



Managed by Rio Tinto Coal Australia

Hunter Valley Operations South

Section 75W Modification

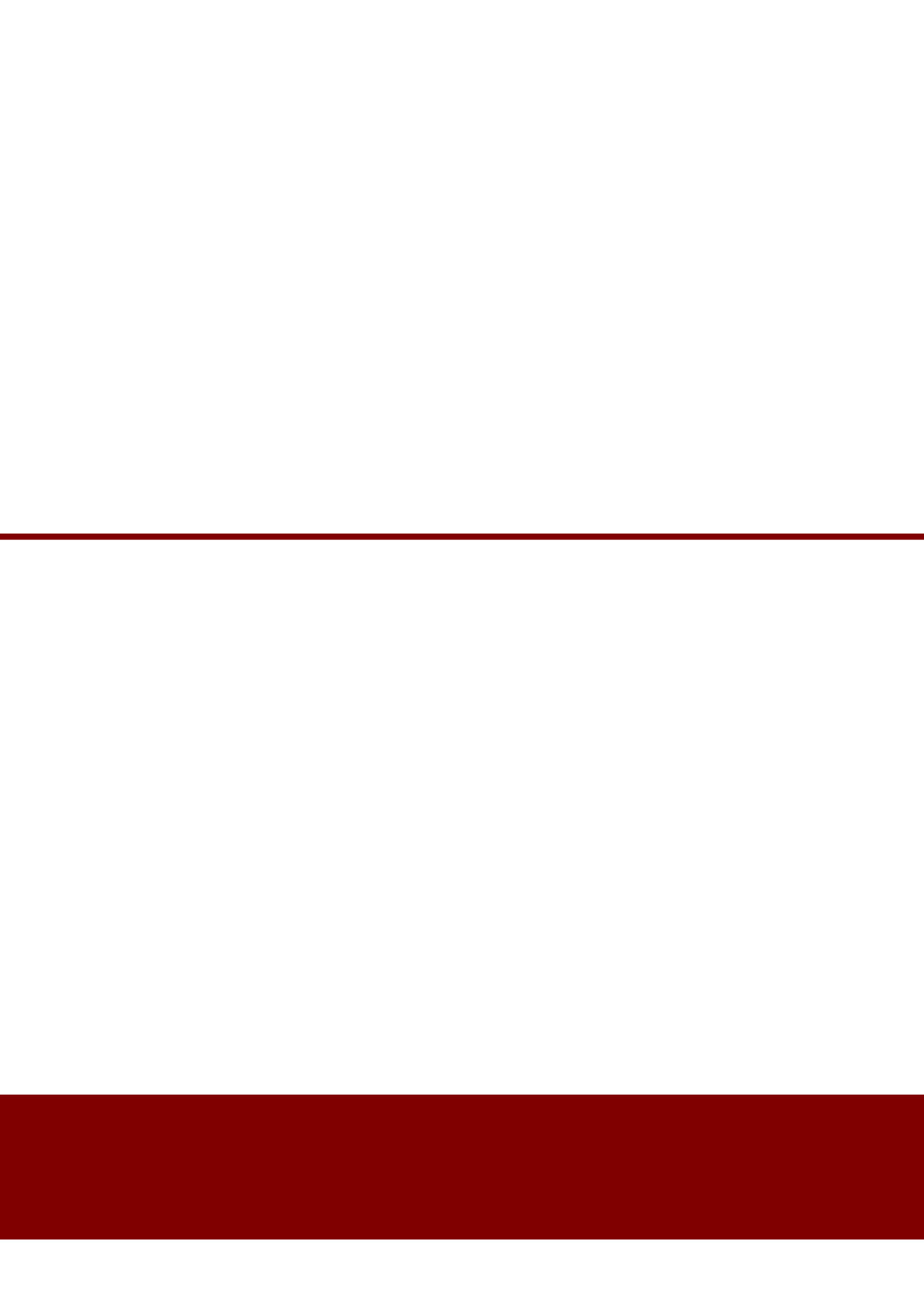
Raising of Lake James Dam






Environmental

Assessment

October 2009





Issue	Revision	Date	Reviewer	Signature
1	Draft v1	11/06/2009	Mark Nolan	
2	Draft v2	28/07/2009	Mark Nolan	
3	Draft v3	11/08/2009	Mark Nolan	
4	Final Draft	27/08/09	Anthony Russo	
5	Final	19/10/09	Anthony Russo	

Printed: 19 October 2009

Last saved: 19 October 2009

File Name: S:\HS&E\Environmental Services after restructure\Projects\HVO\HVO South Lake James s75W mod\3.0 SEE\Final\HVO_Lake James Modification s75W FINAL EA091009.doc

Prepared By: Rachel Uhlmann and Trudie MacDonell

Name of Proposal: Raising of Lake James Dam

Hunter Valley Operations South
Coal & Allied Operations Pty Ltd
PO Box 315
SINGLETON NSW 2330

www.coalandallied.com.au

Executive Summary

Coal and Allied Operations Pty Limited (Coal & Allied) owns the Hunter Valley Operations (HVO) mining complex located 18 kilometres west of Singleton. Coal & Allied is proposing a modification to its HVO South Coal Project (HVO South) to increase the storage capacity of the existing mine water dam known as Lake James.

This Environmental Assessment has been prepared to support a Section 75W Application under the *Environmental Planning and Assessment Act 1979* to modify existing Project Approval 06_0261 and support a subsequent application under Section 55 of the *Protection of the Environment Operations Act 1997* to vary the existing Environmental Protection Licence 640. The proposed modification comprises three key components:

- amendment of HVO South Approval boundary to incorporate the entire footprint of Lake James and associated infrastructure;
- increase the storage capacity Lake James from 330 ML to 730 ML; and
- increase currently permitted maximum discharge rate from currently approved 120 ML/day to 200 ML/day.

This Environmental Assessment has been prepared by Coal & Allied to assess the impacts of the proposal on the surrounding environment and community, taking into consideration water, noise, air quality, ecology, visual and Aboriginal cultural heritage.

Minimal environmental impacts have been identified during the preparation of this document and it is proposed that all potential impacts can be mitigated through appropriate controls and environmental management strategies. Mitigation measures identified in this document either form part of the existing Environmental Management System for HVO South, or will be incorporated into construction and operation specification.

Table of Contents

1	Introduction	1
1.1	Background.....	3
1.2	Approval History	3
2	Proposed Modification.....	6
2.1	Boundary Amendment	6
2.2	Additional Storage Capacity.....	6
2.2.1	Construction.....	7
2.2.2	Operation	9
2.3	EPL Variation.....	11
3	Environmental Assessment and Management.....	12
3.1	Water	12
3.2	Noise	14
3.3	Air Quality	14
3.4	Ecology.....	15
3.5	Aboriginal Cultural Heritage	16
3.6	Visual Amenity	17
4	Conclusion.....	17

Table of Figures

Figure 1	HVO Locality Plan	2
Figure 2	HVO South Operations	5
Figure 3	Lake James Project Approval Boundary.....	8
Figure 4	Preliminary Lake James Design.....	10

Table of Appendices

Appendix 1	HVO South Project Approval	A1
Appendix 2	Environmental Protection Licence	A2
Appendix 3	Stream Impact Assessment.....	A3

Acronyms

AHD	Australian Height Datum
ATC	Australian Tailings Consultants
Coal & Allied	Coal & Allied Operations Pty Limited
DECC	Department of Environment and Climate Change
DoP	Department of Planning
DPI-MR	Department of Primary Industries – Mineral Resources
EA	Environmental Assessment
EAR	Environmental Assessment Report
EMS	Environmental Management System
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPL	Environmental Protection Licence
ERM	Environmental Resource Management
HRSTS	Hunter River Salinity Trading Scheme
HVO	Hunter Valley Operations
HVO South	Hunter Valley Operations South Coal Project
LCPP	Lemington Coal Preparation Plant
ML	Megalitres
MOP	Mining Operations Plan
Mtpa	Million tonnes per annum
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RL	Relative Level

1 Introduction

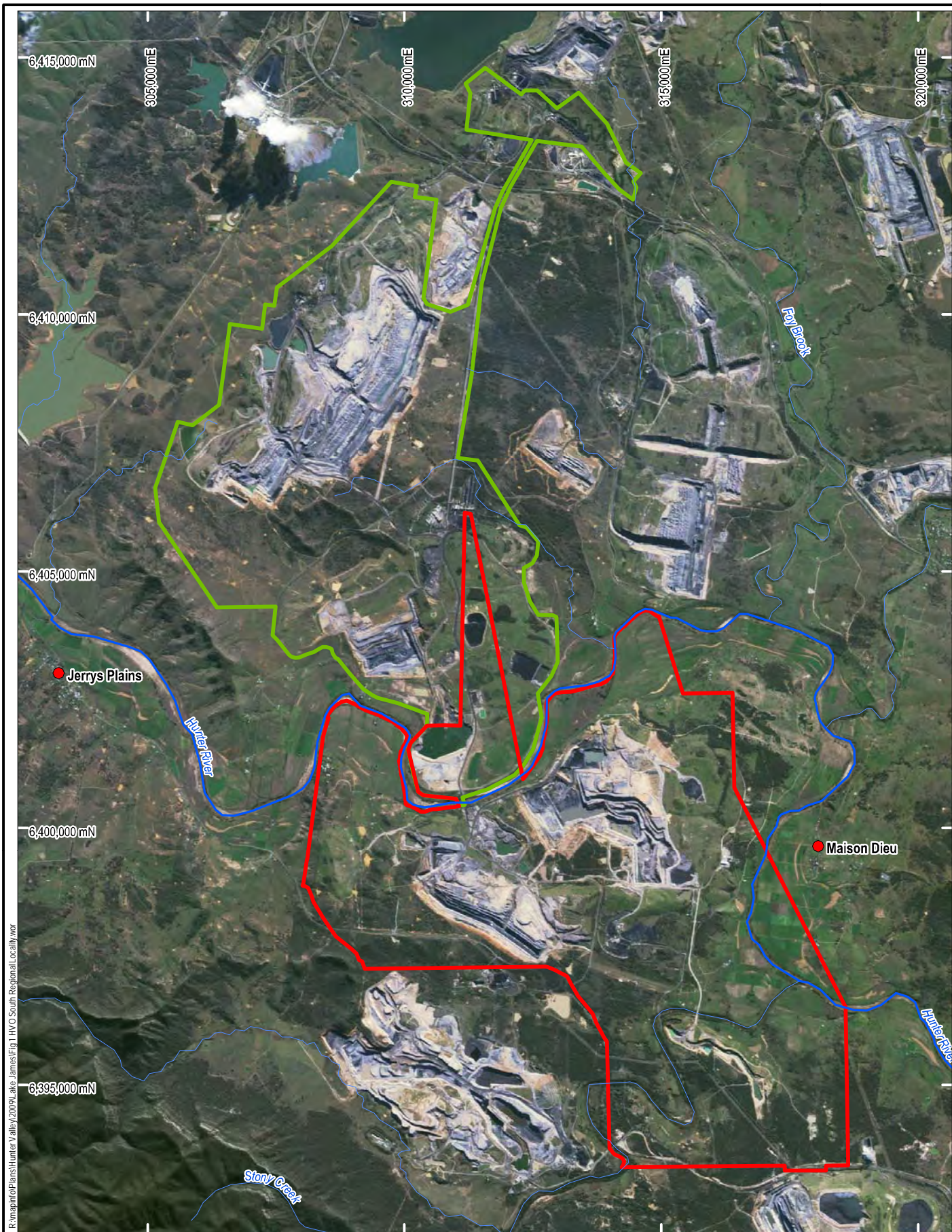
This Environmental Assessment (EA) has been prepared to support an application under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify the Hunter Valley Operations South (HVO South) Project Approval 06_0261 to increase the storage and discharge capacity of the existing mine water dam known as Lake James. It will also be used as supporting information for a *Licence variation application – premises* under Section 55 of the *Protection of the Environment Operations Act 1997* (POEO Act) for the site Environmental Protection Licence (EPL) 640.

Hunter Valley Operations (HVO) is an open cut coal mining complex owned by Coal & Allied Operations Pty Limited (Coal & Allied) in the Hunter Valley, located approximately 18 kilometres west of Singleton, New South Wales (Figure 1). HVO is split geographically by the Hunter River into HVO North and HVO South. While HVO South and HVO North have separate project approvals, HVO is managed as an integrated operation. Both sites are licenced under a single EPL (EPL 640).

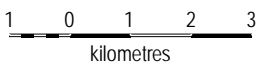
Modification to the existing HVO South Project Approval boundary is proposed to include infrastructure associated with the proposed embankment raise which is partly located outside the existing boundary to be incorporated. Lake James is currently the only discharge location for the HVO South operations to the Hunter River under the Hunter River Salinity Trading Scheme (HRSTS).

The proposed works will increase the storage capacity of Lake James by from 330 megalitres (ML) to 730 (ML). The works have been designed to provide greater flexibility in managing the site water balance. The major components of the proposal include the aforementioned embankment raise, excavation of a new 4 ML capacity dissipater dam below the Lake James Dam wall for secondary containment, testing and control of water discharged to the Hunter River. The construction of a new southern clean water diversion will be required as the existing structure will be absorbed into the modified dam footprint.

The drainage channel below Lake James to the river is some 950 metres long and runs mostly parallel to the Hunter River, joining the river some 450 metres downstream of Lake James. This channel will remain unchanged.



R:\mapinfo\Plains\Hunter Valley\2009\Lake James\Fig 1 HVO South Regional Locality.mxd



- HVO South Project Approval boundary
- HVO North Development Consent boundary

COAL & ALLIED
 A Rio Tinto Group Company

Datum, Projection: GDA94, TM MGA Zone 56
 Date: 5/08/2009
 Satellite image capture date: 22/06/2007

Figure 1

HVO Locality Plan

The intention of the subsequent application to vary the currently approved EPL is to increase the approved discharge limit for the Lake James location from 120 ML/day to 200 ML/day. The content within this report is intended to support the application.

1.1 Background

HVO South is located within the Singleton local government area and is in proximity to the communities of Maison Dieu and Jerry's Plains. The area surrounding the site is dominated by coal mining, industrial development and agriculture.

As previously discussed, the mining and processing activities at HVO are geographically divided by the Hunter River into HVO South and HVO North with movements of coal, coarse and fine reject, overburden, topsoil, operational water, equipment, materials and personnel between the two areas.

HVO North comprises the active West, Carrington and North Pits and the mined out Alluvial Lands. In addition, three coal preparation plants are located at HVO North; Hunter Valley Coal Preparation Plant, Newdell Coal Preparation Plant and Howick Coal Preparation Plant. There are two train load out areas; Hunter Valley Load Point and Newdell Load Point. In addition, Ravensworth Coal Terminal is utilised.

HVO South comprises the Cheshunt, Riverview and Lemington Pits and the Lemington Coal Preparation Plant (LCPP). The key features of HVO South, including Lake James, are depicted in Figure 2.

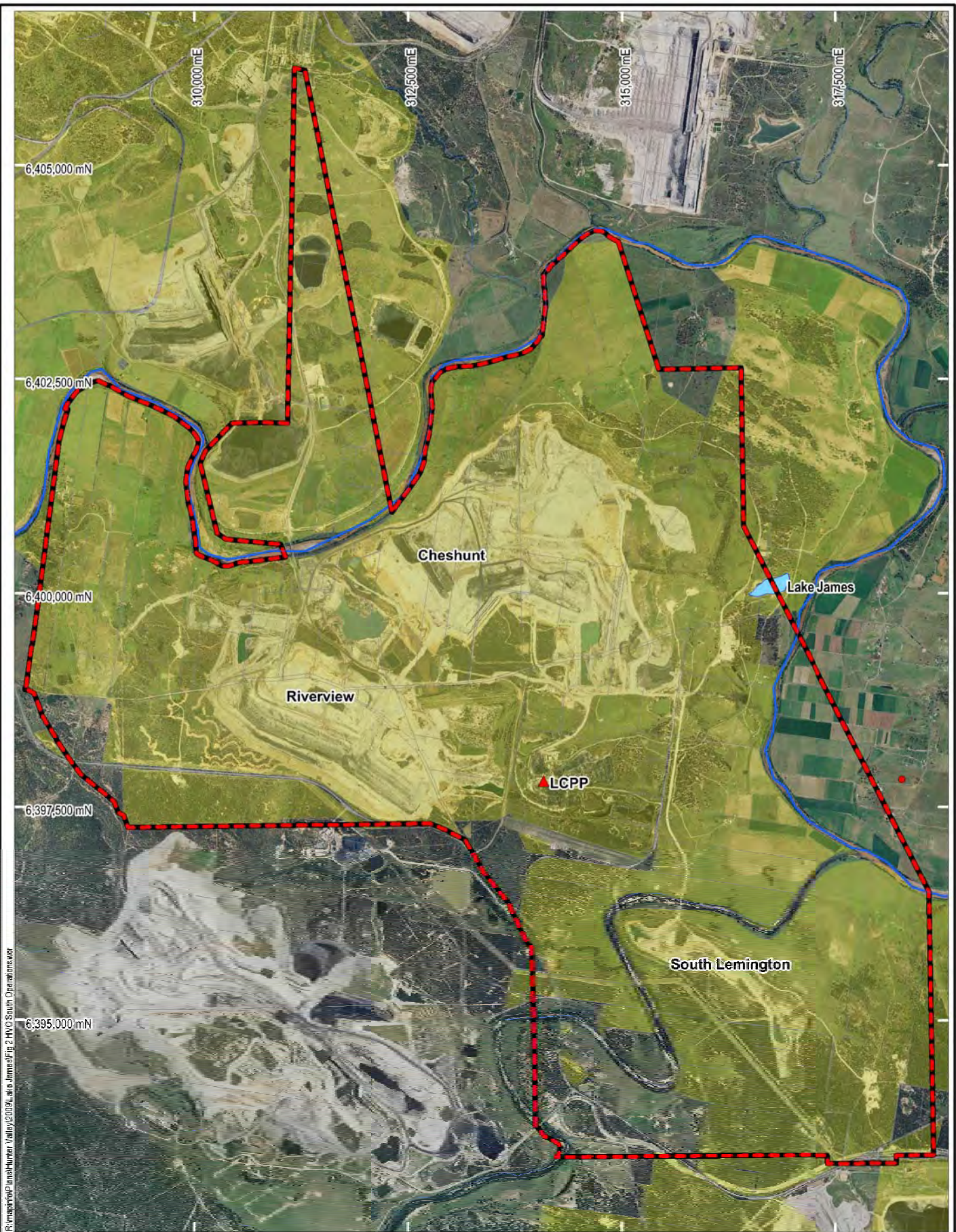
1.2 Approval History

HVO has expanded over time through a process of extension of existing mines and acquisition of additional mines. As a result there were numerous historic development approvals that applied to the operation.

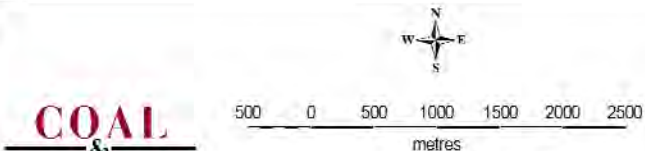
In 2003, Coal & Allied obtained development consent for the continued operation and amalgamation of all its coal mining and processing operations north of the Hunter River. This consent also amalgamated 18 differing consents and approvals with a single, unambiguous consent that sets out Coal & Allied's obligations, limits and controls for the HVO North operations.

In 2009, Coal & Allied obtained project approval for the continued operation and amalgamation of all coal mining and processing operations south of the Hunter River. The project approval also amalgamated 25 separate consents and 10 associated modifications that apply to HVO South with a single Project Approval. The current Project Approval 06_0261 is included in Appendix 1.

The current EPL 640 is included in Appendix 2.



Ryngaert/Planchener, Valley/2009, Lake James/fig. 2 HVO South Operations.wor



HVO South Project Approval boundary
 Coal and Allied land

COAL & ALLIED
 A BHP Billiton Group Company

Datum, Projection: GDA94, TM MGA Zone 56
 Date: 4/08/2009
 Orthophoto capture date: 16/12/2008

Figure 2
HVO South Operations

2 Proposed Modification

The proposed modification to Lake James comprises the following three key components:

1. amendment of HVO South Approval boundary to incorporate Lake James and associated infrastructure;
2. increase in Lake James storage capacity from 330 ML to 730 ML; and
3. increase permitted maximum discharge rate from currently approved 120 ML/day to 200 ML/day.

2.1 Boundary Amendment

The proposed modification to the Project Approval boundary is also proposed as a minor administrative amendment. The Project Approval boundary as defined in the recently granted Project Approval 06_0261 bisects Lake James. An amendment to the Project Approval boundary will incorporate Lake James and associated infrastructure. The current and proposed Project Approval boundary is shown in Figure 3.

The additional area proposed for inclusion within the Project Approval boundary is within land that is owned by Coal & Allied and is located directly adjacent to, existing mining related activities. The schedule of land tabled in Appendix 1 of Project Approval 06_0261 will need to be amended to include Lot 2 of Deposited Plan 48646.

2.2 Additional Storage Capacity

Coal & Allied propose to increase the current 330 ML capacity of Lake James by approximately 400 ML through construction of a downstream raise of the existing embankment. The revised capacity of the dam will be approximately 730 ML upon completion of the works, and Lake James will continue to function as the primary discharge point for the HVO South operations to the Hunter River under the HRSTS. The proposed storage footprint is shown in Figure 3.

The proposed works include:

- a downstream embankment raise of approximately 2.5 metres height by 30 metres in length, resulting in a increase in the mine water storage capacity of

Lake James to 730 ML; and a increase in the dam footprint from 10 hectares to 20 hectares.

- excavation of a 4 ML dissipater dam (40m x 50m approximately) to the east of Lake James that will provide for secondary containment, test capacity and control of discharge;
- realignment of the southern clean water diversion further upslope as the existing diversion will be absorbed into the increased dam footprint;
- construction of a 8.5ML sediment dam (55m x 50m approximately) to control water entering the existing northern clean water diversion.

The proposed works will provide additional capacity for storing waters for dewatering of mining voids to allow approved mining operations to continue, while providing a long term water supply during periods of prolonged drought. In turn, this will decrease the likelihood of the site extracting water from the Hunter River.

