The payment of additional coal royalties and payments to State Authorities through the sale of an additional 1.1Mt of coal each year would not occur.

(vii) The minor impacts on the local biophysical environment would not eventuate.

It is considered that the benefits of proceeding with the proposed increase in throughput to the Whitehaven CHPP and Rail Loading Facility therefore far outweigh the minor impacts on the environment that would result. The consequences of not proceeding also weigh heavily in favour of proceeding with the modified proposal.

Section 6
References and Glossary of Terms

References

Australian Greenhouse Office (2005), *Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks 2005 – Energy (Stationary Sources).*

Australian Greenhouse Office (2006), *National Greenhouse Inventory 2004 – Accounting for the 108% Target.*

Australian Greenhouse Office (2007), *State and Territory Greenhouse Gas Inventories 2005* – March 2007.

Bagnold, **R. A. (1941),** *The Physics of Blown Sand and Desert Dunes,* London, Chapman and Hall.

Buonicore A. J. & Davis W.T. (1992), *Air Pollution Manual*, Air & Waste Management Association (US).

Bureau of Meteorology (2007), Hourly Meteorological Data for Gunnedah AWS (station no. 055202).

NSW Department of Environment and Climate Change (2006), *Assessing Vibration: A Technical Guideline - Department of Environment and Conservation*, March 2006.

Department of Environment and Heritage (DEH) (2000), "*Emission Estimation Technique Manual for Mining and Processing of Non-Metallic Minerals Version 2.0*", National Pollutant Inventory, August 2000.

Department of Environment and Heritage (DEH) (2001), "*Emission Estimation Technique Manual for Mining Version 2.3*", December 2001.

Environment Australia National Pollution Inventory (2001), *Emission Estimation Technique Manual for Mining Version 2.3.*

Marticorena B. and Bergametti G. (1995), *Modeling the Atmospheric Dust Cycle. 1. Design of a Soil-Derived Dust Emission Scheme*. Journal of Geophysical Research, 100, 16 415 - 16430.

National Environmental Protection Council (NEPC) (1998), *National Environmental Protection Measure for Ambient Air Quality.*

National Health and Medical Research Council (1981), 92nd Session, 1981.

NSW Department of Environment and Climate Change (DECC) (2005), *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.*

NSW Department of Environment and Conservation (1998), *Action for Air, the NSW Government's 25-Year Air Quality Management Plan.*

SKM (2005), *Improvement of the NPI Fugitive Particulate Matter Emission Estimation Techniques.*

US EPA (1985), *Compilation of Air Pollutant Emission Factors* AP-42 Fourth Edition United States Environmental Protection Authority.

US EPA (1988), *Compilation of Air Pollutant Emission Factors* AP-42 Fourth Edition United States Environmental Protection Authority.

US EPA (1995), *Compilation of Air Pollutant Emission Factors* AP-42 - Chapter 13.2.4 Aggregate Handling and Storage Piles.

US EPA (2000), *Federal Register: Control of Air Pollution from New Motor Vehicles: Heavy Duty Engine and Vehicle Standards; Highway Diesel Fuel Sulfur Control Requirements; Proposed Rules.*

US EPA (2006), *Compilation of Air Pollutant Emission Factors* AP-42 (Chapter 13, Section 13.2.5 Industrial Wind Erosion).

VIC EPA (2000), *AUSPLUME Gaussian-plume Dispersion Model Technical User Manual*.