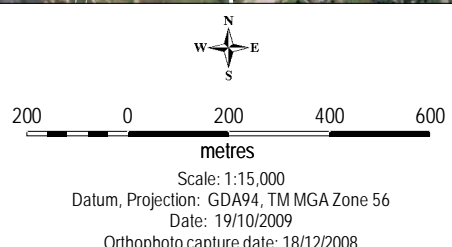
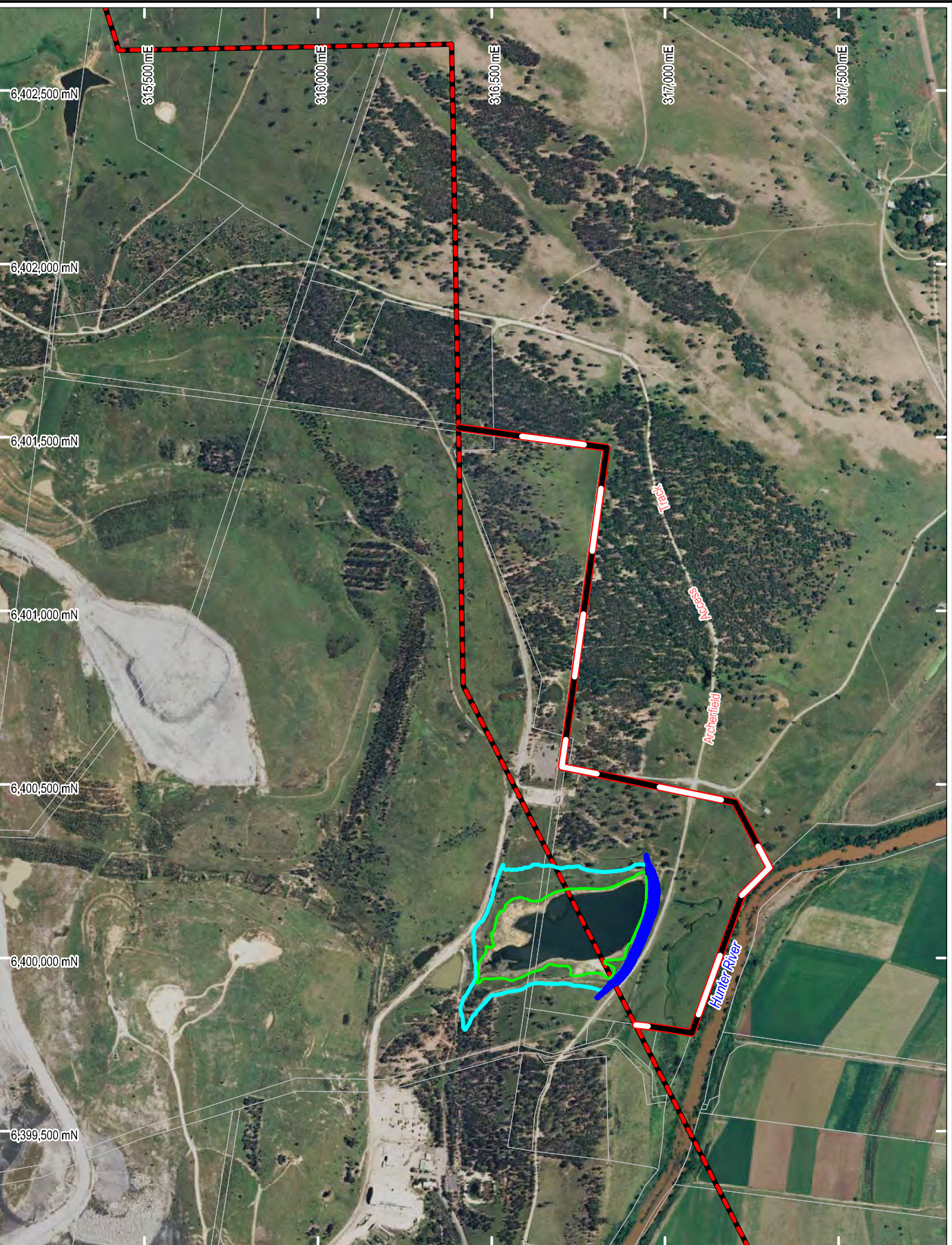
A 4 ML dissipater dam will be excavated on the western side of Archerfield Road that will provide full control over the quality and rate of discharge of water to the Hunter River, but also provide additional buffering capacity in the unlikely event of a dam leak or flood event.

The proposed modification does not change the mining rate or the approved tonnage, nor does it increase the footprint of the existing mine or involve a substantial change to the existing layout.

2.2.1 Construction

An order of magnitude study has been completed by Australian Tailings Consultants (ATC). ATC consults to the mining industry both in Australia and internationally. The company has a detailed knowledge of the HVO South site, having previously undertaken detailed design of numerous dams at both HVO North and South and Coal & Allied's Mount Thorley Warkworth Operations. Dam designs undertaken by ATC on behalf of Coal & Allied are subject to NSW Dams Safety Committee review and approval where necessary. The final detailed design for the raising of Lake James dam will be undertaken by ATC.

R:\mapinfo\Plans\Hunter Valley\2009\Lake James\Fig 3 Lake James Proposed Boundary.wm



- HVO South Project Approval boundary
- Proposed top water level
- Property boundary
- Current top water level
- Proposed boundary amendment
- Proposed embankment

Figure 3
Lake James
Proposed Project Approval Boundary

The preliminary design of the proposed works is shown in Figure 4. The crest of the existing embankment lies at approximately RL 63 meters and will be raised by approximately 2.5 meters to RL 66 meters.

Materials required for the construction of the dam wall embankment will be sourced either from within the dam footprint or nearby suitable locations within the currently approved Project Approval boundary.

All construction activities associated with the proposal will be undertaken during the day from 7am to 6pm. Construction is scheduled to commence in late 2009 pending approvals and procurement. Construction is expected to take approximately 10 weeks to complete pending weather conditions.

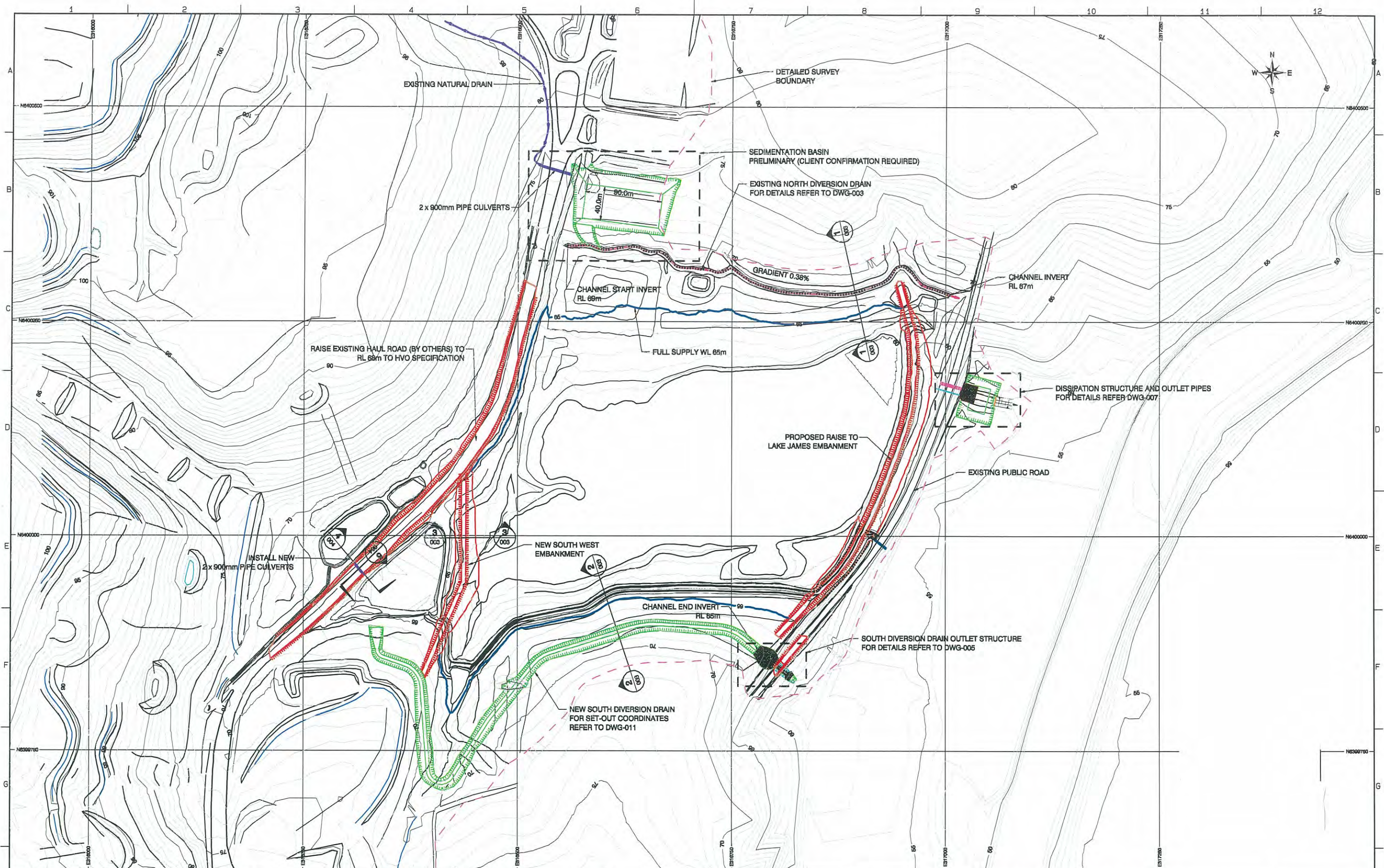
2.2.2 Operation

The Lake James dam will continue to serve primarily as containment for mine water pumped from the Cheshunt Pit; however it is integrated with the HVO water management system and therefore will also assist with the management of water on the HVO South site generally.

The Lake James dam is typically designed to be a terminal point for water prior to discharge to the Hunter River, however the infrastructure is in place such that this water can be transported around both the HVO South and HVO North sites as required.

Lake James is currently used as the discharge point for HVO South operations into the Hunter River under the HRSTS. Any discharge events from Lake James into the Hunter River will be conducted in accordance with the conditions of the site EPL 640 and the HRSTS.

The HVO South Mine Operations Plan (MOP) will be updated to include the additional capacity proposed for Lake James. The amended MOP will be submitted to the Department of Primary Industries – Mineral Resources (DPI-MR) for approval.



No.	DESCRIPTION	DATE	DRAWN	CHECKD	APPRD
A	TENDER ISSUE	14.09.09			

SCALE 1:4000

JOB No.	108027.03
DATE	14.09.09
DESIGN	BP
DRAWN	DK
CHECKED	PS
APPROVED	


ATC Williams
 AUSTRALIAN TAILINGS CONSULTANTS

Melsb T +61 3 8587 0900
 melb@atcwilliams.com.au

A.B.N. 64 005 931 288
 www.atcwilliams.com.au

Perth T +61 8 9361 4664
 perth@atcwilliams.com.au

**RIO TINTO COAL AUSTRALIA
HUNTER VALLEY OPERATIONS**

Figure 4: Preliminary Lake James Design

108027-002	
CLIENT No.	
DWG REF. 108027	
REV. No. A	SHT SIZE A3
SHEET 1 OF 1	

2.3 EPL Variation

The EPL 640 permits a discharge from Lake James of 120 ML/day. The existing discharge system is proposed to be replaced with larger discharge infrastructure with capacity to discharge up to 200 ML/day.

The proposed increase in discharge rate is required to dispose of excess water accumulated since the 1:100 ARI rainfall event in 2007 and to provide ongoing flexibility for future events. The 2007 event filled mine water storages across HVO to capacity and has resulted in large volumes of water stored in open cut voids.

3 Environmental Assessment and Management

The following sections provide an overview of the potential impacts on the environmental aspects resulting from the proposal.

A preliminary risk assessment identified the key environmental aspects pertaining to the proposal suggested that water, noise, air quality, aboriginal cultural heritage, visual amenity and ecology were values that may be impacted upon by the proposed works.

A Stream Impact Statement (Appendix 3) was also undertaken.

Mitigation measures and management actions, including the application of existing Coal & Allied Environmental Procedures and Management Programmes, are suggested where appropriate to negate and/or minimise potential impacts of the proposal. The 2008 Environmental Assessment Report for HVO South (2008 EAR) (ERM 2008) describes in detail the existing environment of the mine and surrounding areas.

3.1 Water

Surface water hydrology and the mine water management system are described in detail in the 2008 EAR and will remain largely unchanged in terms of potential impacts. The proposal will provide an increase in capacity for the above ground storage of operational water.

Lake James will continue to operate as a water storage and quality control dam. The additional capacity proposed for Lake James will serve as containment for mine water pumped, primarily from Cheshunt Pit. Water levels are controlled in the dam by pumps. Water from the dam can be pumped into Cheshunt pit to prevent overtopping of the emergency spillway if required. The procedures for controlling water levels remains as currently approved.

Lake James will continue to function as the primary discharge point to the Hunter River for HVO South operations under the HRSTS. Erosion protection in the form of rock filled gabion baskets and mattresses will be constructed on all spillway and diversion outlets.

A comprehensive water management plan is in place at HVO South and was updated in September 2009 to reflect compliance with Project Approval conditions. The Rio Tinto Environment Standard on *Water Use and Quality Control* and other related standards regarding commitments made in applicable EIS and EAs, along with other public commitments made to the community will also ensure compliance with Project Approval conditions.

Surface water monitoring will continue to be undertaken generally in accordance with Project Approval, EPL 640 and Environmental Procedure 1.10.5 *Water Monitoring Manual*.

The *Stream Impact Assessment* (Appendix 3) for the increased discharge from the dam from 120 ML/day to 200 ML/day assesses the impacts to the unnamed drainage channel below the discharge point and addresses the impact of any additional salinity load into the Hunter River. The elevated salinity of the discharge water in the discharge channel is considered a minimal impact for two reasons: any affected native vegetation species in the vicinity of the channel can be classified as moderately salt tolerant; and the length of exposure is short, limited to the extent of the discharge.

The HRSTS caps the amount of salt that can be emitted during any event to maintain a maximum salt level in the Hunter River less than 900 $\mu\text{S}/\text{cm}$ and the modification of the discharge point will not change this impact.

Coal & Allied owns all the land on the western side of the Hunter River for some 7.5km downstream of the confluence of the discharge channel and the Hunter River. Full mixing is predicted to be achieved within 850 metres of the entry point to the Hunter River. Landowners on the eastern side of the Hunter River upstream of the full mixing point are not expected to be impacted as mixing will occur within the western side of the river. Coal & Allied will undertake mixing investigations once the discharge point is upgraded, to determine the mixing distance where the river water drops below 900 $\mu\text{S}/\text{cm}$.

The construction and operation of the proposed upgrades to Lake James will not impact groundwater, as the dam footprint will remain the same, the depth of excavation for construction of the dissipater dam will be above any aquifers and the base will be suitably prepared to minimise loss of water.

3.2 Noise

Construction is anticipated to take approximately 10 weeks. While it may be possible that some of the residents (closest 1km) may experience increased noise levels under adverse wind conditions (most likely to be present during the winter months), noise generated during construction will be minimised wherever possible. All construction activities will be undertaken during daylight hours (7am to 6pm) and in accordance with Coal & Allied's existing Environmental Procedure 9.1 Noise, the Project Approval, EPL 640 conditions and the DECC's Construction Noise Guidelines.

All equipment involved in construction activities will be operated in a manner that will reasonably and practically minimise noise emissions. Any operations found to generate increased noise levels at off-site receptors to unreasonable levels during certain hours or during adverse weather conditions will be avoided at those times or when such conditions prevail.

A comprehensive noise monitoring programme is already in place at HVO South and this will continue during the construction and operation of the proposed Lake James upgrade. If exceedances are measured, the Open Cut Examiner will be notified and action will be undertaken to mitigate noise impact.

Any complaints received relating to elevated noise levels will be logged and dealt with promptly. Actions may result in the temporary cessation of work in the particular area or by a particular piece of equipment.

3.3 Air Quality

The 2008 EAR completed for the purposes of the consolidation of numerous development consents across the site, identified that concentrations of Total Suspended Particulates (TSP) and Particulate Matter >10 microns in diameter (PM₁₀) in the Maison Dieu area generally comply with the Department of the Environment and Climate Change (DECC) assessment criteria, but some exceedances of the 24-hour PM₁₀ criterion have been predicted in some years.

The assessment used a computer based dispersion model which incorporated local meteorological data and estimates of dust emissions from proposed and nearby sources to predict the concentration and deposition rate of particulate matter.

The movement of soil during the construction phase has the potential to generate dust. The works will be undertaken in accordance with Coal & Allied's Environmental Procedure *8.2 Dust Management*, the Project Approval and EPL 640. Mitigation measures may include:

- minimising the area of disturbance required for the dam wall raise and associated infrastructure; and
- re-vegetating or stabilising disturbed areas as soon as practicable to prevent or minimise wind-blown dust.

The realignment of a small section of Archerfield Road (unsealed) if required is considered unlikely to influence the predicted dust levels at receivers. Therefore, it is not expected that the proposal will increase the dust emissions experienced by residential receivers.

Site personnel will undertake visual assessments for airborne dust during construction and operation until the embankments are sufficiently rehabilitated. If observed dust levels are deemed likely to cause a nuisance, HVO South will employ a range of measures to ensure the dust impacts are minimised, including:

- watering of exposed areas to prevent dust emissions; and
- if necessary, ceasing or modifying dust-generating activities during periods of high wind.

With a construction timeframe of 10 weeks, it is considered that any impacts experienced by receivers would be short term, minor and manageable through the described mitigation measures.

3.4 Ecology

A number of flora and fauna surveys have been conducted for the HVO South site and these are detailed in the 2008 EAR.

The land impacted by the modification is disturbed by previous land uses including the existing embankment and associated infrastructure, roads, access tracks, clean water diversions and grazing land. The grazing land has been continually grazed for at least 40 years and is highly disturbed by clearing, invasion of introduced flora and fauna species and erosion. It consists of pasture improved land with introduced

grasses such as kikuyu grass and herbs dominate along areas that have been disturbed for track and fence construction or erosion. The total weed community is estimated to be in excess of 30 per cent.

Some native tree regrowth occurs in the vicinity of the new high water level of the dam and where the new southern clean water diversion is to be constructed. The understorey in this area consists of exotic pasture, weeds and contains some scattered acacia species. The regrowth trees (9 trees and < 60 saplings) which will be inundated by the high water level will either be cleared or left as stags. Other areas which will be inundated by the increased water level within the dam are also dominated by exotic grasses and weeds. Regrowth trees (12 trees and < 20 saplings) in the vicinity of the new southern clean water diversion will be avoided where possible with minimal no tree clearing required.

The unnamed drainage line below the dam is well vegetated and stable. The drainage line is dominated by exotic pasture and exotic weeds. Closer to the river the channel is dominated by willow trees and other exotic weeds. No clearing of any vegetation is planned within the unnamed drainage line. The potential ecological impacts from the increase in discharge rate are assessed in the *Stream Impact Statement* (Appendix 3). The Stream Impact Statement indicates that there is no significant effect on the ecological values caused by the increased discharge rate from the dam, due to the the short term saline pulse of the nature of the proposed discharges.

No threatened species or Endangered Ecological Communities have been recorded within the disturbance footprint. The footprint within the proposed works is considered to have low to very low conservation value and is unlikely to provide any valuable native fauna habitat, particularly for threatened species. The potential impacts on ecology remain unchanged and are similar to those currently assessed and approved.

Given the already heavily disturbed nature of the site the proposal is considered to have a negligible impact on ecology values in the surrounding area.

3.5 Aboriginal Cultural Heritage

A number of assessments have previously been undertaken across the HVO South Project Approval area. These included desktop studies, stakeholder consultation and

field surveys to identify Aboriginal cultural heritage sites and items or values associated with the assessment areas. A detailed cultural heritage assessment was undertaken for the proposed mining extension areas and associated surface disturbance areas for the HVO South Coal Project Application in addition to previous assessment results and management outcomes and is reported in the 2008 EAR.

The assessment did not identify any items of cultural heritage within the proposed modification area. Given this, potential impact on Aboriginal cultural heritage as a result of the proposal is not likely.

3.6 Visual Amenity

Visual amenity will remain similar to that currently experienced by residences. The 2.5m height increase of the dam wall when viewed from the closest residence 1 kilometre away is not expected to significantly vary the existing viewscape.

4 Conclusion

The raising of Lake James dam will provide additional capacity and improve the site water balance by transferring water currently stored in Cheshunt Pit to an above ground, out-of-pit storage. The transfer of this water has significant operational benefits and allows the efficient mining of the coal reserves within Cheshunt Pit and surrounding areas. It also provides a long term supply of water for the HVO South and HVO North sites during periods of prolonged drought. In turn, this may decrease the dependence of the HVO South and HVO North sites on the extraction of water from the Hunter River.

The proposed modification to the existing Project Approval and EPL is substantially the same as the approved development. HVO South will continue to operate in accordance with DA 34/95, EPL 640 (as modified for the increase in discharge rate), MOP and the EMS. The proposed raising of Lake James dam will have minimal environmental impact as there are unlikely to be any increase in noise, air quality, blasting, aboriginal cultural heritage, ecological or water quality impacts resulting from this proposal.

Appendix 1 HVO South Project Approval

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the on-going environmental management of the project.



The Hon Kristina Keneally MP
Minister for Planning

Sydney

24/3

2008 9

SCHEDULE 1

Project Application:	06_0261
Proponent:	Coal and Allied Operations Pty Limited
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Hunter Valley Operations South Coal Project

TABLE OF CONTENTS

DEFINITIONS	3
ADMINISTRATIVE CONDITIONS	4
Obligation to Minimise Harm to the Environment	4
Terms of Approval	4
Limits on Approval	4
Management Plans/Monitoring Programs	4
Surrender of Consents	4
Structural Adequacy	4
Demolition	5
Operation of Plant and Equipment	5
Development Contributions	5
Dispute Resolution	5
SPECIFIC ENVIRONMENTAL CONDITIONS	6
Acquisition Upon Request	6
Noise	6
Blasting and Vibration	8
Air Quality	10
Meteorological Monitoring	12
Surface and Ground Water	13
Rehabilitation and Landscape	14
Aboriginal Heritage	16
Transport and Utilities	17
Visual Amenity	18
Greenhouse and Energy Efficiency	18
Waste	19
Hazards	19
ADDITIONAL PROCEDURES	20
Notification of Landowners	20
Independent Review	20
Land Acquisition	21
ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING	23
Environmental Management	23
Reporting	23
Independent Environmental Audit	24
Community Consultative Committee	24
Access to Information	24
APPENDIX 1: SCHEDULE OF LAND	25
APPENDIX 2: PROJECT LAYOUT PLANS	36
APPENDIX 3: STATEMENT OF COMMITMENTS	38
APPENDIX 4: LANDOWNER/RECEIVER LOCATION PLAN	47
APPENDIX 5: ARCHERFIELD OFFSET STRATEGY PLAN	49
APPENDIX 6: CONCEPTUAL REHABILITATION PLAN	50
APPENDIX 7: TRANSPORT OPTIONS	51
APPENDIX 8: THREATENED SPECIES AND EECs AT HVO SOUTH	52
APPENDIX 9: INDEPENDENT DISPUTE RESOLUTION PROCESS	53

DEFINITIONS

AEMR	Annual Environmental Management Report
BCA	Building Code of Australia
CCC	Community Consultative Committee
CHPP	Coal handling and preparation plant
Council	Singleton Shire Council
CNA	Coal and Allied Operations Pty Limited
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DECC	Department of Environment and Climate Change
Department	Department of Planning
Director-General	Director-General of Department of Planning, or delegate
DPI	Department of Primary Industries
DWE	Department of Water and Energy
EA	Environmental assessment titled <i>Hunter Valley Operations South Coal Project Environmental Assessment Report, Volumes 1, 2 and 3</i> , dated January 2008, including the response to submissions <i>Environmental Planning and Assessment Act 1979</i> <i>Environmental Planning and Assessment Regulation 2000</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPL	Environment Protection Licence issued under the <i>Protection of the Environment Operations Act 1997</i>
Evening	The period from 6pm to 10pm
Habitat Management Area	Habitat Management Area as identified in the Warkworth coal mine development consent (DA 300-9-2002)
HVGC	Hunter Valley Gliding Club Co-operative Limited
HVO	CNA's mining complex known as Hunter Valley Operations
HVO North	CNA's activities and facilities at its HVO mining complex located north of the Hunter River
HVO South	CNA's activities and facilities at its HVO mining complex located south of the Hunter River
Independent Dispute Resolution Process	The independent dispute resolution process as described in Appendix 9
LCPP	Lemington coal preparation plant
LCPP 'Short Loop' rail line	The rail loop and coal loading facilities shown in Appendix 7
Land	Land means the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Material harm to the environment as defined in <i>Protection of the Environment Operations Act 1997</i>
Mine water	Water that accumulates within active mining areas, coal reject emplacement areas, tailings dams and infrastructure areas (excluding sedimentation dams)
Mining Operations	The removal and emplacement of topsoil and overburden, and the extraction, processing, and transportation of coal carried out on site
Minister	Minister for Planning, or delegate
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
Offset Strategy	The conservation and enhancement program described in the EA
Privately-owned land	Land that is not owned by a public authority, or a mining company (or its subsidiary)
Project	The development described within the EA
Project Area	The area outlined in broken red line in Figure 2 in Appendix 2
Proponent	Coal and Allied Operations Pty Limited, or its successors in title
Reasonable and feasible	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements. Feasible relates to engineering considerations and what is practical to build
Response to Submissions	The Proponent's response to issues raised in submissions, dated July 2008 and 15 September 2008
ROM	Run-of-Mine
RTA	Roads and Traffic Authority
Site	The land subject to this Project Approval, as listed in Appendix 1 and shown conceptually in Figure 2 of Appendix 2
Statement of Commitments	The Proponent's commitments in Appendix 3

**SCHEDULE 2
ADMINISTRATIVE CONDITIONS**

Obligation to Minimise Harm to the Environment

1. The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.

Terms of Approval

2. The Proponent shall carry out the project generally in accordance with the:
 - (a) EA;
 - (b) statement of commitments; and
 - (c) conditions of this approval.

Notes:

- *The general layout of the project is shown in Appendix 2.*
- *The statement of commitments is reproduced in Appendix 3.*

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.
4. The Proponent shall comply with any reasonable and feasible requirement/s of the Director-General arising from the Department's assessment of:
 - (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with this approval; and
 - (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.

Limits on Approval

5. Mining operations may take place for a period of 21 years from the date of this approval.

Note: Under this approval, the Proponent is required to rehabilitate the site and complete a Biodiversity Offset Strategy to the satisfaction of the Director-General and DPI. Consequently this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated and the offsets provided to a satisfactory standard.

6. The Proponent shall not extract more than 16 million tonnes of ROM coal a year from the site.
7. The Proponent shall not extract coal from below the base of the:
 - (a) Bowfield Seam, in the case of the South Lemington Pits;
 - (b) Vaux Seam, in the case of the Riverview Pit and the Cheshunt Pit; and
 - (c) Bayswater Seam, in the case of the Deep Cheshunt Pit.

Management Plans/Monitoring Programs

8. With the approval of the Director-General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.
9. The Proponent shall ensure that monitoring programs, management plans and the Environmental Management Strategy, as in existence at the date of this approval, continue to be implemented (to the satisfaction of the Director-General) until replaced by monitoring programs and management plans approved in accordance with the conditions of this approval.

Surrender of Consents

10. Within 12 months of the date of this approval, the Proponent shall surrender all existing development consents and existing use rights associated with HVO South's mining operations and related facilities in accordance with clause 97 of the *EP&A Regulation*.

Structural Adequacy

11. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

Demolition

12. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

Operation of Plant and Equipment

13. The Proponent shall ensure that all plant and equipment used on site is:
 - (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

Development Contributions

14. Within 12 months from the date of this approval (unless otherwise agreed by the Director-General), the Proponent shall enter into an agreement with Singleton Council to provide development contributions to Council for the project, in accordance with Division 6 of Part 4 of the EP&A Act.

If the Proponent and Council cannot agree on the level or composition of the development contributions, then either party may refer the matter to the Director-General for resolution.

Dispute Resolution

15. In the event that the Proponent and the Council or a Government agency, other than the Department, cannot agree on the specification or requirements of this approval, the matter shall be referred by either party to the Director-General for resolution, whose determination of the disagreement shall be final and binding on the parties.
-

**SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS**

ACQUISITION OF AFFECTED PROPERTIES

Acquisition Upon Request

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Proponent shall acquire the land in accordance with the procedures in conditions 10-12 of schedule 4.

Table 1: Land subject to acquisition upon request

16 - Algie	38 - Henderson
32 - Algie (Curlewis)	
Keys (vacant land - Lot 2 DP 770905 and Lot 84 DP 753792)	

Note: 'Acquisition upon request' for 38 – Henderson commences with the recommencement of mining operations at any South Lemington pit.

NOISE

Noise Impact Assessment Criteria

2. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 2 at any residence on privately-owned land, or on more than 25% of any privately-owned land.

Table 2: Noise impact assessment criteria dB(A)

Land Number / Receiver	Day	Evening	Night	Night
	<i>L_{Aeq}(15 minute)</i>	<i>L_{Aeq}(15 minute)</i>	<i>L_{Aeq}(15 minute)</i>	<i>L_{A1}(1 minute)</i>
<i>Hunter Valley Gliding Club (when in use)</i>	55	55	55	
7– Stapleton (Cheshunt East)	41	41	41	45
10 – Moses (Wandewoi)	37	37	37	45
<i>Maison Dieu residences</i>				
16 – Algie	42	42	42	45
32 – Algie (Curlewis)				
5 – Bowman, 47 – Moxey, 61 – Shearer and all other land on Shearer's Lane	41	41	41	45
17 – Algie	40	40	40	45
34 – Ernst				
24 – Clifton and Edwards and residences located within 250 metres of this residence, not otherwise listed in this table	39	39	39	45
Maison Dieu residences within 1 kilometre of Shearers Lane, not otherwise listed in this table	37	37	37	45
All other Maison Dieu residences	35	35	35	45
<i>Jerrys Plains Road Residences</i>				
36 – Smith (ex Garland)	36	36	36	45
All Jerrys Plains Road residences other than Smith	35	35	35	45
Jerrys Plains village residences	35	35	35	45
<i>Warkworth residences</i>				
38 - Henderson	48	48	48	45
23 – Hawkes (Springwood)	43	43	43	45
45 – Kelly and all other privately-owned land in Warkworth village	43	43	43	45
All other privately-owned land	35	35	35	45

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 2, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in Table 2 in accordance with the negotiated noise agreement.

Notes:

- Noise impacts at HVCG are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Noise impact assessment limits are only applicable during times of use that have been notified by HVGC to the Proponent.
- The land numbers and receiver references are as described in the EA, and shown in Appendix 4.
- To determine compliance with the $L_{Aeq(15\text{ minute})}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- To determine compliance with the $L_{A1(1\text{ minute})}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).
- The noise emission limits identified in the above table apply under meteorological conditions of:
 - wind speeds of up to 3 m/s at 10 metres above ground level; or
 - temperature inversion conditions of up to 3°C/100m, plus a 2 m/s source-to-receiver component drainage flow wind at 10 metres above ground level for those receivers where applicable in accordance with the NSW Industrial Noise Policy.

Land Acquisition Criteria

3. If the noise generated by the project exceeds the criteria in Table 3 at any residence on privately-owned land (not listed in Table 1 and not subject to acquisition on request by Wambo coal mine), or on more than 25% of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 10-12 of schedule 4.

Table 3: Land acquisition criteria dB(A)

Land Number / Receiver	Day	Evening	Night
	$L_{Aeq(15\text{ minute})}$	$L_{Aeq(15\text{ minute})}$	$L_{Aeq(15\text{ minute})}$
36 – Smith (ex Garland)	43	41	41
All Maison Dieu residences	43	41	41
All Jerrys Plains Road residences other than Smith	43	40	40
All other privately-owned land	40	40	40

Note: Noise generated by the project is to be measured in accordance with the notes presented in Table 2.

Additional Noise Mitigation Measures

4. Upon receiving a written request from:
 - an owner of land listed in Table 1 (unless the landowner has requested acquisition or where a negotiated noise agreement established under this approval is in place); or
 - an owner of land listed in Table 4 (except where a negotiated noise agreement established under this approval is in place); or
 - any residence on privately-owned land where subsequent noise monitoring show the noise generated by the project is greater than or equal to the equivalent criteria in Table 5 (except where a negotiated noise agreement established under this approval is in place)
 the Proponent shall implement reasonable and feasible noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at any residence on the land in consultation with the landowner.

If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Within 3 months from the date of this approval, the Proponent shall notify all applicable landowners that they are entitled to receive noise mitigation measures, to the satisfaction of the Director-General.

Table 4: Land subject to additional noise mitigation upon request

17 – Algie	34 – Ernst
24 – Clifton and Edwards, and residences located within 250 metres of this residence	5 – Bowman, 47 – Moxey, 61 – Shearer and all other Shearers Lane residences
All privately-owned Warkworth residences	7 – Stapleton (Cheshunt East)

Table 5: Additional Noise Mitigation Criteria dB (A)

Land Number / Receiver	Day	Evening	Night
	$L_{Aeq(15\text{ minute})}$	$L_{Aeq(15\text{ minute})}$	$L_{Aeq(15\text{ minute})}$
Maison Dieu residences	39	39	39
Smith (ex Garland)	39	39	39
Jerrys Plains Road residences except Smith	38	38	38
All other privately-owned land	38	38	38

Note: Noise generated by the project is to be measured in accordance with the notes to Table 2.

Continuous Improvement

5. The Proponent shall:
- continue to implement all reasonable and feasible best practice noise mitigation measures;
 - continue to investigate ways to reduce the noise generated by the project, including maximum noise levels which may result in sleep disturbance; and
 - report on these investigations and the implementation and effectiveness of these measures in the AEMR to the satisfaction of the Director-General.

Monitoring

6. The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. This program must:
- be submitted to the Director-General for approval within 6 months from the date of this approval, or other time agreed by the Director-General; and
 - include a:
 - combination of real-time and supplementary attended monitoring measures; and
 - noise monitoring protocol for evaluating compliance with the noise impact assessment and land acquisition criteria in this approval.

Note: The requirement for this Noise Monitoring Program may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional noise monitoring program. This program should take into account monitoring requirements of neighbouring mines, and where possible, be integrated with these mines' monitoring networks.

BLASTING AND VIBRATION

Airblast Overpressure Impact Assessment Criteria

7. The Proponent shall ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 6 at any residence on privately-owned land.

Table 6: Airblast overpressure impact assessment criteria

Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
115	5% of the total number of blasts over a period of 12 months
120	0%

Ground Vibration Impact Assessment Criteria

8. The Proponent shall ensure that the ground vibration level from blasting at the project does not exceed the criteria in Table 7, at any residence on privately-owned land.

Table 7: Ground vibration impact assessment criteria

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts over a period of 12 months
10	0%

Note: Vibration shall be measured in accordance with applicable guidelines, including DECC's Assessing Vibration: A Technical Guideline (2006).

9. For St Philip's Church and the outbuildings at Archerfield, the Proponent shall ensure that ground vibration peak particle velocity generated by the project does not exceed 5 mm/s, or as otherwise approved by the Director-General.

Blasting Hours

10. The Proponent shall only carry out blasting on site between 7 am and 6 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the DECC.

Operating Conditions

11. During mining operations on site, the Proponent shall implement best blasting practice to:
 - (a) protect the safety of people, property, public infrastructure, and livestock;
 - (b) minimise the dust and fume emissions from blasting at the project to the satisfaction of the Director-General.
12. The Proponent may carry out a maximum of:
 - (a) 3 blasts a day; and
 - (b) 15 blasts a week, on the site.
13. The Proponent shall not undertake blasting within 500 metres of any privately-owned land, unless suitable arrangements have been made with the landowner and any tenants to minimise the risk of flyrock-related impact to the property to the satisfaction of the Director-General.

Road Closure

14. The Proponent shall continue to implement its existing Road Closure Management Plan for the project to the satisfaction of RTA, Council and DPI.

Public Notice

15. During mining operations on site, the Proponent shall:
 - (a) notify the landowner/occupier of any residence within 2 kilometres of the mining area who registers an interest in being notified about the blasting schedule at the mine, or any other landowner nominated by the Director-General;
 - (b) operate a blasting hotline, or alternate system agreed to by the Director-General, to enable the public to get up-to-date information on the blasting schedule at the project;
 - (c) advertise the blasting hotline number in a local newspaper at least 4 times each year; and
 - (d) publish an up-to-date blasting schedule on its website to the satisfaction of the Director-General.

Property Inspections

16. At least 3 months prior to blasting within 2 kilometres of any privately-owned land, or any other landowner nominated by the Director-General, the Proponent shall advise applicable landowners that they are entitled to a structural property inspection.

If the Proponent receives a written request for a structural property inspection from the landowner, the Proponent shall within 2 months of receiving this request and prior to blasting within 2 kilometres of the property:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
- (b) give the landowner a copy of the property inspection report.

Note: This condition does not operate so as to prevent blasting within the first 3 months of this approval as consents applying to the site contain similar provisions for the inspection or residences potentially affected by blasting operations.

Property Investigations

17. If any landowner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Director-General, claims that buildings and/or structures on his/her land have been damaged as a result of blasting at the project, the Proponent shall within 3 months of receiving this claim:
- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and
 - (b) give the landowner a copy of the property investigation report.
- If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.

If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 9).

Blast Monitoring Program

18. The Proponent shall prepare and implement a Blast Monitoring Program for the project to the satisfaction of the Director-General. This program must:
- (a) be submitted to the Director General for approval within 6 months from the date of this approval, or as otherwise agreed by the Director-General; and
 - (b) include a protocol for evaluating blasting impacts on, and demonstrating compliance with, the blasting criteria in this approval for all privately-owned residences and structures.

Note: The requirement for this Blast Monitoring Program may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional blast monitoring program. This program should take into account monitoring requirements of neighbouring mines, and where possible, be integrated with the mines' monitoring networks.

AIR QUALITY

Impact Assessment Criteria

19. The Proponent shall ensure that dust generated by the project does not cause additional exceedances of the air quality impact assessment criteria listed in Tables 8, 9, and 10 at any residence on privately-owned land, the Hunter Valley Gliding Club (when in use) or on more than 25 percent of any privately-owned land.

Table 8: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 9: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³

Table 10: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Notes:

- Air quality impacts at HVGC are to be assessed in the immediate vicinity of its residential facilities and/or clubhouse. Air quality limits are only applicable during times of use that have been notified by HVGC to the Proponent.
- Deposited dust is assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method, or its latest version.

However, if the Proponent has a written negotiated air quality agreement with any landowner or HVGC to exceed the air quality limits in Table 8, 9 and/or 10, and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the air limits in Table 8, 9 and/or 10 in accordance with the negotiated air quality agreement.

Land Acquisition Criteria

20. If the dust emissions generated by the project exceed the criteria in Tables 11, 12, and 13 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 10-12 of schedule 4.

Table 11: Long term land acquisition criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 12: Short term land acquisition criteria for particulate matter

Pollutant	Averaging period	Criterion	Percentile¹	Basis
Particulate matter < 10 µm (PM ₁₀)	24 hour	150 µg/m ³	99 ²	Total ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³	98.6	Increment ⁴

¹Based on the number of block 24 hour averages in an annual period.

²Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with DECC.

³Background PM₁₀ concentrations due to all other sources plus the incremental increase in PM₁₀ concentrations due to the mine alone.

⁴Incremental increase in PM₁₀ concentrations due to the mine alone.

Table 13: Long term land acquisition criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

Additional Air Quality Impact Mitigation Measures

21. Upon receiving a written request from:
- an owner of land listed in Table 1 (unless the landowner has requested acquisition); or
 - an owner of land listed in Table 14
- the Proponent shall implement reasonable and feasible air quality impact mitigation measures (such as air conditioning, first flush drinking water collection systems etc) at any residence on the land, in consultation with the landowner.

However, if the Proponent has an air quality agreement with the owner of any land listed in Table 1 or Table 14 and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent does not have to implement such measures.

If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution. Within 3 months of the date of this approval, the Proponent shall notify all applicable landowners that they are entitled to receive air quality impact mitigation measures, to the satisfaction of the Director-General.

Table 14: Land subject to additional air quality impact mitigation upon request

7 – Stapleton (Cheshunt East)	34 – Ernst
17 – Algje	50 – Nelson
24 – Clifton and Edwards	56 – Edwards

Operating Conditions

22. The Proponent shall:
- ensure any visible air pollution generated by the project is assessed regularly, and that mining operations are relocated, modified, and/or stopped as required to minimise air quality impacts on privately-owned land;
 - ensure that the real-time air quality monitoring and meteorological monitoring data is assessed regularly and, where the dust is generated by the project, that mining operations are relocated, modified and/or stopped as required to ensure compliance with the relevant air quality criteria, and in particular to mitigate dust emission impacts for Maison Dieu and Warkworth residences; and
 - implement all practicable measures to minimise the off-site odour and fume emissions generated by any spontaneous combustion or blasting activities on site to the satisfaction of the Director-General.

Monitoring

23. The Proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director-General. This program must:
- be submitted to the Director-General for approval within 6 months of the date of this approval, or as otherwise agreed by the Director-General; and
 - include:
 - high-volume and real-time samplers to monitor the dust emissions of the project; and
 - an air quality monitoring protocol for evaluating compliance with the air quality impact assessment and land acquisition criteria in this approval.

Note: The requirement for this Air Quality Monitoring Program may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional air quality monitoring program. This program should take into account monitoring requirements of neighbouring mines, and where possible, be integrated with these mines' monitoring networks.

METEOROLOGICAL MONITORING

24. During the life of the project, the Proponent shall ensure that there is a suitable meteorological station in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

SURFACE AND GROUND WATER

Discharge Limits

25. The Proponent shall only discharge mine water from the site in accordance with the provisions of an EPL, section 120 of the *Protection of the Environment Operations Act 1997* or the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002*.

Protection of Watercourses

26. The Proponent shall:
- (a) ensure mining operations do not interfere with the stability of the Hunter River, Wollombi Brook and creek lines located outside the area of mining operations; and
 - (b) retain a buffer zone of 150 metres, or less if agreed by the Director-General following consultation with DWE, from the edge of open cut pits and the high bank of the Hunter River and its connected alluvium, excepting the area of the site adjacent to the Hobden Gully levee.

Note: The requirement under condition 23(b) does not apply to lands, part of the site, located to the north of the Hunter River.

Water Management Plan

27. The Proponent shall prepare and implement a Water Management Plan to the satisfaction of the Director-General. This Plan must:
- (a) be prepared in consultation with DWE by a suitably qualified expert whose appointment has been approved by the Director-General;
 - (b) be submitted to the Director-General for approval within 6 months of this approval or otherwise agreed by the Director-General; and
 - (c) include:
 - a site water balance, which includes details of sources and security of water supply, on site water use and management and off site water transfers and investigates and describes measures to minimise water use by the project;
 - an erosion and sediment control plan for surface works on the site that is consistent with the requirements of the *Managing Urban Stormwater: Soils and Construction Manual* (Landcom 2004, or its latest version);
 - a program for review of groundwater modelling that includes assessment of the effect of short and long-term changes to groundwater quality and mobilisation of salts;
 - a surface water monitoring program that includes:
 - detailed baseline data of surface water flows and quality in the watercourses that could be affected by the project, including the Hunter River and Wollombi Brook;
 - surface water impact assessment criteria, including trigger levels for investigating potentially adverse surface water impacts of the project; and
 - a program to monitor surface water flows and quality in the watercourses that could be affected by the project;
 - a groundwater monitoring program that includes:
 - additional baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores, which could be affected by the project;
 - groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts of the project; and
 - a program to monitor:
 - groundwater inflows to the open cut mining operations; and
 - impacts of the project on the region's aquifers, any groundwater bores, and surrounding watercourses, and in particular, the Hunter River and Wollombi Brook and adjacent alluvium; and
 - a surface and groundwater response plan which describes the measures and/or procedures that would be implemented to:
 - respond to any exceedances of the surface water and groundwater assessment criteria;
 - offset the loss of any baseflow to watercourses caused by the project;
 - compensate landowners of privately-owned land whose water supply is adversely affected by the project; and
 - mitigate and/or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation, and Hunter River Red Gum populations located within and adjacent to the site.

Note: The requirements for the Surface and Ground Water Quality Monitoring Programs and Response Plan may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional environmental monitoring program.

Groundwater Impacts Report

28. The Proponent shall provide an annual report of alluvial and hard rock buffer groundwater levels. This report shall:
- be provided to DWE and the Department in the AEMR each year following the reporting period;
 - include interpreted drawdown levels resulting from existing and/or ongoing mining operations of the project; and
 - account for any drawdown loss of alluvial groundwater or river flows to the satisfaction of the Director-General.

REHABILITATION AND LANDSCAPE

Biodiversity Offset Strategy

29. The Proponent shall:
- implement the Archerfield Offset Strategy described in the EA and summarised in Table 15 (shown conceptually in Appendix 5);
 - implement a trial program to enhance the two populations of Coast Banksias within the Archerfield Offset Area with the aim of restoring a functioning Warkworth Sands Woodland community;
 - avoid impacts to Aboriginal Site 25;
 - ensure that adequate resources are dedicated towards the implementation of this offset;
 - provide appropriate long term security for this offset area; and
 - provide a timetable for the implementation of the offset strategy within 6 months from the date of this approval, or otherwise agreed by the Director-General in consultation with DECC and to the satisfaction of the Director-General.