Watson, J. G., Chow, J. C. & Pace, T. G. (2000), Chapter 4: *Fugitive Dust Emissions* in Buonicore A. J. & Davis, W. T. (ed.), *Air Quality Engineering Manual.*

Glossary of Terms

EPA	Environmental Protection Authority
Gg	Gigagramme (g x 10^9)
GJ	GigaJoule (joules x 10^9)
mg	Milligram (g x 10^{-3})
µg	Microgram (g x 10^{-6})
µm	Micrometre or micron (metre x 10^{-6})
m^3	Cubic metre
MW	Megawatt
MJ	MegaJoule (joules x 10^6)
NEPM	National Environment Protection Measure
NO	Nitric Oxide
NPI	National Pollutant Inventory
NSW DECC	NSW Department of Environment and Climate Change
PJ	PetaJoule (joule x 10^{15})
PM_{10}	Particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in aerodynamic diameter
ppb	Parts per billion (volumetric concentration)
ppm	Parts per million (volumetric concentration)
SO_2	Sulphur Dioxide
TJ	TeraJoule (joule x 10^{12})
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

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Appendices

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Appendix 1: Request for Development Consent Modification

Appendix 2: Seasonal Stability Class Frequency Distribution

Appendix 3: Emissions Inventory

Appendix 4: Greenhouse Gas Protocol Initiative

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Appendix 1
Request for Development Consent Modification

(No. of pages excluding this page = 1)

Whitehaven Coal Mining Pty Ltd
ABN 65 086 426 253

24 October 2007

General Manager
Gunnedah Shire Council
PO Box 63
GUNNEDAH NSW 2380

Dear Sir

Re: Increased Throughput at the Whitehaven Coal Handling Preparation Plant and Rail Loading Facility

I am writing on behalf of Whitehaven Coal Limited to formally seek Council's approval to modify Development Consent 0079.2002 to enable the increased throughput at the Whitehaven Coal Handling and Preparation Plant and Rail Loading Facility. It is envisaged that it will be necessary to modify the Consent through amendment of the following conditions.

Condition 1.1:	Reference to the accompanying Statement of Environmental Effects is sought in this condition.
Condition 1.4:	The maximum throughout of the Coal Handling Preparation Plant sought is 3.0 million tonnes per year and 4.1 million tonnes per year for the rail loading facility.
Condition 2.7(b):	Modified hours of operation to allow deliveries of coal from the Belmont Coal Mine between 10:00pm and 7:00am, ie. in line with the proposed hours of operation of coal transportation from that mine, if it is approved.

I have enclosed ten copies of the Statement of Environmental Effects prepared to describe the proposed increased throughput and assessment of the environmental attributes of the proposal.

The increased throughput at our facility is an important component of our Company's commitment to its various coal mining projects throughout Gunnedah Shire.

We trust the information provided in the Statement of Environmental Effects attached meets Council's requirements. Should you require any further information, please do not hesitate to contact either myself or Rob Corkery of R.W. Corkery & Co Pty. Limited.

Yours sincerely

Chris Burgess
General Manager – New Projects

Encls: Statement of Environmental Effects (x10)