Table 15: Offset Strategy

Offset Areas	Minimum Size
Archerfield Biodiversity Offset Area	140 hectares

River Red Gum Restoration Strategy

30. Within 12 months of the date of this approval, or otherwise agreed by the Director-General, the Proponent shall review, revise and provide a timetable for the implementation the HVO River Red Gum Strategy for the Hunter River and Wollombi Brook river red gum populations (as shown in Appendix 8), in consultation with DWE and DECC, and to the satisfaction of the Director-General. This strategy must be prepared by suitably qualified expert/s, and must include:
- the conservation and restoration objectives for the river red gum populations;
 - a description of the short, medium and long term measures that would be implemented to conserve and restore the river red gum populations (including measures to address matters which affect the long term health and sustainability of the river red gums such as surface and ground water supply, and controlling weeds, livestock and feral animals); and
 - detailed assessment and completion criteria for the conservation and restoration of the river red gum populations.

Hunter Lowland Red Gum Forest

31. The Proponent shall protect all stands of the Hunter Lowland Red Gum Forest (also identified as Hunter Floodplain Red Gum Woodland Complex in the EA) endangered ecological community within the site, and adjacent lands under the control of the Proponent, as shown in Appendix 8, to the satisfaction of the Director-General.

Habitat Management Areas

32. With the exception of proposed alterations to heavy equipment access routes included in the EA, and the LCPP 'short loop' rail line, the Proponent shall not disturb any portion of a Habitat Management Area, without the approval of the Director-General.

Strategic Study Contribution

33. If, during the project, the Department or the DECC commissions a strategic study into the regional vegetation corridor stretching from the Wollemi National Park to the Barrington Tops National Park, then the Proponent shall contribute a reasonable amount, up to \$10,000, towards the completion of this study.

Rehabilitation

34. The Proponent shall progressively rehabilitate the site in a manner that is generally consistent with the final landform set out in the EA (shown conceptually in Appendix 6) to the satisfaction of the DPI and the Director-General.

Landscape Management Plan

35. The Proponent shall prepare and implement a detailed Landscape Management Plan for the project to the satisfaction of the Director-General and the Director-General of DPI. This plan must:
- be prepared by suitably qualified expert/s;
 - be prepared in consultation with DWE, DPI and Council where appropriate jurisdictions exist;
 - be submitted to the Director-General for approval within 12 months from the date of this approval or as otherwise approved by the Director-General; and
 - include:
 - a Rehabilitation and Offset Management Plan;
 - Final Voids Management Plans; and
 - a Mine Closure Plan.

Note: The Department accepts that the initial Landscape Management Plan may not include the detailed Final Void Management Plan and Mine Closure Plan. However, if this occurs, the Proponent will be required to seek approval from the Director-General for an alternative timetable for the completion and approval of the Final Void Management Plan and Mine Closure Plan.

Rehabilitation and Offset Management Plan

36. The Rehabilitation and Offset Management Plan must include:
- the objectives for rehabilitation of the site and offset area;
 - a description of how the rehabilitation of the site and implementation of the Offset Strategy would be integrated with the rehabilitation and offset strategies of the Warkworth/Mt Thorley, Wambo, United, HVO North, Ravensworth West, Ravensworth South, Narama and Ashton mines to ensure there is a comprehensive strategic framework for the restoration and enhancement of the landscape over time;
 - a description of the short, medium, and long term measures that would be implemented to:
 - rehabilitate the site;
 - implement the Offset Strategy;
 - manage the remnant vegetation and habitat on the site and in the offset areas;
 - maximise effective habitat linkages to surrounding vegetated lands;
 - conserve and reuse topsoil;
 - control weeds, feral pests and access; and
 - manage any potential conflicts between the rehabilitation works and/or biodiversity offsets and Aboriginal cultural heritage;
 - detailed performance and completion criteria for the rehabilitation of the site and implementation of the Offset Strategy;
 - a detailed description of how the performance of the rehabilitation of the mine and the offset areas would be monitored over time to achieve the stated objectives;
 - a detailed description of what measures and procedures would be implemented over the next 3 years to rehabilitate the site and implement the Offset Strategy;
 - a description of the potential risks to successful rehabilitation and/or revegetation, and a description of the contingency measures that would be implemented to mitigate these risks; and
 - details of who (by person and/or position) is responsible for monitoring, reviewing, and implementing the plan.

Notes: Reference to "rehabilitation" in this approval includes all works associated with the rehabilitation and restoration of the site as described in the EA.

Final Voids Management

37. A Final Void Management Plan must:
- be prepared for each proposed final void at least 5 years prior to the completion of mining in the vicinity of the proposed void;
 - incorporate design criteria and specifications for the final void based on verified groundwater modelling predictions and a re-assessment of post-mining groundwater equilibration;
 - assess potential uses of the void, such as off stream water storage;
 - assess the potential interactions between the Hunter River and its connected alluvium and the final void; and
 - describe what actions and measures would be implemented to:
 - minimise any potential adverse impacts associated with the final void; and
 - manage and monitor the potential impacts of the final void.

Mine Closure Plan

38. The Mine Closure Plan must:
- (a) be prepared in consultation with DWE, DPI and Council;
 - (b) define the objectives and criteria for mine closure;
 - (c) investigate options for the future use of the site, including the final void;
 - (d) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local employment levels;
 - (e) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project; and
 - (f) describe how the performance of these measures would be monitored over time.

Conservation and Biodiversity Offset Implementation Bond

39. Within 3 months of the approval of the Landscape Management Plan, the Proponent shall lodge a conservation and biodiversity implementation bond with either the DPI or the Department to ensure that the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Landscape Management Plan. The sum of the bond shall be determined by:
- (a) calculating the full cost of implementing the Biodiversity Offset Strategy; and
 - (b) employing a suitably qualified rehabilitation expert or quantity surveyor to verify the calculated costs.

Notes:

- *If the Biodiversity Offset Strategy is completed to the satisfaction of the Director-General and DPI, then the bondholder will release the conservation bond.*
- *If the Biodiversity Offset Strategy is not completed to the satisfaction of the Director-General and DPI, all or part of the conservation bond will be used to ensure the satisfactory completion of the relevant works.*
- *The conservation bond may be incorporated into rehabilitation bonding arrangements under the Mining Act 1992.*

ABORIGINAL HERITAGE

Aboriginal Heritage Management Plan

40. The Proponent shall prepare and implement an Aboriginal Heritage Management Plan for the project to the satisfaction of the Director-General. The Plan must:
- (a) be prepared in consultation with DECC and the Aboriginal community;
 - (b) be submitted to the Director-General for approval within 12 months of this approval or as otherwise agreed by the Director-General; and
 - (c) include:
 - measures to be taken to avoid impacts to Aboriginal cultural heritage values at all stages of the project. If impacts are unavoidable, mitigation measures are to be negotiated with the Aboriginal community;
 - a program for the recording, salvage and surface collection of Aboriginal objects/sites within the site;
 - a program for the conservation of the other Aboriginal objects/sites within the site, including measures to secure, analyse and record the objects/sites;
 - definition of restricted access zones to protect Sites 26-44, 47-58, 84-100, 102-104 and 107-109 from disturbance;
 - measures to ensure potential impacts to Sites 26-44, 47-58 and 107-109 by the proposed rail spur and loop are avoided;
 - measures to provide for the controlled collection of Sites 1-24, 59-79, 80-83, 101 and 105-106, where avoidance of impacts by planned mining and infrastructure activities is not possible;
 - provision for a long term 'keeping place' and care and control plan for any Aboriginal objects recovered from the site;
 - provisions for Aboriginal cultural heritage awareness training for all HVO South employees, and as a component of mine site inductions for contractors working at HVO South;
 - a description of the measures that would be implemented if any Aboriginal skeletal remains are discovered during the project;
 - a protocol for the ongoing consultation and involvement of the Aboriginal community in the conservation and management of the Aboriginal heritage of the objects/sites; and
 - a protocol for the regular review of the Plan's effectiveness.

Notes:

- *The requirements for the Aboriginal Heritage Management Plan may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional Aboriginal heritage management plan.*
- *The Aboriginal cultural heritage sites and site numbers referenced in this condition are provided in Section 12 and Annex M of the EA.*

TRANSPORT AND UTILITIES

Monitoring of Coal Transport

41. The Proponent shall keep records of the amount of coal transported from the site each year, and include these records in the AEMR.

Coal Haulage Limits

42. The Proponent shall not transport coal from the project by public roads, unless otherwise approved by the Director-General.

Relocation of Comleroi Road

43. The Proponent shall:
- (a) prior to construction, consult with all road users and Council about the proposed road works and their timing;
 - (b) develop and implement procedures for road closures and diversions to be undertaken during the construction of the relocated road; and
 - (c) construct the relocated section of the road to the satisfaction of Council.

Jerrys Plains Road Heavy Equipment Crossing

44. Prior to the relocation of any heavy equipment, to or from the project, that would require Jerrys Plains Road to be closed to public traffic, the Proponent shall obtain approval for each planned road closure from RTA and then undertake each transfer of equipment across Jerrys Plains Road in accordance with any approval obtained from RTA for this purpose.

Coal Conveyor to HVO North

45. The Proponent shall design and construct the conveyor to HVO North to the satisfaction of DPI and DWE. A copy of all final documentation shall be provided to the Director-General within 6 months of the completion of its construction.

LCPP 'Short Loop' Rail Line

46. Prior to the commencement of construction activities for the Lemington Coal Preparation Plant 'short loop' rail line and coal loading facilities, the Proponent shall provide an alternative area of Habitat Management Area, to replace that disturbed by mining operations or construction of mine infrastructure, to the satisfaction of the Director-General.

Hunter Valley Gliding Club Co-operative Limited

47. While HVGC continues to use its facilities within the site, the Proponent shall maintain an agreement with HVGC to address the potential impact of the mine on the use and operation of HVGC's facilities, including the potential impacts to the flight paths from dragline operations. This agreement shall take into consideration the impacts of the dragline position on:
- useable length of the runway;
 - interference with flight paths; and
 - guidelines of the Department of Aviation.

Note: This condition shall cease to operate if both parties agree to terminate the agreement and the need for an agreement.

48. The Proponent shall not conduct any activity associated with the project above the obstacle limitation surface (OLS) as shown in Figure 2.3 of the *HVO South Coal Project Response to Submissions Report (July 2008)* unless agreed with HVGC.
49. The Proponent shall develop an Amenity Management Plan for HVGC's facilities within the site. This Plan shall;
- (a) be prepared in consultation with the Hunter Valley Gliding Club;
 - (b) be submitted to the Director-General for approval 6 months prior to the commencement of mining in the Riverview South East Extension Area, or otherwise agreed by the Director-General;
 - (c) include a risk assessment to identify those circumstances most likely to generate impacts from mining operations on gliding activities and use of the club's residential facilities;
 - (d) include details of any proposed modifications to the HVO South mine plan to exclude land owned by the Hunter Valley Gliding Club;

- (e) provide for additional air quality and noise modelling of the potential impacts of modified mining activities; and
- (f) identify and implement management measures for mining activities to ensure that air quality and noise emissions meet respective impact assessment criteria, or obtain written agreement from the Hunter Valley Gliding Club to exceed these criteria to the satisfaction of the Director-General.

If the Proponent and HVGC cannot agree on the level or composition of the Amenity Management plan, then either party may refer the matter to the director-General for resolution.

Should the Hunter Valley Gliding Club cease to operate its facilities at the site, the Proponent's obligations under this condition shall cease.

VISUAL AMENITY

Lighting Emissions

50. The Proponent shall:
- (a) ensure no external lights shine above the horizontal;
 - (b) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version, and
 - (c) take all practicable measures to mitigate off-site lighting impacts from the project to the satisfaction of the Director-General.

Visual Impact Mitigation

51. Within 12 months of this approval, or otherwise agreed by the Director-General, the Proponent shall prepare a visual impact mitigation report for the project to the satisfaction of the Director-General. This report shall:
- (a) be prepared in consultation with Council;
 - (b) identify the privately-owned residences and public roads that are likely to experience significant additional visual impacts from the project during its operation; and
 - (c) describe (in general terms) the mitigation measures that could be implemented to reduce the visibility of the mine from these residences and roads.
52. Within 3 months of the Director-General approving this report, the Proponent shall advise all owners of residences identified in the report that they are entitled to mitigation measures to reduce the visibility of the mine from their properties and reach agreement with Council about mitigation measures (if any) to be implemented for public roads. If the Proponent and Council cannot agree about these measures, the matter shall be referred by either party to the Director-General for resolution.

Note: The additional visual impact mitigation measures must be aimed at reducing the visibility of the mine from significantly affected residences and do not necessarily require measures to reduce visibility of the mine from other locations on the affected properties. The additional visual impact mitigation measures do not necessarily have to include measures on the affected property itself (i.e. the additional measures may consist of measures outside the affected property boundary that provide an effective reduction in visual impacts).

GREENHOUSE & ENERGY EFFICIENCY

53. The Proponent shall implement all reasonable and feasible measures to minimise greenhouse gas emissions from the project to the satisfaction of the Director-General.
54. Within 12 months of this approval or otherwise agreed by the Director-General, the Proponent shall prepare and implement a Greenhouse and Energy Efficiency Plan for the project. This plan must:
- (a) be prepared generally in accordance with the *Guidelines for Energy Savings Action Plans* (DEUS 2005, or its latest version);
 - (b) be submitted to the Director-General for approval;
 - (c) include a program to estimate/monitor greenhouse gas emissions and energy use generated by the project;
 - (d) include a framework for investigating and implementing measures to reduce greenhouse gas emissions and energy use at the project;
 - (e) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures at the project, including a feasibility study to identify and assess potential options for the capture and reuse of coal seam methane;
 - (f) describe how the performance of these measures would be monitored over time; and
 - (g) report on the project's greenhouse gas emissions and minimisation measures in the AEMR to the satisfaction of the Director-General.

WASTE

55. The Proponent shall:
- (a) monitor the amount of waste generated by the project;
 - (b) investigate ways to reuse, recycle or minimise this waste;
 - (c) implement reasonable and feasible measures to minimise this waste;
 - (d) ensure irrigation of treated wastewater is undertaken in accordance with DECC's *Environmental Guideline for the Utilisation of Treated Effluent*; and
 - (e) report on waste management and minimisation in the AEMR to the satisfaction of the Director-General.
56. Within 12 months of this approval or otherwise agreed by the Director-General, the Proponent shall install and operate a wastewater treatment system with adequate capacity to treat wastewater loads from the Lemington workshop and facilities, to the satisfaction of DECC.
57. Except as expressly permitted in a licence under the *Protection of the Environment Operations Act 1997* or by the *Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008*, waste must not be:
- (a) received at the project site for storage, treatment, processing or disposal; or
 - (b) disposed of at the project site.

HAZARDS

Dangerous Goods

58. The Proponent shall ensure that the storage, handling, and transport of:
- (a) dangerous goods is done in accordance with the relevant *Australian Standards*, particularly *AS1940* and *AS1596*, and the *Dangerous Goods Code*; and
 - (b) explosives are managed in accordance with the requirements of DPI.

Fire Control

59. During the project, the Proponent shall:
- (a) ensure that it maintains suitable equipment to respond to any fires on site; and
 - (b) assist the rural Fire service and emergency services as much as possible if there is a fire on site.
60. The Proponent shall ensure that it maintains a Fire Management Plan for the site, in consultation with Council and the Rural Fire Service.
-

**SCHEDULE 4
ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT**

NOTIFICATION OF LANDOWNERS

1. Within 1 month of this approval, the Proponent shall notify the landowners of the land listed in Table 1 in writing that they have the right to require the Proponent to acquire their land at any stage of the project (subject to the note to that Table).
2. If the results of monitoring required in Schedule 3 identify that impacts generated by the project are greater than the relevant impact assessment criteria in Schedule 3, except where this is predicted in the documents listed in condition 2 of Schedule 2 or where a negotiated agreement has been entered into in relation to that impact, then the Proponent shall, within 2 weeks of obtaining the monitoring results, notify the Director-General, the affected landowners and tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the criteria in Schedule 3.
3. If the results of monitoring required in Schedule 3 identify that impacts generated by the project are greater than the relevant air quality impact assessment criteria in Schedule 3, then the Proponent shall send the relevant landowners and tenants (including tenants of mine owned properties) a copy of the NSW Health fact sheet entitled "Mine Dust and You" (and associated updates) in conjunction with the notification required in condition 2.

INDEPENDENT REVIEW

4. If a landowner considers the project to be exceeding the impact assessment criteria in Schedule 3, except where this is predicted in the EA, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land.

If the Director-General is satisfied that an independent review is warranted, the Proponent shall within 2 months of the Director-General's decision:

- (a) consult with the landowner to determine his/her concerns;
 - (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to:
 - determine whether the project is complying with the relevant impact assessment criteria in Schedule 3; and
 - identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and
 - (c) give the Director-General and landowner a copy of the independent review.
5. If the independent review determines that the project is complying with the relevant impact assessment criteria in Schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the project is not complying with the relevant impact assessment criteria in Schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall:

- (a) implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria, and conduct further monitoring to determine whether these measures ensure compliance; or
 - (b) secure a written agreement with the landowner to allow exceedances of the relevant impact assessment criteria,
- to the satisfaction of the Director-General.

However, if the further monitoring referred to under paragraph (a) above determines that the project is complying with the relevant impact assessment criteria, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the project is not complying with the relevant land acquisition criteria in Schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 7-9 below, to the satisfaction of the Director-General.

6. If the independent review determines that the relevant impact assessment criteria in Schedule 3 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Proponent shall, together with the relevant mine/s:
 - (a) implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the relevant impact assessment criteria are complied with, and conduct further monitoring to determine whether these measures ensure compliance; or

- (b) secure a written agreement with the landowner and other relevant mines to allow exceedances of the relevant impact assessment criteria in Schedule 3, to the satisfaction of the Director-General.

If the further monitoring referred to under paragraph (a) above determines that the project is complying with the relevant impact assessment criteria in Schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the relevant land acquisition criteria in Schedule 3 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Proponent shall acquire all or part of the landowner's land on as equitable basis as possible with the relevant mine/s, in accordance with the procedures in conditions 7-9 below, to the satisfaction of the Director-General.

LAND ACQUISITION

7. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:
- (a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project the subject of the project application, having regard to the:
- existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
 - presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of 'additional noise mitigation measures' in condition 4 of schedule 3, 'additional air quality impact mitigation measures' in condition 21 of schedule 3, or 'additional visual impact mitigation measures' in condition 52 of schedule 3;
- (b) the reasonable costs associated with:
- relocating within the Singleton or Muswellbrook local government areas, or to any other local government area determined by the Director-General;
 - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and
- (c) reasonable compensation for any disturbance caused by the land acquisition process.

However, if following this period, the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.

Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute (the API) to appoint a qualified independent valuer to:

- (a) consider submissions from both parties;
- (b) determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
- (c) prepare a detailed report setting out the reasons for any determination; and
- (d) provide a copy of the report to both parties.

Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Director-General for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Director-General shall determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above and the independent valuer's report. Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Director-General's determination.

If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Director-General determines otherwise.

8. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 7 above.
 9. If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall also pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.
-

**SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING**

ENVIRONMENTAL MANAGEMENT

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:
 - (a) be submitted to the Director-General for approval within 6 months of this project approval or otherwise agreed by the Director-General;
 - (b) provide for the strategic context for the environmental management of the project;
 - (c) identify the statutory requirements that apply to the project;
 - (d) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the project;
 - respond to any non-compliance;
 - manage cumulative impacts; and
 - respond to emergencies;
 - (e) include an environmental monitoring program for the project that includes all the monitoring requirements of this approval;
 - (f) describe how the various incident and approval reporting requirements of the project would be integrated into a single reporting system; and
 - (g) describe the role, responsibility, authority and accountability of all the key personnel involved in the environmental management of the project.

Note: The requirements for the Environmental Management Strategy may, with the Director-General's approval, be satisfied as a component of CNA's Hunter regional environmental management strategy.

REPORTING

Incident Reporting

2. Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Applicant shall notify the Department and other relevant agencies of the exceedance/incident.
3. Within 21 days of notifying the Department and other relevant agencies of such an exceedance/incident, the Proponent shall provide the Department and these agencies with a written report that:
 - (a) describes the date, time, and nature of the exceedance/incident;
 - (b) identifies the cause (or likely cause) of the exceedance/incident;
 - (c) describes what action has been taken to date; and
 - (d) describes the proposed measures to address the exceedance/incident.

Annual Reporting

4. Within 12 months of this approval, and annually thereafter, the Proponent shall submit an AEMR to the Director-General, CCC and all relevant agencies. This report must:
 - (a) identify the standards and performance measures that apply to project;
 - (b) describe the works carried out in the last 12 months;
 - (c) describe the works planned to be carried out in the next 12 months;
 - (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
 - (e) include a summary of the monitoring results for the project during the past year;
 - (f) include an analysis of these monitoring results against the relevant:
 - impact assessment criteria/limits;
 - monitoring results from previous years; and
 - predictions in the EA or other documents listed in condition 2 of schedule 2;
 - (g) identify and discuss all exceedances of approval and licence conditions and other applicable standards and performance measures;
 - (h) identify any trends in the monitoring results over the life of the project;
 - (i) identify any non-compliance during the previous year; and
 - (j) describe what actions were, or are being, taken to ensure compliance.

INDEPENDENT ENVIRONMENTAL AUDIT

5. By 31 January 2010, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
- be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been endorsed by the Director-General;
 - include consultation with the relevant agencies;
 - assess the environmental performance of the project and whether it is complying with the relevant requirements in this approval and any relevant mining lease and EPL (including any strategy, plan or program required under these approvals); and
 - review the adequacy of strategies, plans and/or programs required under these approvals; and, if appropriate,
 - recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals.

Note: This audit team should be led by a suitably qualified auditor, and include experts in the field of noise and air quality, surface water and groundwater and mine rehabilitation.

6. Within 6 weeks of completing this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General with a response to any recommendations contained in the audit report.
7. Within 3 months of submitting the audit report to the Director-General, the Proponent shall review and if necessary revise the strategies/plans/programs required under this approval, to the satisfaction of the Director-General.

COMMUNITY CONSULTATIVE COMMITTEE

8. The Proponent shall operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General in general accordance with the *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007, or its latest version)*.

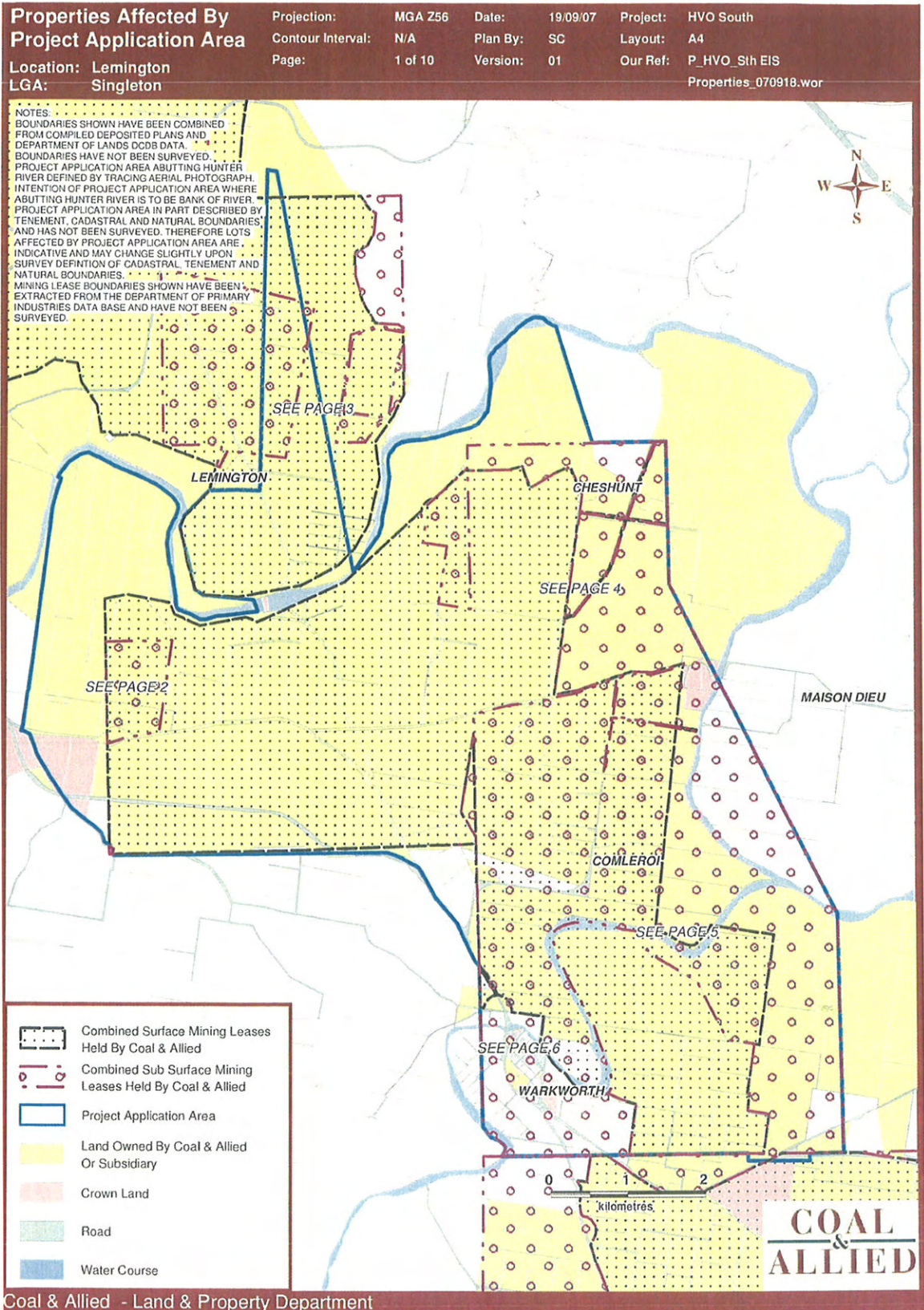
Notes:

- The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.*
- In accordance with the Guideline, the Committee should comprise an independent chair and appropriate representation from the Proponent, Council, recognised environmental groups and the general community in the area of the development.*
- With the approval of the Director-General, this CCC may be combined with the CCC for HVO North.*

ACCESS TO INFORMATION

9. Within 3 months of the approval of any strategy/plan/program required under this approval (or any subsequent revision of these strategies/plans/programs), or the completion of the audits or AEMR, required under this approval, the Proponent shall:
- provide a copy of the relevant document/s to the relevant agencies and CCC;
 - place a copy of the document/s on its website; and
 - remove superseded copies of strategies/plans/programs from its website.
10. During the project, the Proponent shall:
- make a summary of monitoring results required under this approval publicly available on its website; and
 - update these results on a regular basis (at least every 3 months).
-

APPENDIX 1 SCHEDULE OF LAND



LAND OWNERSHIP – HVO SOUTH PROJECT AREA

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
1		48394	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		48591	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
1		48592	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
1		48646	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		90727	Coal & Allied Operations Pty Limited	Y	N	Lemington
1		105943	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
1		114966	Coal & Allied Operations Pty Limited	Y	N	Lemington
1		123374	Coal & Allied Operations Pty Limited	N	Y	Warkworth Village
1		129808	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
1		182139	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
1		191982	Coal & Allied Operations Pty Limited	Y	N	Lemington
1		195523	Coal & Allied Operations Pty Limited	N	Y	Warkworth South of Wollombi Brook
1		249327	Coal & Allied Operations Pty Limited	Y	N	Warkworth North East
1		251877	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		592598	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
1		619309	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		633717	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
1		657394	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
1		719879	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
1		723248	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		723249	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		729048	Coal & Allied Operations Pty Limited	Y	Y	Lemington
1		729984	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
1		729985	Coal & Allied Operations Pty Limited	Y	N	Warkworth North East
1		737796	Coal & Allied Operations Pty Limited	Y	Y	Lemington
1		737880	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
1		741544	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
1	5	759053	Coal & Allied Operations Pty Limited	N	Y	Warkworth Village
1		783484	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
1		797721	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		821123	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
1		821127	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
1		822177	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
1		823767	Coal & Allied Operations Pty Limited	Y	N	Lemington
1		857021	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
1		876447	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1		947886	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
1		963714	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
1		997228	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
1		998117	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
1		1041635	Coal & Allied Operations Pty Limited	N	Y	Warkworth North East
1		1103396	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
2		300150	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
2		306421	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
2		619309	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
2		633717	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
2		710088	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
2		719879	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
2		723248	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
2		737880	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
2		755267	Coal & Allied Operations Pty Limited	N	Y	Warkworth South of Wollombi Brook
2		783484	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
2		808301	Coal & Allied Operations Pty Limited	Y	Y	Lemington
2		876447	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
2		998117	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
3		48646	Coal & Allied Operations Pty Limited	N	Y	Warkworth North East
3		113342	Coal & Allied Operations Pty Limited	N	Y	Warkworth South of Wollombi Brook
3		635392	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
3		783484	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
4		113342	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
4		783484	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
5		720643	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
5		783484	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
5		1085145	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
10		740183	Coal & Allied Operations Pty Limited	Y	Y	Lemington
11		586639	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
11		843432	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Location
12		247239	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
12		586639	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
13		247239	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
14		247239	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
14		755267	Coal & Allied Operations Pty Limited	N	Y	Warkworth South of Wollombi Brook
15		247239	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
16		247239	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
20		1085391	Coal & Allied Operations Pty Limited	Y	Y	Lemington
31		610878	Coal & Allied Operations Pty Limited	N	Y	Warkworth Village
32		610878	Coal & Allied Operations Pty Limited	N	Y	Warkworth Village
40		753792	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North West
43		755267	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
91		733895	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
101		1037665	Coal & Allied Operations Pty Limited	Y	Y	Lemington
102		588247	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
108		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
112		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
115		753792	Coal & Allied Operations Pty Limited	Y	N	Warkworth North East
118		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
119		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
121		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
122		753792	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
122		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
128		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
135		755267	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
140		753792	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
141		753792	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
142		755267	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
143		755267	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
145		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
146		970755	Coal & Allied Operations Pty Limited	Y	Y	Warkworth South of Wollombi Brook
151		753792	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
152		704486	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
153		704486	Coal & Allied Operations Pty Limited	N	Y	Warkworth North East

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
155		705446	Coal & Allied Operations Pty Limited	Y	N	Warkworth North East
164		729960	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
165		729961	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
166		729962	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
167		729963	Coal & Allied Operations Pty Limited	Y	N	Warkworth North East
170		752481	Coal & Allied Operations Pty Limited	Y	N	Lemington
179		823775	Coal & Allied Operations Pty Limited	Y	N	Warkworth North West
182		823775	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
194		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
195		755267	Coal & Allied Operations Pty Limited	Y	N	Warkworth South of Wollombi Brook
204		821040	Coal & Allied Operations Pty Limited	N	Y	Warkworth Village
300		597726	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
745		597317	Coal & Allied Operations Pty Limited	N	N	Warkworth North West
854		1000822	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Village
1001		785197	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1002		785197	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1420		586339	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
1421		586339	Coal & Allied Operations Pty Limited	Y	Y	Warkworth North East
A		386100	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
B		386100	Coal & Allied Operations Pty Limited	Y	Y	Warkworth Near Comleroi Road
1		111381	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
1		532623	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
1		659810	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
1		901179	J. & A. Brown and Abermain Seaham Collieries Limited	Y	Y	Warkworth North West
1		1102213	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
2		111381	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
2		114966	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
3		111381	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
12		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
13		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
14		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
15		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
16		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
17		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
18		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
19		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
20		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
21		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
21		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
22		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
22		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
23		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
24		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
25		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
26		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
27		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
28		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
29		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
30		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
31		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
73		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	Y	Warkworth North West
89		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
98		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
117		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
118		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
119		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
120		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
120		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	Y	Warkworth North West
121		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
121		753792	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Warkworth North West
122		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
123		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
124		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
125		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
126		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
127		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
164		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	N	Lemington
171		752481	J. & A. Brown and Abermain Seaham Collieries Limited	Y	Y	Lemington

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
1		129811	Warkworth Mining Limited	Y	Y	Warkworth South of Wollombi Brook
1		246201	Warkworth Mining Limited	Y	Y	Warkworth Village
2		129811	Warkworth Mining Limited	Y	Y	Warkworth South of Wollombi Brook
3		129811	Warkworth Mining Limited	Y	Y	Warkworth South of Wollombi Brook
7001		93632	Administered by The State Land Services	N	Y	Warkworth Village
1		90052	Commonwealth of Australia	N	Y	Warkworth Village
1	25	759053	Crown	N	Y	Warkworth Village
2	5	759053	Crown	N	Y	Warkworth Village
2	25	759053	Crown	N	Y	Warkworth Village
3	4	759053	Crown	N	Y	Warkworth Village
3	5	759053	Crown	N	Y	Warkworth Village
4	4	759053	Crown	N	Y	Warkworth Village
5	4	759053	Crown	N	Y	Warkworth Village
6	4	759053	Crown	N	Y	Warkworth Village
130		753792	Crown	Y	Y	Warkworth North East
175		823775	Crown	N	N	Warkworth North West
			Crown License 175936 (Coal & Allied Operations Pty Limited)	N	N	Warkworth North West
			Crown License 341401 (Coal & Allied Operations Pty Limited)	N	Y	Warkworth North East
201		755267	Crown Land	Y	Y	Warkworth South of Wollombi Brook
1		710088	The State of NSW	N	Y	Warkworth North East
154		704486	The State of NSW	N	Y	Warkworth North East
170		823775	The State of NSW	N	N	Warkworth North West
172		823775	The State of NSW	N	N	Warkworth North West
173		823775	The State of NSW	N	N	Warkworth North West
21		1109631	Brian Kennedy & John Griffiths	N	Y	Warkworth Village
No297		Bk 904	Ada Elizabeth Watts	N	Y	Warkworth Village
35		755267	Cec M Hawkes Pty Ltd	N	Y	Warkworth Village
36		755267	Cec M Hawkes Pty Ltd	N	Y	Warkworth Village
5		247239	Construction, Forestry, Mining & Energy Union	Y	Y	Warkworth Near Comleroi Road
6		770904	Edward & Carol Burley	N	Y	Warkworth Village
3		3005	Elizabeth Bowman	N	Y	Maison Dieu
4		3005	Elizabeth Bowman	N	Y	Maison Dieu
5		3005	Elizabeth Bowman	N	Y	Maison Dieu
1		113343	Heather Kannar	N	Y	Warkworth Village
1	2	759053	Heather Kannar	N	Y	Warkworth Village
1		794506	Heather Kannar	N	Y	Warkworth Village
2	2	759053	Heather Kannar	N	Y	Warkworth Village
2		794506	Heather Kannar	N	Y	Warkworth Village

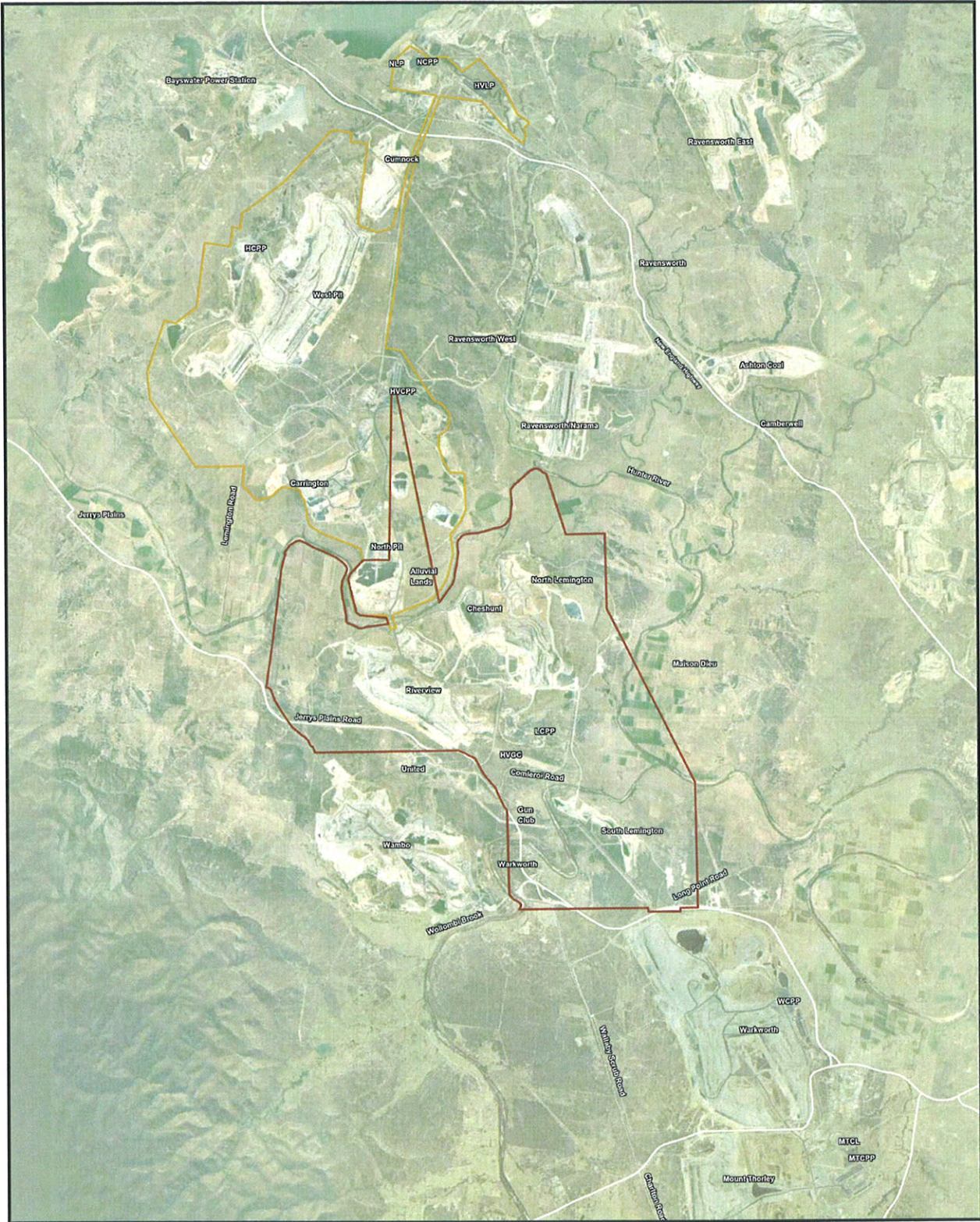
Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
3	2	759053	Heather Kannar	N	Y	Warkworth Village
3		794506	Heather Kannar	N	Y	Warkworth Village
4	2	759053	Heather Kannar	N	Y	Warkworth Village
4	3	759053	Heather Kannar	N	Y	Warkworth Village
5	2	759053	Heather Kannar	N	Y	Warkworth Village
5	3	759053	Heather Kannar	N	Y	Warkworth Village
6	2	759053	Heather Kannar	N	Y	Warkworth Village
6	3	759053	Heather Kannar	N	Y	Warkworth Village
7	2	759053	Heather Kannar	N	Y	Warkworth Village
7	3	759053	Heather Kannar	N	Y	Warkworth Village
8	2	759053	Heather Kannar	N	Y	Warkworth Village
8	3	759053	Heather Kannar	N	Y	Warkworth Village
9	3	759053	Heather Kannar	N	Y	Warkworth Village
10	3	759053	Heather Kannar	N	Y	Warkworth Village
11	3	759053	Heather Kannar	N	Y	Warkworth Village
12	3	759053	Heather Kannar	N	Y	Warkworth Village
13	3	759053	Heather Kannar	N	Y	Warkworth Village
14	3	759053	Heather Kannar	N	Y	Warkworth Village
15	3	759053	Heather Kannar	N	Y	Warkworth Village
16	3	759053	Heather Kannar	N	Y	Warkworth Village
17	3	759053	Heather Kannar	N	Y	Warkworth Village
18	3	759053	Heather Kannar	N	Y	Warkworth Village
19	3	759053	Heather Kannar	N	Y	Warkworth Village
20	3	759053	Heather Kannar	N	Y	Warkworth Village
10		247239	Hunter Valley Gliding Club Cooperative Limited	Y	Y	Warkworth Near Comleroi Road
92		733895	Hunter Valley Gliding Club Cooperative Limited	Y	Y	Warkworth Near Comleroi Road
5		251617	Inchneuk Pty Ltd	N	Y	Maison Dieu
2		617852	John Maitland, Robert Graham, George Coates	N	N	Warkworth North West
2		835812	John Maitland, Robert Graham, George Coates	Y	N	Warkworth North West
3		835812	John Maitland, Robert Graham, George Coates	Y	N	Warkworth North West
4		635392	John Maitland, Robert Graham, George Coates	N	N	Warkworth Near Comleroi Road
4		835812	John Maitland, Robert Graham, George Coates	Y	N	Warkworth North West
6		247239	John Maitland, Robert Graham, George Coates	N	N	Warkworth Near Comleroi Road
7		247239	John Maitland, Robert Graham, George Coates	N	N	Warkworth Near Comleroi Road
8		247239	John Maitland, Robert Graham, George Coates	N	N	Warkworth Near Comleroi Road
9		835812	John Maitland, Robert Graham, George Coates	N	N	Warkworth North West
134		566275	John Maitland, Robert Graham, George Coates	Y	Y	Warkworth Near Comleroi Road
147		753792	Johnson Woods & Co Pty Ltd	N	N	Warkworth Near Comleroi Road
8		3005	Julie & Gregory Ernst	N	Y	Maison Dieu

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
9		3005	Julie & Gregory Ernst	N	Y	Maison Dieu
50		848334	Kenneth & Loraine Haynes	N	Y	Warkworth Village
9	2	759053	Kenneth Russell Partridge	N	Y	Warkworth Village
10	2	759053	Kenneth Russell Partridge	N	Y	Warkworth Village
11	2	759053	Kenneth Russell Partridge	N	Y	Warkworth Village
12	2	759053	Kenneth Russell Partridge	N	Y	Warkworth Village
13	2	759053	Kenneth Russell Partridge	N	Y	Warkworth Village
75		753792	M F Holdings Pty Ltd	N	N	Warkworth North West
1		446656	Neville Robert Stapleton	N	Y	Warkworth North East
1		770904	Olga Henderson	N	Y	Warkworth Village
1		770905	Olga Henderson	N	Y	Warkworth Village
1		1043120	Olga Henderson	Y	Y	Warkworth Village
2		770904	Olga Henderson	N	Y	Warkworth Village
3		770904	Olga Henderson	N	Y	Warkworth Village
4		770904	Olga Henderson	N	Y	Warkworth Village
5		770904	Olga Henderson	N	Y	Warkworth Village
7		770904	Olga Henderson	N	Y	Warkworth Village
40		755267	Olga Henderson	N	Y	Warkworth Village
41		755267	Olga Henderson	N	Y	Warkworth Village
186		755267	Olga Henderson	N	Y	Warkworth Village
1		70857	Phillip & Collen Algie	N	Y	Maison Dieu
6		3005	R & J Wenham	N	Y	Maison Dieu
45		1015315	Redbank Project Pty Limited	N	Y	Warkworth South of Wollombi Brook
1		66331	Robert Algie	N	Y	Maison Dieu
7		3005	Robert Algie	N	Y	Maison Dieu
10		3005	Robert Algie	N	Y	Maison Dieu
2		770905	Shane & Glenn Keys	Y	Y	Warkworth Village
84		753792	Shane & Glenn Keys	Y	Y	Warkworth Village
1	6	759053	Singleton Council	N	Y	Warkworth Village
2	6	759053	Singleton Council	N	Y	Warkworth Village
3	6	759053	Singleton Council	N	Y	Warkworth Village
2		90052	Telstra Corporation Limited	N	Y	Warkworth Village
12		843432	Telstra Corporation Ltd	N	Y	Warkworth Near Comleroi Road
1		738657	Wambo Coal Pty Ltd	N	Y	Warkworth Village
1		1090601	Wambo Coal Pty Ltd	N	Y	Warkworth Village
2		583524	Wambo Coal Pty Ltd	N	Y	Warkworth Village
2		738657	Wambo Coal Pty Ltd	N	Y	Warkworth Village
3		1085145	Wambo Coal Pty Ltd	Y	Y	Warkworth North West
4		1085145	Wambo Coal Pty Ltd	N	N	Warkworth North West
1		1088908	Wambo Coal Terminal Pty Ltd	N	Y	Warkworth Village
2		1088908	Wambo Coal Terminal Pty Ltd	N	Y	Warkworth Village