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Maitland Office
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Unit 6, 500 High Street
Maitland NSW 2320
Ph: 02 49313153
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Fortitude Valley BC QLD 4006
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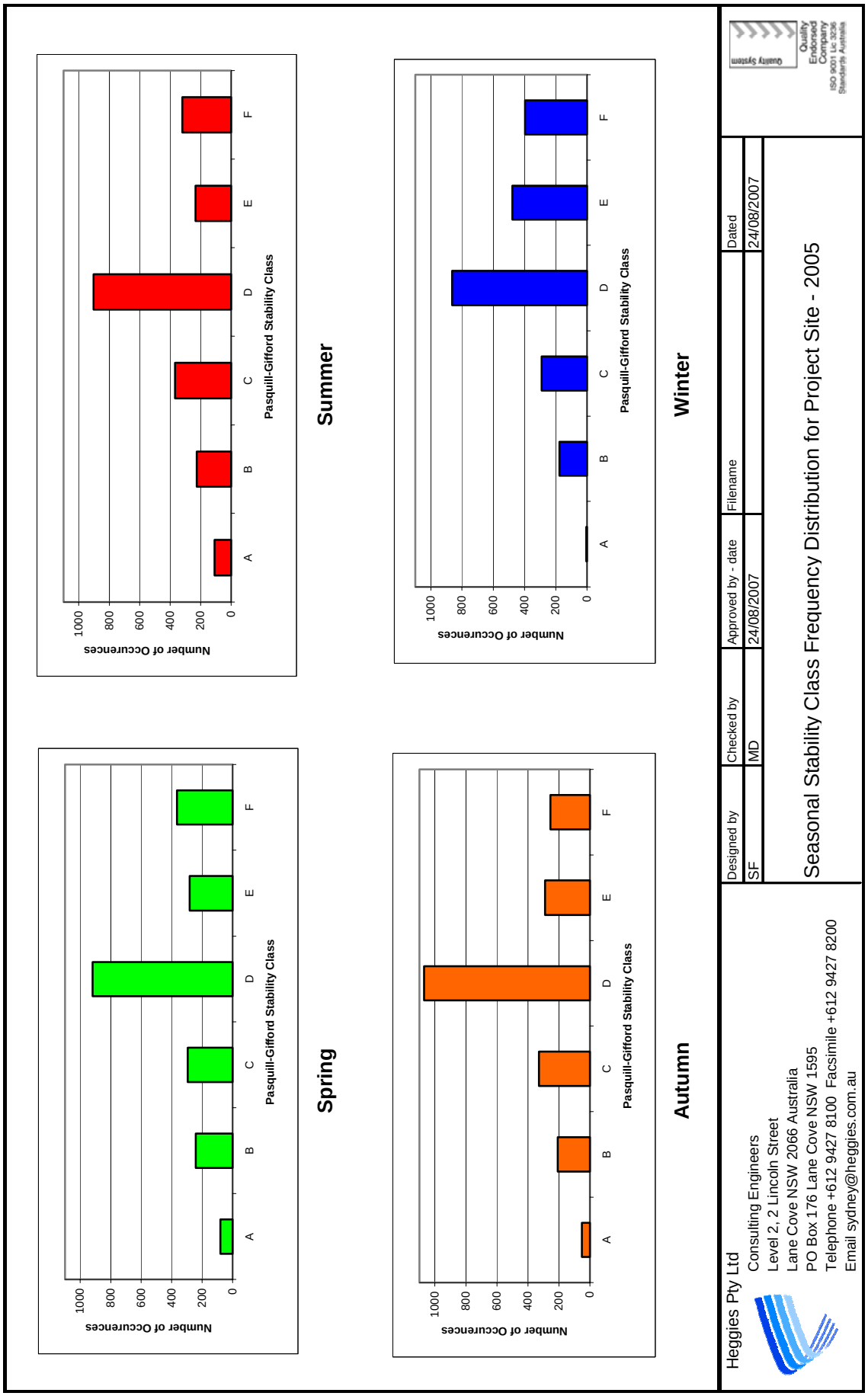
Appendix 2
Seasonal Stability Class Frequency Distribution

(No. of pages excluding this page = 1)



Seasonal Stability Class Frequency Distribution for Project Site - 2005

Designed by	Checked by	Approved by - date	Filename	Dated
SF	MD	24/08/2007		24/08/2007

Quality System — Quality Endorsed Company ISO 9001 Lic 3236 Standards Australia

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Appendix 3
Emissions Inventory

(No. of pages excluding this page = 1)

Whitehaven Coal Handling & Processing Plant, Gunnedah	TSP Emission Factor	PM10 Emission Factor	Emission Factor Units	Hourly Throughput (t)	Working days available	Working hours per day	TSP Emission Rate (mg/s)	Long Term TSP Emission Rate (mg/s)	PM10 Emission Rate (mg/s)
Front End Loader (on coal)7	0.016	0.008	kg/t	182	350	24	408.2	425.7	196.2
Tertiary Crushing Plant4, 5	0.03	0.01	kg/t	607	350	24	1,138.4	1,187.2	379.5
Loading Stockpiles	0.004	0.0017	kg/t	607	350	24	337.3	351.8	143.4
Loading to Trains	0.0004	0.00017	kg/t	607	350	24	20.2	21.1	8.6
Drop Points of Conveyor Units (2 points)	0.0004	0.0002	kg/t	304	350	24	37.6	39.2	17.8