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
86		755267	Wambo Coal Terminal Pty Ltd	N	Y	Warkworth Village
88		755267	Wambo Coal Terminal Pty Ltd	N	Y	Warkworth Village
171		755267	Wambo Coal Terminal Pty Ltd	N	Y	Warkworth Village
174		755267	Wambo Coal Terminal Pty Ltd	N	Y	Warkworth Village
1	17	759053	Wambo Mining Corporation Limited	N	Y	Warkworth Village
2		113343	Wambo Mining Corporation Limited	N	Y	Warkworth Village
2	17	759053	Wambo Mining Corporation Limited	N	Y	Warkworth Village
3		113343	Wambo Mining Corporation Limited	N	Y	Warkworth Village
4		113343	Wambo Mining Corporation Limited	N	Y	Warkworth Village
5		113343	Wambo Mining Corporation Limited	N	Y	Warkworth Village
1	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
2	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
7	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
8	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
9	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
10	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
11	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
12	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
13	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
14	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
15	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
16	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
17	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
18	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
19	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
20	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
21	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
22	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
23	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
24	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
25	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
26	4	759053	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
199		755267	Wambo Mining Corporation Pty Limited	N	Y	Warkworth Village
1	16	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
1	21	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village

Lot	Section	DP	Property Owner	Wholly or Partly Affected by Coal & Allied Surface Mining Lease	Wholly or Partly Affected by Coal & Allied Sub Surface Mining Lease	Location
2	16	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
2	21	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
3	16	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
3	21	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
4	21	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
5	21	759053	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
10		113343	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
202		257063	Wambo Mining Corporation Pty Ltd	N	Y	Warkworth Village
1	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
2	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
3	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
4	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
5	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
6	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
7	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
8	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
9	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
10	1	759053	Wilfred & Ross Kannar	N	Y	Warkworth Village
86		753792	Wilfred & Ross Kannar	N	Y	Warkworth Village
87		753792	Wilfred & Ross Kannar	N	Y	Warkworth Village
88		753792	Wilfred & Ross Kannar	N	Y	Warkworth Village
89		753792	Wilfred & Ross Kannar	N	Y	Warkworth Village
2		113342	Wilfred and Ross Kannar	N	Y	Warkworth Village Warkworth South of Wollombi Brook
114		755267	Wilfred and Ross Kannar	N	Y	Warkworth South of Wollombi Brook
123		755267	Wilfred and Ross Kannar	N	Y	Warkworth South of Wollombi Brook
No447		Bk718	William Henry Trewenack William, Marie & Lawrence Kelly	N	Y	Warkworth Village
33		610878		N	Y	Warkworth Village
2		658467	Wyoming Holsteins Pty Ltd	N	Y	Maison Dieu
1		782299	Xstrata Coal Pty Ltd Crown Enclosure Permit 51250 (Coal & Allied Operations Pty Limited)	N Y	Y Y	Warkworth Village Warkworth South of Wollombi Brook
174		823775	Road	N	N	Warkworth North West
176		823775	Road	N	N	Warkworth North West
193		755267	Road	N	Y	Warkworth Village
180		823775	Singleton Shire Council (Road)	Y	N	Warkworth North West

APPENDIX 2 PROJECT LAYOUT PLANS



Legend

- Project Application Area
- Current Development Consent Boundary (HVO North only)

Client: Coal & Allied Operations Pty Limited
 Project: Hunter Valley Operations South Coal Project
 Drawing No: 0017820_F_02 Suffix No: R1
 Date: 19.09.2006 Drawing Size: A3
 Drawn By: DH Reviewed By: LS
 Source: -
 Scale: Refer to Scale Bar

**Figure 1.2
HVO South in its Local Setting**
 Environmental Resources Management Australia Pty Ltd
 Building C, 33 Saunders St, Pyrmont, NSW 2009
 Telephone +61 2 8554 8558



Figure 1: Local Setting of HVO South and North

Legend

- Land Ownership**
- Privately Owned Land
 - CNA Owned Land (outside PA area)
 - CNA Owned Land (within PA area)
 - Crown Land
- Project: Application Area**
- Current Mining Lease Boundary
 - Proposed Mining Lease Boundary Merged
 - Current Development Consent Boundary Merged

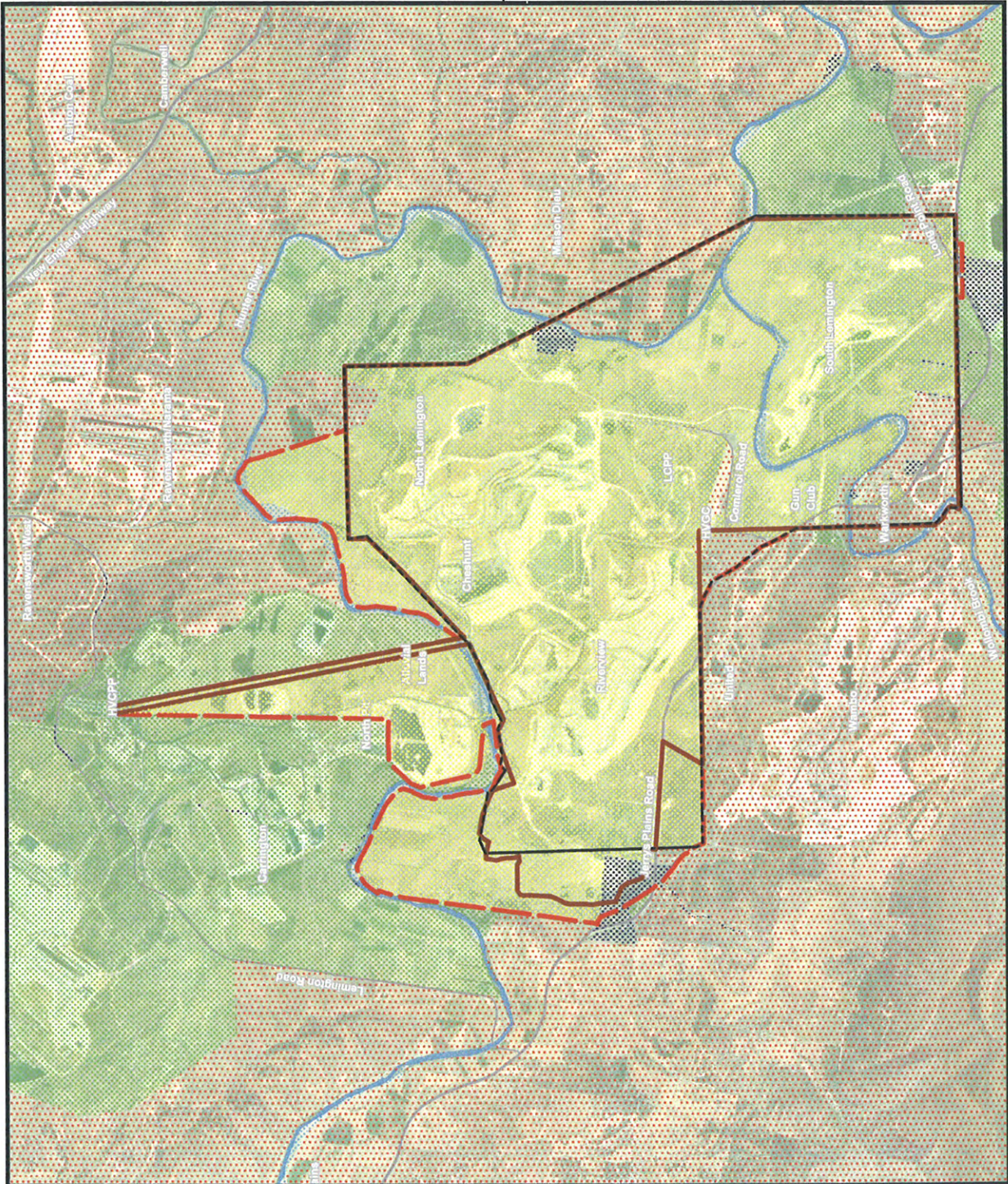


Figure 2: Project Application Area

Figure 1.3

Property Ownership, Project Application Area and Mining Lease Boundaries

Client: Coal & Allied Operations Pty Limited
 Project: Hunter Valley Operations South Coal Project
 Drawing No: 0047820_F_03 Suffix No: R5
 Date: 04.10.2007 Drawing Size: A
 Drawn By: DH Reviewed By: L
 Source: -
 Scale: Refer to Scale Bar
 0 1 2km
 N
 Environmental Resources Management Australia Pty
 Building C, 33 Saururus St, Pyrmont, NSW 2009
 Telephone +61 2 8584 8888



APPENDIX 3 CNA STATEMENT OF COMMITMENTS

The following Statement of Commitments has been prepared in accordance with the DGRs and Part 3A of the *EP&A Act*. These commitments outline the management, mitigation and monitoring measures to be adhered to by CNA throughout the development and operation of the proposed HVO South Coal Project to manage potential environmental impacts arising from the proposal.

Management of activities occurring at HVO is undertaken with reference to the corresponding management plan that details the key objectives and control measures. The management plans outline key environmental issues, performance criteria, recommended control measures, monitoring, inspection and incident management requirements, performance reporting and key related policies and procedures. The relevant EMS procedures describe the implementation of these recommended controls. Monitoring is undertaken in accordance with the approved monitoring programme to determine the effectiveness of the control measures and promotes a continuous improvement cycle. The CNA EMS will continue to be implemented across HVO and the relevant plans, procedures and monitoring programmes will be reviewed and modified to reflect the changes to HVO South resulting from the proposal.

The recommended management measures from each of the technical reports include a number of control measures to minimise the potential impacts resulting from the proposal. These measures have been considered in the context of the existing HVO activities and the CNA EMS. Many of these measures are already in place as part of existing controls for the HVO South activities, and will continue to be implemented across HVO South to minimise the potential impacts resulting from the proposal. This Statement of Commitments details those controls that are considered specific to the proposal.

General

CNA will:

- carry out the proposal generally in accordance with the systems, plans and mitigation measures identified throughout this Environmental Assessment Report;
- bring any matters that arise and require further assessment by the Director General to the Director General's attention and will comply with all requirements received; and
- obtain and maintain all permits, licences and approvals required throughout the life of the project that are not incorporated into the Part 3A Project Approval. This Statement of Commitments does not replace any obligations CNA has under these statutory requirements.

All works will be undertaken in accordance with the relevant Australian Standards where these standards do not conflict with specific legislative or safety requirements.

Standards may include but not be restricted to the latest versions of:

- *AS 2601-2001: The Demolition of Structures; and*
- *AS1940 - The Storage and Handling of Flammable and Combustible Liquids.*

Environmental Management Systems

The CNA EMS has been developed and implemented in accordance with ISO14001.

This EMS will continue to be applied to the activities undertaken as part of the HVO South Coal Project.

Management Measures

Community Consultation

The existing consultation programmes will continue to be undertaken to ensure any specific outcomes from the environmental assessment are included into the relevant programmes as required.

The community consultation specific to the proposal will continue throughout the project, from submission through to government decision and implementation of commitments. Ongoing communication techniques utilised by CNA (*Table 6.1*) will be implemented as appropriate.

Noise

In addition to the mitigation measures undertaken at HVO for noise, the following controls specific to the proposal will be implemented:

- equipment operation within South Lemington Pit 1 and associated truck movements will cease during night time operations if monitoring identifies unacceptable noise impacts will result from south westerly winds (occurring at or above 2.1 m/s). At lower wind speeds, real-time noise and/or weather monitoring will be used to guide modifications to operations as required.
- noise limits that will apply to the proposal are detailed in *Table 22.1*.

Table 0.1 Noise Limits Applicable to Proposal, dB(A)

No.	Location	Day Limits	Evening Limits	Night Limits	
		L _{Aeq} (15 min)	L _{Aeq} (15 min)	L _{Aeq} (15 min)	L ₁ {1 min)
3	Elisnore	38	38	38	45
4	Muller	38	38	38	45
5	Bowman	39	39	41	46
7	Stapleton ¹	N/A	N/A	N/A	45
8	Holz (Oaklands) ²	N/A	N/A	N/A	45
10	Moses (Wandewoi) ¹	N/A	N/A	N/A	45
13	Jerrys Plains Centre	38	38	38	45
16	Algie	39	39	42	46
17	Algie	39	39	40	46
19	Birrilee Feeds Pty Ltd	38	38	38	45
23	Hawkes ¹ (Springwood)	N/A	N/A	N/A	46
24	Clifton & Edwards	39	39	39	46
31	Cooper (Kilburnie)	39	39	39	49
32	Algie (Curlewis)	39	39	42	46
33	Edward & Haynes ²	N/A	N/A	N/A	46
34	Ernst	39	39	40	46
36	Garland	38	38	38	45
38	Henderson ¹	N/A	N/A	N/A	46
43	Kannar ²	N/A	N/A	N/A	46
45	Kelly ¹	N/A	N/A	N/A	46
47	Moxey	39	39	41	46
61	Shearer	39	39	41	46

1. These private residences are currently inside a zone of affectation. A private agreement may exist with the land holder.

2. These residences are owned by mining companies other than CNA.

General:

- Daytime (between 7am and 6pm); evening (between 6pm and 10pm); and night time (between 10pm and 7am).
- The noise emission limits above apply for winds up to 3 m/s (at a height of 10 m) and temperature gradients up to 4 degrees Celsius per 100 m.
- If there is a valid private amenity agreement with any property owners these criteria may be exceeded.
- Maison Dieu assessment locations are No's 5, 16, 17, 24, 32, 34, 47 and 61, Warkworth Village assessment locations are No's 23, 33, 38, 43 and 45 and Jerrys Plains assessment locations are No's 3, 4, 13, 19, 31 and 36. Isolated assessment locations are No's 7, 8 and 10.
- Location No. is consistent with the HVO West Pit consent (DA 450-10-2003).

Blast and Vibration

In addition to the mitigation measures undertaken at HVO for blast and vibration management, blasts will be designed to minimise impacts on neighbouring mine ventilation structures and minimise the potential for fracture development along pit walls to assist with pit wall stability:

- blast vibration will be managed through design and modelling;
- bench heights will be managed to not significantly exceed 15 m;
- no throw blasts will take place adjacent to final walls;
- high density explosives will be toe loaded;
- blast monitoring and post blast analysis will be undertaken where required;
- presplit blasting will be implemented on final walls where this indicates improved wall conditions; and
- visual monitoring by way of regular highwall and pit inspections will be undertaken.

Air Quality

In addition to the mitigation measures undertaken at HVO for air quality management, efficient mine planning and operations will ensure:

- the mine plan is regularly reviewed with a view to controlling dust emissions and keeping emissions to the lowest levels practicable;
- exposed areas are kept to the minimum practicable; and
- haul roads are kept to the shortest routes practicable and material handling is kept to the minimum levels practicable.

Groundwater

In addition to the mitigation measures undertaken at HVO for groundwater management, the following controls specific to the proposal will be implemented:

Groundwater Flow To and From Rivers:

- development of protocols for monitoring and reporting of DWE stream gauge results to clearly record any reductions in flows that are attributed to mining. This will include monitoring Hunter River flows immediately up gradient and down gradient of the site. In addition, consideration will be given to tying in specific CNA water level recordings with current DWE gauging locations;
- monitoring of groundwater elevations within alluvium between the Hunter River and the Cheshunt Pit; and
- measured groundwater elevations and river flow will be assessed against predictions to determine whether application of additional management measures is required; and
- offset seepage to pits in accordance with regulatory requirements.

Regional Groundwater Drawdown:

- the HVO *River Red Gum Rehabilitation and Restoration Strategy* and CNA EMS procedure for Flora and Fauna will be updated to reflect changes resulting from the proposal. This will include monitoring the health of the River Red Gums located on the Hunter River and

Wollombi Brook alluvium as identified in *Chapter 11 (Figure 11.2)*. The monitoring programme will include details on frequency of monitoring, reporting and corrective actions; and

- up to three monitoring wells will be installed in the proximity of the cluster of registered DWE bores located to the east of the LCPP (*Figure 25 Annex J*). Data will be used to compare actual versus predicted impacts. Deviations away from predicted impacts will be assessed, and if predictions are exceeded, management measures will be implemented.

Alluvial Buffer Zone:

- a buffer zone of 100 m will be retained from the Cheshunt Pit highwall to the edge of alluvium of the Hunter River;
- a buffer zone of 150 m will be retained from the South Lemington Pit 2 highwall to the edge of alluvium of the Wollombi Brook;
- bores will be installed to further delineate the saturated zone between the Hunter River and the Cheshunt Pit before mining commences within this area; and
- the groundwater component of the HVO Water Management Manual will include procedures for monitoring potential impacts, including accurately measuring seepage to pits throughout mining and assessment of proximity to alluvials as mining approaches.

Deep Cheshunt Pit Final Void:

- the Deep Cheshunt Pit final void will be designed to intercept leachate from overburden emplacements and minimise discharge of saline groundwater. Deep Cheshunt Pit final void design will be reviewed at least three years prior to anticipated mine closure;
- the Deep Cheshunt Pit Final Void Management Plan will include future use options including investigation of feasibility to use the Deep Cheshunt Pit final void as a water storage that could be used as a buffer in times of flood flows in the Hunter River and as a supplementary water supply at times of scarce water supply. This would include additional investigations to refine predictions of final void water chemistry;
- a post closure monitoring programme will be developed as part of the Deep Cheshunt Pit Final Void Management Plan for water quality monitoring of the final void; and
- the mine plan will be further reviewed with a view to minimise the area of the Deep Cheshunt Pit final void as much as practicable.

Surface Water

In addition to the mitigation measures undertaken at HVO for surface water management, the following controls specific to the proposal will be implemented.

Water Supply:

- modify Water Access Licences, review conditions and report on water use in the AEMR;
- monitor and record abstraction quantities; and
- increase pump capacity from Dam 20S (or alternative storage) to the LCPP and undertake minor improvements to the existing HVO South water system in conjunction with the design of the LCPP to minimise need to pump from Hunter River *Water Discharge*;
- review current discharge conditions in respect of the proposal and incorporate where applicable into the Water Management Manual.

Flood Mitigation:

- construct South Lemington Pit 2 Levee SLL2 as a permanent levee and ensure the outer face of the levee will withstand 100-year ARI flood flow velocities; and

- assess Hobden Gully levee (CL1) prior to mine closure to determine if protection of the Deep Cheshunt Pit final void is required.

Erosion and Sediment Control:

- erosion and sediment control structures will remain in place to divert water away from the Deep Cheshunt Pit final void unless required for use as flood flow storage.

Monitoring and Inspections:

- prior to LCPP and infrastructure construction works review the Surface Water Monitoring Programme, establish additional representative monitoring sites where required and undertake monitoring; and
- annual monitoring of water level and water quality in the Deep Cheshunt Pit final void after mining operations have ceased as part of the post closure monitoring programme. Monitoring will continue in accordance with regulatory requirements.

Ecology

In addition to the mitigation measures undertaken at HVO for management of flora and fauna, the following controls specific to the proposal will be implemented:

- the River Red Gum Rehabilitation and Restoration Strategy prepared by CNA will be updated to include the stands along the Hunter River and Wollombi Brook, will include collection and storage of seed from existing stands, and will ensure the health of these River Red Gums is periodically monitored;
- studies will be undertaken to investigate the preferred water source of River Red Gums and develop appropriate management measures;
- areas identified with sand profile will be included in the Warkworth Green Offsets research programme;
- the Coast Banksias will be assessed and fenced to exclude stock and provide for enhancement opportunities;
- rehabilitation planning will identify opportunities to create similar ecological characteristics (such as habitat types) of proposed extension areas;
- remnant vegetation areas not required to be disturbed by the proposal will be managed to ensure security of flora and fauna habitat in the future; and
- the Warkworth and Wambo Green Offset areas and the Hunter Valley Synoptic Plan will be considered with rehabilitation planning to enhance linkage where practical.

Aboriginal Heritage

In addition to the mitigation measures undertaken at HVO for management of Aboriginal heritage, the following controls specific to the proposal will be implemented as agreed with the Aboriginal Working Group.

Management Measures for ACHMP HVO South Stage 1 include:

- all management measures will be undertaken in accordance with the Aboriginal Heritage Assessment as outlined in the ACHMP;
- if at a later date it is found necessary to undertake an action that would impact sites described within the Aboriginal cultural heritage assessment, additional and specific management recommendations may be implemented in consultation with the Working Group;

- provision is to be made for the management of collected cultural heritage material;
- provision will be made in the ACHMP for the Working Group to undertake an independent compliance audit of the management programme on a six monthly basis. In the event that any non-compliant activities are identified at any time, an additional compliance audit may be undertaken as part of the investigation process;
- where any mitigation is required it will be undertaken by representatives of the Working Group and suitably qualified technical advisers;
- implement a management programme providing for the controlled collection of the following sites where site avoidance is not possible. Until management measures (which may involve the collection of cultural material) have been implemented, mine-related impacts to the sites will be prevented:
 - Riverview South West Mining Extension Area Sites 1-24
 - South Lemington Pit 1 Mining Extension Area Sites 59-79
 - Proposed rail spur and loop easement Sites 80-83
 - LCPP Sites 101 and 105-106
- the alignment of the proposed rail spur and loop have been amended to avoid impacts to Sites 26-44, 47-58 and 107-109;
- restricted access zones will be defined for Sites 26-44, 47-58, 84-100, 102-104 and 107-109. The boundaries (*Figure 12.3*) are indicative only; and
- land management activities on the Archerfield property will avoid any impacts to Site 25.

Management measures to be implemented in accordance with the agreed ACHMP for HVO South Stage 2.

Historic Heritage

In addition to the mitigation measures undertaken at HVO for management of historic heritage, the following action specific to the proposal will be implemented:

- a targeted field assessment will be undertaken by an historic heritage professional where required to supplement existing information to report on the relative significance of the additional sites identified on CNA land including a derelict bridge structure over an unnamed ephemeral creek and the cockatoo fence and recommend additional management measures.

Visual

In addition to the mitigation measures undertaken at HVO for management of visual amenity, the following action specific to the proposal will be implemented:

- a review of the extension areas that adjoin Jerrys Plains Road and the proposed rail spur and loop easement will be undertaken prior to construction of the rail spur and loop, to determine if additional screening is required.

Traffic and Transport

In addition to the mitigation measures undertaken at HVO for management of traffic and transport, the following action specific to the proposal will be implemented:

- ❑ ensure the relocation of Comleroi Road and construction of the rail loop are undertaken in accordance with the relevant regulatory requirements; and
- ❑ obtain the appropriate approvals, including those required for heavy equipment transfer; and
- ❑ ensure relevant stakeholders are consulted as required.

Waste Management

There are no suggested controls for waste management specific to the proposal. It is anticipated the mitigation measures currently implemented at HVO will be sufficient to manage the increase in waste resulting from the proposal.