Wind Erosion	TSP Emission Flux ($mg/s/m^2$)			PM10 Emission Flux ($mg/s/m^2$)		
Wind Band (m/s)	**<8.3**	**8.3-10.8**	**>10.8**	**<8.3**	**8.3-10.8**	**>10.8**
Coal Stockpiling Area A	0.09	0.69	1.88	0.03	0.28	0.75
Coal Stockpiling Area B	0.09	0.69	1.88	0.03	0.28	0.75
ROM Stockpiling Area	0.09	0.69	1.88	0.03	0.28	0.75
Coarse Rejects Area	0.09	0.69	1.88	0.03	0.28	0.75
Screened Products Wind Erosion	0.09	0.69	1.88	0.03	0.28	0.75

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Designed by	Checked by	Approved by - date		Filename	Dated
MD	RK	24/08/2007			24/08/2007

Appendix B - Emissions Inventory for Operations at Project Site

Quality System Quality Endorsed Company ISO 9001 Lic 3236 Standards Australia

Appendix 4
Greenhouse Gas Protocol Initiative

(No. of pages excluding this page = 6)

1. THE GREENHOUSE GAS PROTOCOL INITIATIVE

The Greenhouse Gas Protocol Initiative (hereafter, "the GHG Protocol") is a multi-stakeholder partnership of businesses, non-governmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI), a U.S.-based environmental NGO, and the World Business Council for Sustainable Development (WBCSD), a Geneva-based coalition of 170 international companies. Launched in 1998, the Initiative's mission is to develop internationally accepted greenhouse gas (GHG) accounting and reporting standards for business and to promote their broad adoption (WBCSD, 2005).

The GHG Protocol comprises two separate but linked standards:\.

- GHG Protocol Corporate Accounting and Reporting Standard (this document, which provides a step-by-step guide for companies to use in quantifying and reporting their greenhouse gas emissions).
- GHG Protocol Project Quantification Standard (forthcoming; a guide for quantifying reductions from greenhouse gas mitigation projects).

There are three scopes of emissions that are established for greenhouse gas accounting and reporting purposes, defined as follows.

2. SCOPE 1 EMISSIONS – DIRECT GHG EMISSIONS

The GHG Protocol defines Scope 1 emissions as those which result from activities under the company's control or from sources which they own. They are principally a result of the following activities.

- Generation of electricity, heat or steam. These emissions result from the combustion of fuels in stationary sources, e.g. boilers, furnaces or turbines.
- Physical or chemical processing. The majority of these emissions result from the manufacture or processing of chemicals and materials e.g. the manufacture of cement, aluminium, adipic acid and ammonia, or waste processing.
- Transportation of materials, products, waste, and employees. These emissions result from the combustion of fuels in company owned/controlled mobile combustion sources (e.g., trucks, trains, ships, airplanes, buses, and cars).
- Fugitive emissions. These emissions result from intentional or unintentional releases, e.g., equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions during the use of refrigeration and air conditioning equipment; and methane leakages from gas transport.

3. SCOPE 2 EMISSIONS – ELECTRICITY INDIRECT GHG EMISSIONS

Scope 2 emissions are those which relate to the generation of purchased electricity consumed in its owned or controlled equipment or operations. For many companies, purchased electricity represents one of the largest sources of GHG emissions and the most significant opportunity to reduce these emissions.

4. SCOPE 3 EMISSIONS – OTHER INDIRECT GHG EMISSIONS

The GHG protocol states that Scope 3 reporting is optional and covers all other indirect GHG emissions. Scope 3 emissions are defined as those which do not result from the activities of a company although arise from sources not owned or controlled by the company. Examples of Scope 3 emissions include the extraction and production of purchased materials, transportation of purchased fuels and the use of sold products and services.

In the case of the coal mining industry, Scope 3 emissions may include the transportation of sold coal and the use of this coal, either at home or overseas.

The GHG protocol flags the issue that the reporting of Scope 3 emissions may result in the double counting of emissions. A second problem is that as their reporting is optional, comparisons between countries and / or projects may become difficult. The GHG protocol also states that compliance regimes are more likely to focus on the "point of release" of emissions (direct emissions) and / or indirect emissions from the use of electricity. However, for GHG risk management and voluntary reporting, double counting is less important.

AGO Workbook

The Australian Greenhouse Office (AGO) Workbook, published by The Department of Environment and Heritage (DEH) in December 2005 provides a single source of current greenhouse gas emission factors for Australian organisations to estimate their emissions and abatement. It should be noted that the emission factors in the December 2005 AGO Workbook have been harmonised with the international reporting framework of the World Resources Institute / World Business Council for Sustainable Development (The GHG Protocol).

5. DIRECT EMISSIONS

Direct emissions are defined in the AGO Workbook as those which are produced from sources within the boundary of an organisation and as a direct result of that organisation's activities and arise from the following activities.

- Generation of energy, heat steam and electricity, including carbon dioxide (CO_2) and the products of incomplete combustion (methane (CH_4) and nitrous oxide (N_2O).
- Manufacturing processes, which produce emissions (for example, cement, aluminium and ammonia production).
- Transportation of materials, products, waste and people; for example, use of vehicles owned and operated by the reporting organisation.
- Fugitive emissions – intentional or unintentional GHG releases (such as methane emissions from coal mines, natural gas leaks from joints and seals); and
- On-site waste management, such as emissions from company owned and operated landfill sites.

The AGO gives several examples of direct emissions; a company with a vehicle fleet would report the GHG emissions from the combustion of petrol or diesel in these vehicles as direct emissions. A mining company would report methane escaping from a coal seam during mining (fugitive emissions) as direct emissions and a cement manufacturer would report carbon dioxide released during cement production as direct emissions.

6. INDIRECT EMISSIONS

The AGO Workbook defines indirect emissions as those which are generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation. The most important category of indirect emissions is from the consumption of electricity. Other examples of indirect emissions from an organisation's activities include upstream emissions generated in the extraction and production of fossil fuels, downstream emissions from transport of an organisation's product to customers, and emissions from contracted / outsourced activities. The appropriate emissions factor for these activities depends on the parts of the upstream production and downstream use considered in calculating emissions associated with the activity.

For purposes of harmonisation, the AGO emission factors for indirect emissions have been subdivided into Scope 2 and Scope 3 emissions (adopted by the GHG Protocol).

Broadly, the AGO Workbook defines Scope 3 emissions as including:

- disposal of waste generated (e.g. if the waste is transported outside the organisation and disposed of);
- use of products manufactured and sold;
- disposal (end of life) of products sold;

- employee business travel (in vehicles or aircraft not owned or operated by the reporting organisation);
- employees commuting to and from work;
- extraction, production and transport of purchased fuels consumed;
- extraction, production and transport of other purchased good and materials;
- purchase of electricity that is sold to an end user (reported by electricity retailer);
- generation of electricity that is consumed in a transport and distribution system (reported by end user);
- out-sourced activities; and
- transportation of products, materials and waste.

Draft Guidelines for Energy and Greenhouse in EIA

The Draft NSW EIA Guidelines were prepared in August 2002 by the NSW Sustainable Energy Development Authority (SEDA) and Planning NSW (now the Department of Planning (DOP)). The guidelines state that they are an advisory document and should principally be applied to projects which require an EIS under Part 4 and Part 5 of the Environmental Planning and Assessment Act 1979 (NSW) but can also be used for the assessment of other projects.