Energy Management Activities

In addition to the mitigation measures currently implemented the mine plan will be regularly reviewed with a view to keeping emissions to the lowest levels practicable. Haul roads will be kept to the shortest routes practicable and material rehandling will be kept to the minimum levels practicable. Most of these measures are routinely applied as part of the efficient design of the mine.

Land Management

There are no suggested controls for land management that are specific to the proposal. The current mitigation measures implemented at HVO are anticipated to be sufficient to manage any potential impacts from the proposal on land use.

Mine Landscape Planning

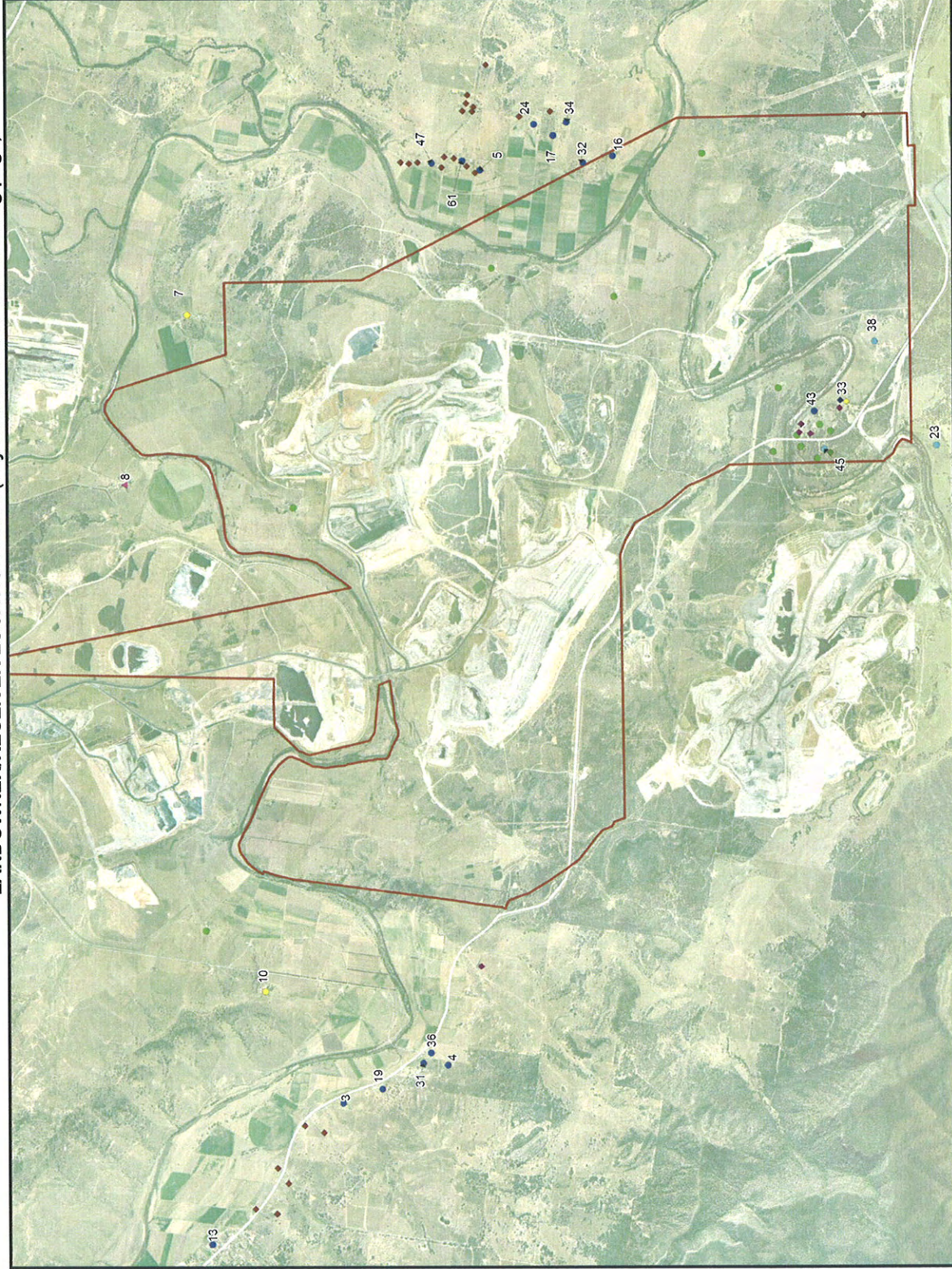
In addition to the mitigation measures undertaken at HVO for management of landscape planning, the following actions specific to the proposal will be implemented:

- General environmental land management practices implemented on all CNA owned land will be applied to the Archerfield Property along with planned rehabilitation areas.
- Remnant vegetation located within the Project Application area and outside proposed disturbance areas will be protected and enhanced to improve the ecological value and biodiversity. In particular, the specific management practices will include:
 - monitoring of remnant vegetation areas in accordance with existing procedures to provide evidence of success of management practices;
 - undertaking bushfire management, weed and pest control in accordance with recommended practices;
 - utilising local native species for seed stock where practical;
 - utilising existing farm dams and retention or establishment of native vegetation around dams to provide habitat; and
 - habitat creation and enhancement for common and threatened species.
- The vegetation on the Archerfield Property will require specific management practices to protect and enhance the ecological value and improve the biodiversity. In particular, the specific management practices will include:
 - monitoring of remnant vegetation areas in accordance with existing procedures to provide evidence of success of management practices;

- undertaking bushfire management, weed and pest control in accordance with recommended practices
 - maintenance and enhancement of native grasses, wherever possible;
 - utilising local native species for seed stock where practical;
 - utilising existing farm dams and retention or establishment of native vegetation around dams to provide habitat;
 - habitat creation and enhancement for common and threatened species; and
 - fencing of remnant vegetation to restrict stock access where practical.
- Options for securing the 140 ha of vegetation on the Archerfield Property will be investigated and a suitable mechanism will be implemented to ensure protection and enhancement of the biodiversity during the life of the project. Due to proximity of the Archerfield Property to coal resources and operations, it is considered inappropriate as a biobank site under the draft NSW Threatened Species Conservation (Biodiversity Banking) Regulation 2007 (DECC). An alternative measure will need to be identified to secure the site for the duration of the development.
 - A Final Void Management Plan will be prepared for the Deep Cheshunt Pit final void at least five years prior to completion of mining and will include:
 - identification of possible beneficial uses for the void;
 - consideration of technologies which will assist to enhance the range of possible uses;
 - review of modelling and predictions of long term hydrological behaviour and water quality responses, including final void water quality and level;
 - long term integrity of void slopes;
 - waste characterisation and containment as pertains to runoff into final voids;
 - coal seam capping; and
 - long term management, monitoring and mitigation measures.
 - Mining in South Lemington Pits will be incorporated into a revised MOP for HVO South, which will supersede all previous MOPs for this area. The management commitments for South Lemington Pit 1 will include highwall stability monitoring, water storage management, minimisation of visual impacts and management of dust emissions and erosion.

The process for designing the landforms across HVO and undertaking progressive rehabilitation with the aim of achieving a final landscape vision will be undertaken in accordance with the *HVO Conceptual Landscape and Rehabilitation Management Strategy*.

APPENDIX 4
 LANDOWNER/RECEIVER LOCATION PLAN (key to landowners on following page)



Legend

- Model Status
- CMA Owned, Not Modelled
 - Private, Modelled
 - Private, Modelled, CMA ZOA
 - Private, Modelled, Warrego ZOA
 - Private, Not Modelled
 - Private, Not Modelled, Warrego ZOA
 - Private, Not Modelled, Not Modelled
 - Warrego Owned, Not Modelled
 - Warrego Owned, Modelled
 - Xstrata Owned, Modelled

Notes:

ZOA = Zone of Affectation

Figure 7.1

Property Ownership and Assessment Locations

Client:	Coal & Allied Operations Pty Limited
Project:	Hunter Valley Operations South Coal Project
Drawing No:	0047820_GSS04_R0
Date:	21/07/2008
Drawn By:	JS
Source:	Refer to Scale Bar
Scale:	0 500 1,000 metres

Environmental Resources Management Australia Pty Ltd
 Building C, 33 Scarborough St, Pyrmont, NSW 2009
 Telephone +61 2 8594 8886



Surrounding Assessment Locations used for Modelling Purposes

Location No.	Location and Name	MGA56 Coordinates	
		Easting	Northing
Locations at Maison Dieu (East)			
5	Bowman	317887	6399172
16	Algie	318128	6397347
17	Algie	318352	6398192
24	Clifton and Edwards	318153	6398497
32	Algie (Curlewis)	317982	6397802
34	Ernst	318530	6397994
47	Moxey	317979	6399821
61	Shearer	318014	6399408
Locations at Warkworth (South)			
23	Hawkes (Springwood)	313989	6392994
33	Edward and Haynes	314699	6394353
38	Henderson	315584	6393898
43	Kannar	314648	6394680
45	Kelly	314149	6394563
Locations west along Jerrys Plains Road (West)			
3	Elisnore	305416	6401053
4	Muller	305950	6399615
13	Jerrys Plains Centre	303535	6402851
19	Birrilee Feeds Pty Ltd	305655	6400600
31	Cooper (Kilburnie)	305953	6399990
36	Garland	306139	6399895
Isolated Locations			
7	Stapleton (Cheshunt) – North East	315919	6403004
8	Holz (Oaklands) - North	313711	6403979
10	Moses (Wandewoi) – North West	306970	6402069
<ul style="list-style-type: none"> • Location No. is consistent with the HVO West Pit consent (DA 450-10-2003). • Location No's 33 and 43 have been purchased by Wambo Mine. • Location No. 8 has been purchased by Xstrata. 			

**APPENDIX 5
ARCHERFIELD BIODIVERSITY OFFSET STRATEGY**



Legend

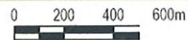
-  Archerfield Property Boundary
-  Area with Remnant Vegetation for Biodiversity Enhancement

**Figure 11.3
Archerfield Biodiversity
Enhancement Area**

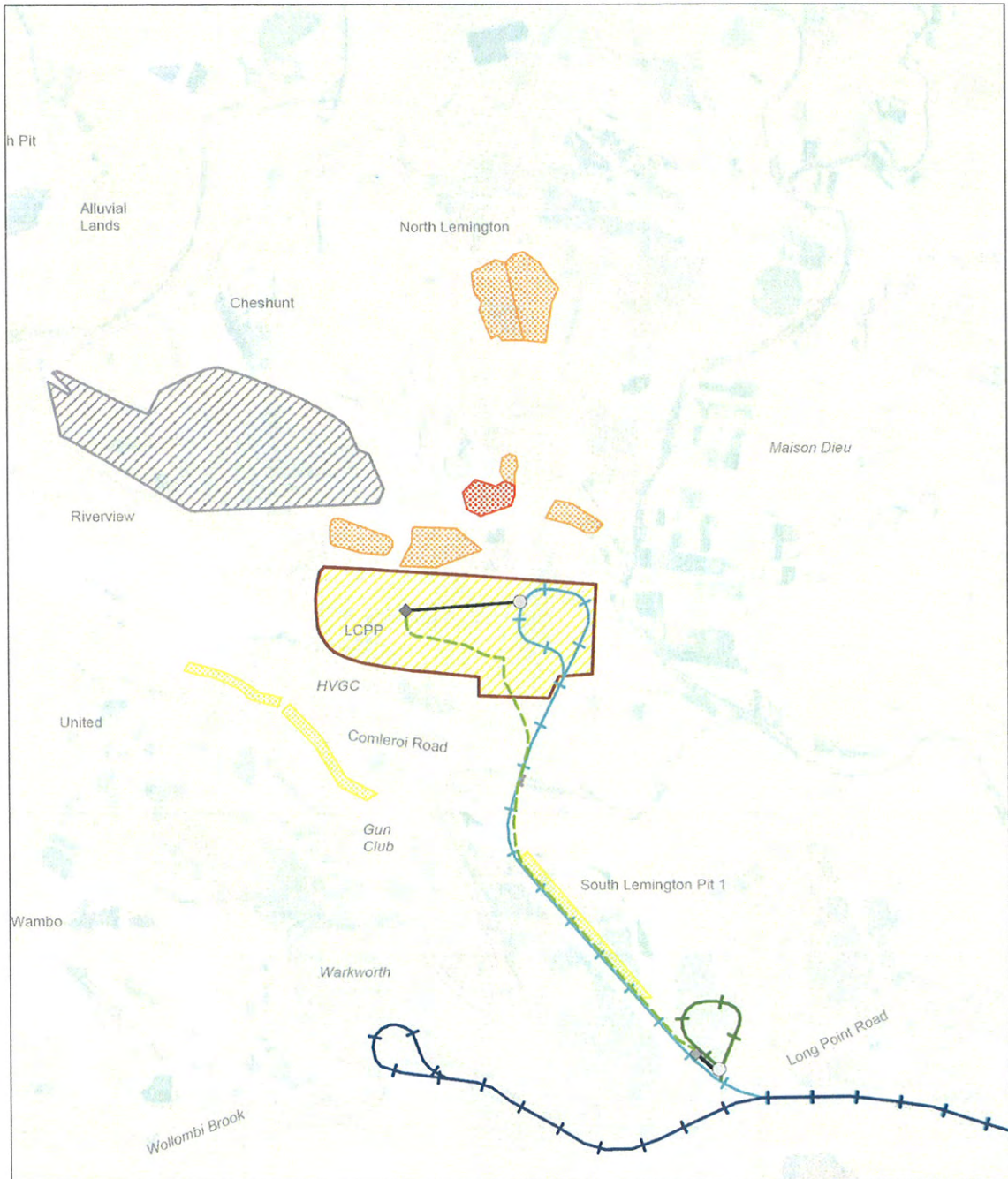
Client:	Coal & Allied Operations Pty Limited
Project:	Hunter Valley Operations South Coal Project
Drawing No:	0077323_GIS03_R0
Date:	18/01/2008
Drawn by:	JS
Source:	-
Scale:	Refer to Scale Bar

Suffix No:	R0
Drawing size:	A4
Reviewed by:	LS

Environmental Resources Management Australia Pty Ltd
Building C, 33 Saunders St, Pymont, NSW 2009
Telephone +61 2 8584 8888



APPENDIX 7 TRANSPORT OPTIONS



Legend

- | | | | |
|--|--|--|---------------------------------|
| | Lemington Coal Preparation Plant and Associated Infrastructure | | Existing Tailings Facility |
| | Final Void | | Proposed Tailings Facility |
| | Loading Terminal | | Rehabilitated Tailings Facility |
| | Coal Stockpile | | |
| | Proposed Trucking & Conveyor Route | | |
| | Proposed Short Loop | | |
| | Coal Conveyor | | |
| | Proposed Rail Line | | |
| | Wambo Rail Loop and Spur | | |
| | Existing Bridge | | |

Client: Coal & Allied Operations Pty Limited
 Project: Hunter Valley Operations South Coal Project
 Drawing No: 0047820_F_10 Suffix No: R4
 Date: 27.08.2007 Drawing Size: A4
 Drawn By: DH Reviewed By: LS
 Source: -
 Scale: Refer to Scale Bar

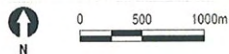
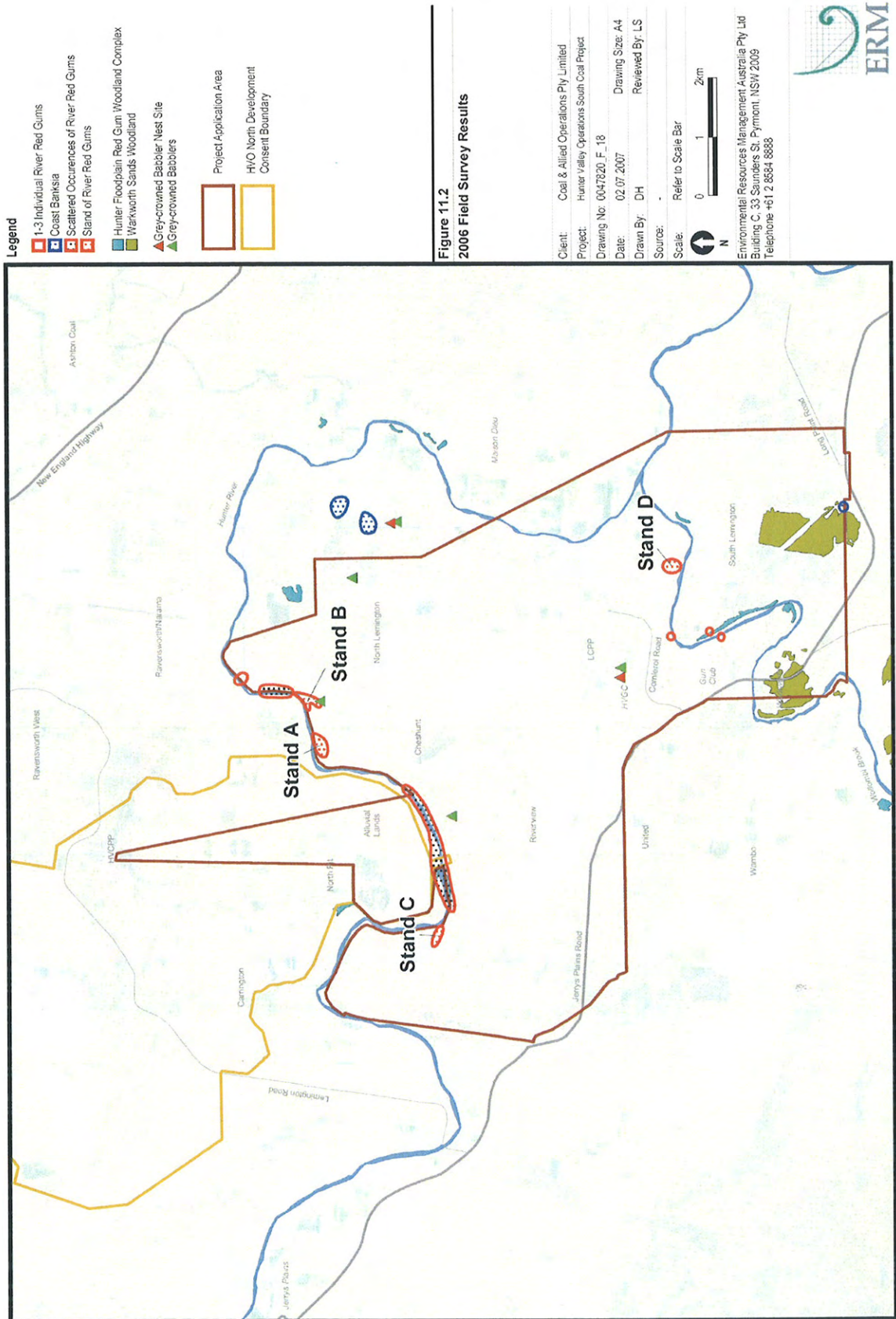


Figure 5.7
Proposed LCPP Footprint, Transport Options from LCPP to Wambo Rail Spur, Tailings Storage Facilities and Final Void

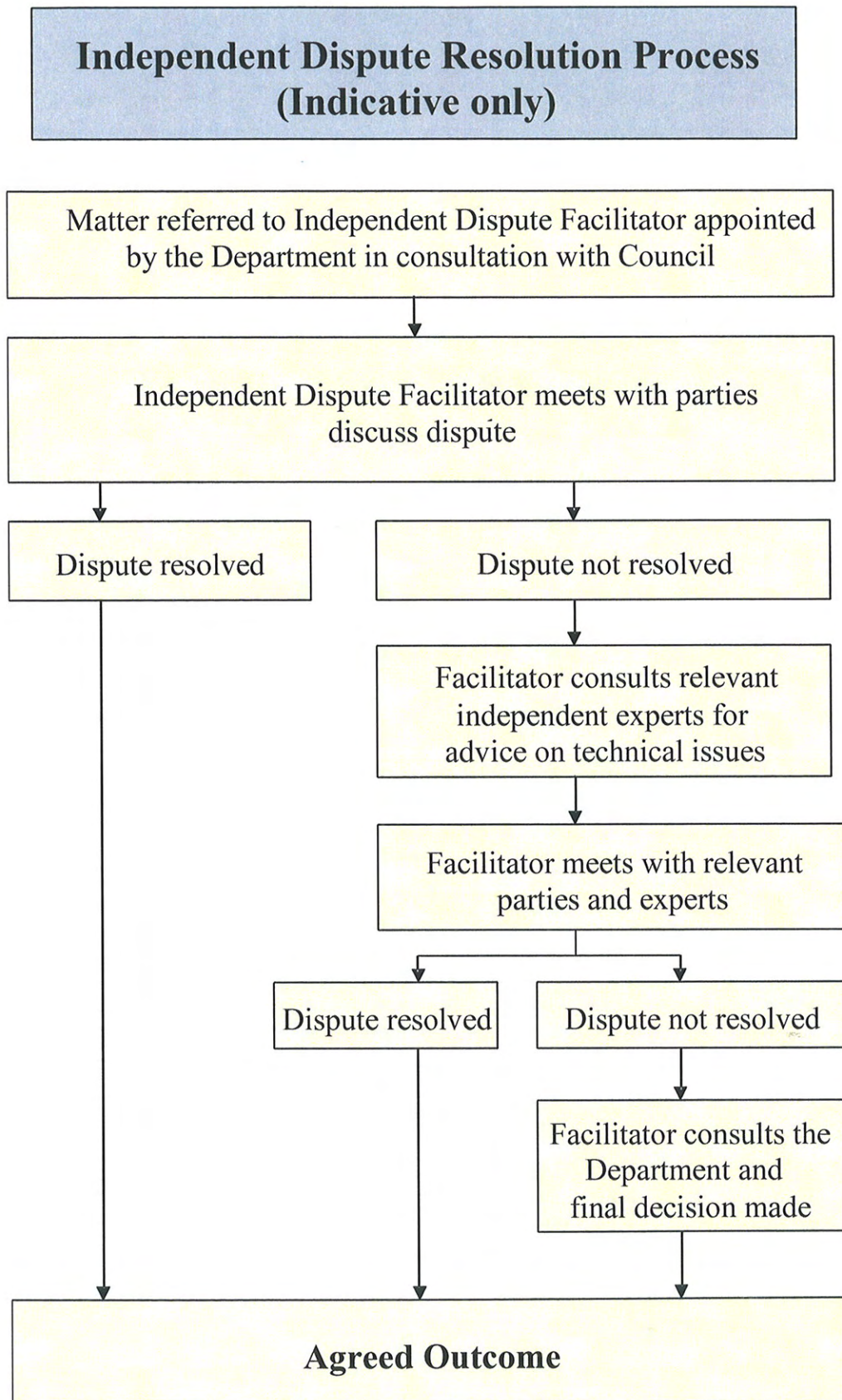
Environmental Resources Management Australia Pty Ltd
 Building C, 33 Saunders St, Pyrmont, NSW 2009
 Telephone +61 2 8584 8888