The Draft NSW EIA Guidelines define four scopes of emissions, the first three being adopted along the lines of the GHG Protocol with the fourth relating to emission abatement

7. SCOPE 1: DIRECT ENERGY USE OR GHG EMISSIONS

Scope 1 considers energy use and GHG emissions that occur on site or are under a proponent's direct and immediate control. Scope 1 emissions broadly consist of the energy use and GHG emissions produced by the following activities.

- Production of electricity, heat or steam.
- Combustion of fossil fuels for any other purpose.
- Physical or chemical processing on site.
- Transportation of materials, products, waste and employees by proponent controlled vehicles.
- Fugitive emissions occurring on site.
- On site landfill wastes or wastewater treatment.
- Animal husbandry.
- On site vegetation or soil disturbance.

8. SCOPE 2: INDIRECT ENERGY USE OR GHG EMISSIONS FROM IMPORT AND EXPORTS OF ELECTRICITY, HEAT OR STEAM

Scope 2 broadly focuses on the indirect emissions associated with the generation of purchased and imported electricity, heat or steam.

9. SCOPE 3: OTHER INDIRECT ENERGY USE OR GHG EMISSIONS

Scope 3 considers the indirect energy use or GHG emissions that are a consequence of the Project but do not occur on site or those emissions which are removed from the proponent's direct control. Examples of Scope 3 emissions as described in the Draft NSW EIA Guidelines include the following.

- Off site waste management (e.g. Land filled waste or waste water treatment).
- Transportation of products, materials and waste by vehicles not controlled by the proponent.
- Employee related business or commuter travel.
- Outsourced activities.
- Production of imported materials, plant and equipment.
- Use of products or services produced by the Project (and end of life phases of products).

10. SCOPE 4: GHG EMISSION ABATEMENT FROM OFFSET OPPORTUNITIES

Scope 4 reporting under the Draft NSW EIA Guidelines allows the reporting of any carbon offsets which have occurred as a direct result of the Project. Proponents may report the following if applicable.

- Carbon sequestration performed by the proponents.
- Community based energy use or emissions reduction initiatives.
- The use of government endorsed Kyoto Protocol flexibility mechanisms such as Clean Development Mechanism (CDM) and Joint Implementation (JI).

Kyoto Protocol Flexibility Mechanisms

Although Australia has not currently ratified the Kyoto Protocol (KP) and is therefore not bound by its commitments, the GHG offset mechanisms contained within the KP can be used as instruments for carbon reduction and can be reported in Scope 4 of the Draft NSW EIA Guidelines. The following mechanisms are relevant for reporting under Scope 4.

- Clean Development Mechanism (CDM) – Developed countries can invest in greenhouse gas emission reduction projects in developing countries.
- Joint Implementation (JI) – Developed countries can invest in greenhouse gas reduction projects in other developed countries.

11. POLICY INSTRUMENTS

The NSW Greenhouse Plan

Published in November 2005, the NSW Greenhouse Plan is a strategic document which sets out the NSW Government's aims and initiatives in terms of greenhouse gas emissions abatement over the next 20 to 45 years. The NSW Government state that it would like to meet the following criteria:

- a 60% reduction in greenhouse gas emissions by 2050; and
- cutting greenhouse gas emissions to year 2000 levels by 2025.

The NSW Greenhouse Plan does not set out a methodology for reporting greenhouse gas emissions, rather seeks to:

- increase awareness among those expected to be most affected by the impacts of climate change;
- begin to develop adaptation strategies to those unavoidable climate change impacts; and
- put NSW on track to meeting the targets set out above.

12. REFERENCES

- Commonwealth of Australia (2005), AGO Factors and Methods Workbook, December 2005.
- NSW Government (2005), NSW Greenhouse Plan
- Sustainable Energy Development Authority and Planning NSW (2002), Draft NSW Energy and Greenhouse Guidelines for Environmental Impact Assessment.
- World Business Council for Sustainable Development and World Resources Institute (2005), The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard

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