APPENDIX 8 THREATENED SPECIES AND EECs AT HVO SOUTH



APPENDIX 9
INDEPENDENT DISPUTE RESOLUTION PROCESS



Appendix 2 Environmental Protection Licence

Environment Protection Licence

Licence - 640



Licence Details

Number:	640
Anniversary Date:	01-April
Review Due Date:	27-Feb-2011

Licensee

COAL & ALLIED OPERATIONS PTY LTD
PO BOX 315
SINGLETON NSW 2330

Licence Type

Premises

Premises

HUNTER VALLEY OPERATIONS
Lemington Rd
SINGLETON NSW 2330

Scheduled Activity

Mining for coal
Coal works
Crushing, grinding or separating

Fee Based Activity

Mining for coal

Scale

> 5000000 - T produced

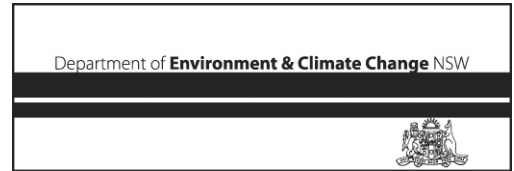
Region

North East - Hunter
Ground Floor, NSW Govt Offices, 117 Bull Street
NEWCASTLE WEST NSW 2302
Phone: 02 49086800
Fax: 02 49086810

PO Box 488G NEWCASTLE
NSW 2300

Environment Protection Licence

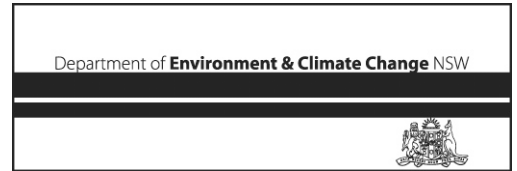
Licence - 640



INFORMATION ABOUT THIS LICENCE	4
Dictionary	4
Responsibilities of licensee.....	4
Variation of licence conditions	4
Duration of licence.....	4
Licence review.....	4
Fees and annual return to be sent to the EPA.....	4
Transfer of licence.....	5
Public register and access to monitoring data.....	5
1 ADMINISTRATIVE CONDITIONS	5
A1 What the licence authorises and regulates.....	5
A2 Premises to which this licence applies	7
A3 Other activities	7
A4 Information supplied to the EPA.....	7
2 DISCHARGES TO AIR AND WATER AND APPLICATIONS TO LAND	9
P1 Location of monitoring/discharge points and areas.....	9
3 LIMIT CONDITIONS	11
L1 Pollution of waters.....	11
L2 Load limits.....	11
L3 Concentration limits.....	11
L4 Volume and mass limits	12
L5 Waste.....	12
L6 Noise Limits	13
L7 Blasting limits	13
4 OPERATING CONDITIONS	13
O1 Activities must be carried out in a competent manner.....	13
O2 Maintenance of plant and equipment.....	14
O3 Dust.....	14
O4 Incineration or open burning.....	14
5 MONITORING AND RECORDING CONDITIONS	15
M1 Monitoring records.....	15
M2 Requirement to monitor concentration of pollutants discharged.....	15
M3 Testing methods - concentration limits	16
M4 Recording of pollution complaints.....	17
M5 Telephone complaints line.....	17
M6 Requirement to monitor volume or mass	17
M7 Requirement to monitor meteorological data	18
M8 HRSTS monitoring	19
M9 Blasting monitoring.....	19

Environment Protection Licence

Licence - 640



6	REPORTING CONDITIONS	19
R1	Annual return documents	19
R2	Notification of environmental harm	21
R3	Written report	21
R4	HRSTS Reporting	22
R5	Reporting of exceedence of noise limits	22
	GENERAL CONDITIONS.....	22
G1	Copy of licence kept at the premises	22
	POLLUTION STUDIES AND REDUCTION PROGRAMS	22
U1	Not applicable.	22
	SPECIAL CONDITIONS	22
E1	Hunter River Salinity Trading Scheme.....	22
	DICTIONARY.....	23
	General Dictionary.....	23



Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

The EPA publication "A Guide to Licensing" contains information about how to calculate your licence fees.

Environment Protection Licence

Licence - 640



The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

COAL & ALLIED OPERATIONS PTY LTD
PO BOX 315
SINGLETON NSW 2330

subject to the conditions which follow.

1 Administrative conditions

A1 What the licence authorises and regulates

A1.1 Not applicable.

A1.2 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.



Licence - 640

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity
Mining for coal
Coal works
Crushing, grinding or separating

Fee Based Activity	Scale
Mining for coal	> 5000000 - T produced

A1.3 Not applicable.

Environment Protection Licence

Licence - 640



A2 Premises to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
HUNTER VALLEY OPERATIONS
Lemington Rd
SINGLETON
NSW
2330
Premises as shown on plan titled Hunter Valley Operations (EPL 640) Premises Map No. HVOEPA-1, dated March 2007.

A3 Other activities

A3.1 This licence applies to all other activities carried on at the premises, including:

application of organic waste for rehabilitation purposes
disposal of coal washery rejects
storage of between 500kg and 12,200 kg of waste oil

A4 Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

Environment Protection Licence

Licence - 640



- (a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- (b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.



2 Discharges to air and water and applications to land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Description of Location
1	Dust Deposition Network		At location where dust deposition levels are representative of the levels experienced at residential properties, or other sensitive receivers, resulting from the operation of the mine.
2	Total Suspended Particles Network		At locations where the level of particulate matter being sampled is representative of emissions from the operation of the mine taking into account prevailing wind direction and the location of residential properties or other sensitive receivers.

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.



Licence - 640

Water and land

EPA identification no.	Type of monitoring point	Type of discharge point	Description of location
3	Discharge point under the Hunter River Salinity Trading Scheme; Discharge quality and volume monitoring	Discharge point under the Hunter River Salinity Trading Scheme; Discharge quality and volume monitoring	Discharge pipe from Dam 11 shown as DISCHARGE POINT 4172 on plan titled "Hunter Valley Operations Monitoring Location Plan HVOPEA-2A", dated January 2005.
4	Discharge point under the Hunter River Salinity Trading Scheme; Discharge quality and volume monitoring	Discharge point under the Hunter River Salinity Trading Scheme; Discharge quality and volume monitoring	Discharge end of outlet pipe on Parnell's Dam shown as DISCHARGE POINT 4171 on plan titled "Hunter Valley Operations Monitoring Location Plan HVOEPA-2A", dated January 2005.
5	Alluvial Lands Discharge Point; Discharge quality and volume monitoring	Alluvial Lands Discharge Point; Discharge quality and volume monitoring	At the discharge end of the alluvial lands discharge pipeline shown as DISCHARGE POINT 4173 on plan titled "Hunter Valley Operations Monitoring Location Plan HVOEPA-2A", dated January 2005.
6	Tributary Monitoring Point; Ambient water monitoring	Tributary Monitoring Point; Ambient water monitoring	In Farrells Creek within 100 metres, and upstream, of the confluence of flow from POINT 3 (4172) as shown on plan titled "Hunter Valley Operations Monitoring Location Plan HVOEPA-2A", dated January 2005.
7	Tributary Monitoring Point; Ambient water monitoring		In Farrells Creek within 100 metres, and downstream, of the confluence of flow from POINT 3 (4172) as shown on plan titled "Hunter Valley Operations Monitoring Location Plan HVOEPA-2A", dated January 2005.
8	Discharge and monitoring point under Hunter River Salinity Trading Scheme.	Discharge and monitoring point under Hunter River Salinity Trading Scheme.	Outlet of discharge pipe from Lake James storage dam as shown on plan titled " Hunter Valley Operations Monitoring Location Plan HVOEPA-2", dated January 2005.



Licence - 640

3 Limit conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Load limits

L2.1 Not applicable.

L2.2 Not applicable.

L3 Concentration limits

L3.1 For each monitoring/discharge point or utilisation area specified in the table below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L3.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L3.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table.

Water and Land

POINTS 3,4

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile Concentration Limit
pH	pH				6.5 - 9.0
Total suspended solids	milligrams per litre				120

POINT 5

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile Concentration Limit
Conductivity	microsiemens per centimetre				900

Environment Protection Licence

Licence - 640



POINT 8

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile Concentration Limit
pH	pH				6.2 - 9.5
Total suspended solids	milligrams per litre				120

L3.4 In addition to the concentration limit specified against Point 5 in the table above, waste water must not be discharged from Point 5 if the conductivity of the waste water is greater than the conductivity of the receiving waters in the Hunter River at the time of discharge.

L4 Volume and mass limits

L4.1 For each discharge point or utilisation area specified below (by a point number), the volume/mass of:

- (a) liquids discharged to water; or;
- (b) solids or liquids applied to the area;

must not exceed the volume/mass limit specified for that discharge point or area.

Point	Unit of measure	Volume/Mass Limit
3	megalitres per day	100
4	megalitres per day	130
5	megalitres per day	7
8	megalitres per day	120

L5 Waste

L5.1 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.

L5.2 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.



L6 Noise Limits

L6.1 Not applicable.

L7 Blasting limits

L7.1 The airblast overpressure level from blasting operations carried out in or on the premises must not exceed:

- (a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
- (b) 120 dB (Lin Peak) at any time.

At any residence or noise sensitive location that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative overpressure level.

L7.2 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:

- (a) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and
- (b) 10 mm/s at any time.

At any residence or noise sensitive location that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative ground vibration level.

L7.3 Blasting in or on the premises must only be carried out between 0700 hours and 1800 hours, Monday to Saturday. Blasting in or on the premises must not take place on Sundays or Public Holidays without the prior approval of the EPA.

4 Operating conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- (a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- (b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.



O2 Maintenance of plant and equipment

- O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
- (a) must be maintained in a proper and efficient condition; and
 - (b) must be operated in a proper and efficient manner.

O3 Dust

- O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.
- O3.2 Activities occurring in or on the premises must be carried out in a manner that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.
- O3.3 All trafficable areas, coal storage areas and vehicle manoeuvring areas in or on the premises must be maintained, at all times, in a condition that will minimise the generation, or emission from the premises, of wind-blown or traffic generated dust.
- O3.4 Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.
- O3.5 The tailgates of all haulage trucks leaving the premises must be securely fixed prior to loading or immediately after unloading to prevent loss of material.

O4 Incineration or open burning

- O4.1 There must be no incineration or open burning of any material(s) on the premises, except as specifically authorised by the EPA.



5 Monitoring and recording conditions

M1 Monitoring records

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
- in a legible form, or in a form that can readily be reduced to a legible form;
 - kept for at least 4 years after the monitoring or event to which they relate took place; and
 - produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
- the date(s) on which the sample was taken;
 - the time(s) at which the sample was collected;
 - the point at which the sample was taken; and
 - the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

- M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Monthly	AM-19

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Total Solid Particles	micrograms per cubic metre	Every 6 days	AM-15

POINTS 3,4

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Continuous during discharge	A probe designed to measure the range 0 to 10,000 uS/cm
Total suspended solids	milligrams per litre	Daily during any discharge	Representative sample
pH	pH	Daily during any discharge	Representative sample

Environment Protection Licence

Licence - 640



POINT 5

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	Probe

POINTS 6,7

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 2	A probe designed to measure the range 0 to 10,000 uS/cm

POINT 8

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Continuous during discharge	A probe designed to measure the range 0 to 10,000 uS/cm
Total suspended solids	milligrams per litre	Daily during any discharge	Representative sample
pH	pH	Daily during any discharge	Representative sample

Special Frequency 1 means:

“at least once every 10 minutes during discharge”.

Special Frequency 2 means:-

“twice per day with at least 6 hours between the two daily measurements on each day during a discharge and on each of the 5 days following the cessation of discharge”

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:

- any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
- if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
- if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The Protection of the Environment Operations (Clean Air) Regulation 2002 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

Environment Protection Licence

Licence - 640



M4 Recording of pollution complaints

- M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.
- M4.2 The record must include details of the following:
- the date and time of the complaint;
 - the method by which the complaint was made;
 - any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
 - the nature of the complaint;
 - the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
 - if no action was taken by the licensee, the reasons why no action was taken.
- M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

- M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.
- M5.3 Conditions M5.1 and M5.2 do not apply until 3 months after:
- the date of the issue of this licence or
 - if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M6 Requirement to monitor volume or mass

- M6.1 For each discharge point or utilisation area specified below, the licensee must monitor:
- the volume of liquids discharged to water or applied to the area;
 - the mass of solids applied to the area;
 - the mass of pollutants emitted to the air;

at the frequency and using the method and units of measure, specified below.

Environment Protection Licence

Licence - 640

Department of **Environment & Climate Change** NSW**POINT 3**

Frequency	Unit Of Measure	Sampling Method
Continuous during discharge	megalitres per day	Flow meter and continuous logger

POINT 4

Frequency	Unit Of Measure	Sampling Method
Continuous during discharge	megalitres per day	Weir structure and level sensor

POINT 5

Frequency	Unit Of Measure	Sampling Method
Special Frequency 1	megalitres per day	Method approved in writing by the Authority

POINT 8

Frequency	Unit Of Measure	Sampling Method
Continuous during discharge	megalitres per day	Flow meter and continuous logger

Special Frequency 1 means:

“at least once every ten minutes during discharge”.

M7 Requirement to monitor meteorological data

M7.1 The Licensee must collect and analyse meteorological data at the following monitoring point for the parameters specified, at the frequency specified, and using the method specified for each parameter.

Meteorological Monitoring

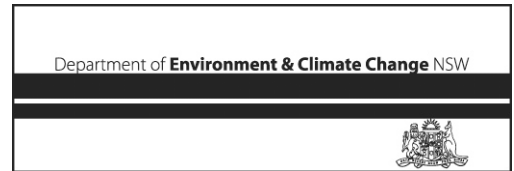
POINT: Site meteorological station.

Parameter	Units of measure	Averaging Period	Method (see note 1)	Frequency
Siting	NA	NA	AM-1 & AM-4	
Measurement	NA	NA	AM-2 & AM-4	
Wind Speed @ 10 m	m/s	10 minutes	AM2 & AM-4	Continuous
Wind Direction @ 10 m		10 minutes	AM-2 & AM-4	Continuous
Temperature @ 1.2 m	C	1 hour	AM-4	Continuous
Rainfall	Mm	24 hours	Standard rain gauge	

Note:

Environment Protection Licence

Licence - 640



- (1) All methods are specified in the *Approved Methods for the sampling and Analysis of Air pollutants in New South Wales* and all monitoring must be conducted strictly in accordance with the requirements outlined in this document.

M8 HRSTS monitoring

- M8.1 The licensee must continuously operate and maintain communication equipment which makes the conductivity and flow measurements, taken at Point 3, 4 and 8 available to the Department of Land and Water Conservation within one hour of those measurements being taken and makes them available in the format specified in the "Hunter River Salinity Trading Scheme Discharge Point Site Equipment" as published by the Department of Land and Water Conservation on 7 May 2002.
- M8.2 The licensee must ensure that all monitoring data is within a margin of error of 5% for conductivity measurements and 10% for discharge flow measurement.
- M8.3 The licensee must mark monitoring point(s) 3, 4, 6, 7 and 8, with a sign which clearly indicates the name of the licensee, whether the monitoring point is up or down stream of the discharge point(s) and that it is a monitoring point for the Hunter River Salinity Trading Scheme.
- M8.4 The licensee must ensure that the results of the measurements it takes at the tributary monitoring points are available to the regional water quality monitoring network operated by DLWC within 1 hour of its recording.

M9 Blasting monitoring

- M9.1 To monitor the blasting limits at L7.1 and L7.2:
- (a) Airblast overpressure and ground vibration levels must be measured at or near the nearest residence or noise sensitive location that is most likely to be most affected by the blast and that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative for all blasts carried out in or on the premises; and
 - (b) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard 2187.2 of 1993.

6 Reporting conditions

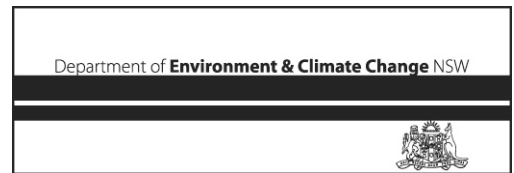
R1 Annual return documents

What documents must an Annual Return contain?

- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
- (a) a Statement of Compliance; and

Environment Protection Licence

Licence - 640



(b) a Monitoring and Complaints Summary.

A copy of the form in which the Annual Return must be supplied to the EPA accompanies this licence. Before the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

Period covered by Annual Return

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

R1.3 Where this licence is transferred from the licensee to a new licensee:

- (a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
- (b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:

- (a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
- (b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

Deadline for Annual Return

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

Notification where actual load can not be calculated

R1.6 Not applicable.

Licensee must retain copy of Annual Return

R1.7 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

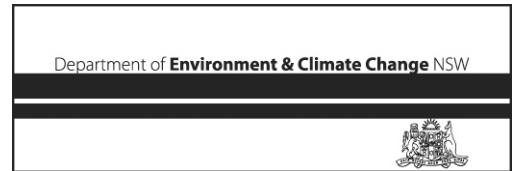
Certifying of Statement of Compliance and signing of Monitoring and Complaints Summary

R1.8 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:

- (a) the licence holder; or
- (b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Environment Protection Licence

Licence - 640



R1.9 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

R2 Notification of environmental harm

Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R2.1 Notifications must be made by telephoning the EPA's Pollution Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:

- (a) where this licence applies to premises, an event has occurred at the premises; or
- (b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,

and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:

- (a) the cause, time and duration of the event;
- (b) the type, volume and concentration of every pollutant discharged as a result of the event;
- (c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
- (d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
- (e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
- (f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
- (g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

Environment Protection Licence

Licence - 640



R4 HRSTS Reporting

R4.1 The licensee must compile a written report of the activities under the Scheme for each scheme year. The scheme year shall run from 1 July to 30 June each year. The written report must be submitted to the EPA's regional office within 60 days after the end of each scheme year and be in a form and manner approved by the EPA. The information will be used by the EPA to compile an annual scheme report.

R5 Reporting of exceedence of noise limits

R5.1 The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.

General conditions

G1 Copy of licence kept at the premises

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

Pollution studies and reduction programs

U1 Not applicable.

Special conditions

E1 Hunter River Salinity Trading Scheme

Environment Protection Licence



Licence - 640

- E1.1 This licence authorises the discharge of saline water into the Hunter River Catchment from an authorised discharge point (or points), in accordance with the Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002.
- E1.2 For the purposes of Clauses 23 and 29 of the Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002 the licensee must apply the conversion factor of 0.6.

Dictionary

General Dictionary

In this licence, unless the contrary is indicated, the terms below have the following meanings:

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity

Environment Protection Licence



Licence - 640

environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998.
flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
industrial waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
inert waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary

Environment Protection Licence



Licence - 640

	of the date of issue or last renewal of the licence following the commencement of the Act.
reprocessing of waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
treatment of waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste code	Means the waste codes listed in Appendix 5 of the EPA document A Guide to Licensing Part B.
waste type	Means Group A, Group B, Group C, inert, solid, industrial or hazardous waste

Mr Mitchell Bennett

Environment Protection Authority

(By Delegation)

Date of this edition - 18-Jun-2008

End Notes

- 1 Licence varied by notice 1003056, issued on 06-Dec-2000, which came into effect on 31-Dec-2000.



End Notes

2	Licence transferred through application 140323, approved on 17-Apr-2001, which came into effect on 01-Apr-2001.
3	Licence varied by notice 1013521, issued on 07-Dec-2001, which came into effect on 01-Jan-2002.
4	Licence varied by Change of Contact details, issued on 07-Feb-2002, which came into effect on 07-Feb-2002.
5	Licence varied by notice 1024752, issued on 27-Feb-2003, which came into effect on 27-Feb-2003.
6	Licence varied by notice 1026218, issued on 31-Mar-2003, which came into effect on 31-Mar-2003.
7	Licence varied by notice 1033325, issued on 22-Jan-2004, which came into effect on 23-Jan-2004.
8	Licence transferred through application 142538, approved on 05-Apr-2004, which came into effect on 01-Apr-2004.
9	Licence varied by notice 1040579, issued on 16-Nov-2004, which came into effect on 11-Dec-2004.
10	Licence varied by notice 1044536, issued on 18-Mar-2005, which came into effect on 07-Apr-2005.
11	Licence varied by correction to EPA object data record, issued on 15-Jun-2005, which came into effect on 15-Jun-2005.
12	Licence varied by notice 1058366, issued on 18-May-2006, which came into effect on 18-May-2006.
13	Licence varied by Internal Testing Only - No Changes, issued on 15-Jun-2007, which came into effect on 15-Jun-2007.
14	Licence varied by notice 1074619, issued on 26-Jun-2007, which came into effect on 26-Jun-2007.
15	Licence varied by notice 1088104, issued on 18-Jun-2008, which came into effect on 18-Jun-2008.

Appendix 3 Stream Impact Assessment

Hunter Valley Operations Stream Impact Assessment Discharge from Dam 15S to the Hunter River

Coal & Allied

11th August 2009

Contents

	Page Number
Executive Summary	iv
1. Background Information	1
1.1 Introduction	1
1.2 Proposed Discharge	1
1.3 Salinity of Proposed Discharge and Hunter River	2
1.4 Proposed Discharge Point	2
1.5 Adjacent Operations	3
1.5.1 Hunter River Catchment	3
1.5.2 Dam 15S Catchment	3
2. Hydrology	4
2.1 Hydrological Modelling Methodology	4
2.1.1 Modelled Catchment Node Locations	4
2.1.2 Peak Discharge Determination	4
2.1.3 Maximum Daily Runoff Determination	5
2.2 Hydrology	5
2.2.1 Hydrology t_c Method	5
2.2.2 Hydrology 24-hour Method	6
2.2.3 Hydrology Maximum Daily Runoff Method	7
2.2.4 Average Yearly Runoff	8
3. Geomorphology	9
3.1 Geomorphology Assessment Methodology	9
3.2 Creek Bed Soils	9
3.3 Hydraulics	10
3.3.1 Hydraulic Modelling Assumptions	10
3.3.2 Hydraulics	11
3.3.3 Travel Time to River	12
4. Salinity	13
4.1 Salinity Levels	13
4.1.1 Natural Catchment	13
4.1.2 Current Mining Catchment	13
4.2 Mining Catchment with Proposed Discharge	13

Contents (continued)

	Page Number
4.2.1 Salinity Modelling	13
4.2.2 Salinity 24-hour Method	13
4.3 Mixing with Hunter River Flows	15
5. Ecological	16
5.1 Flora 16	
5.1.1 Methodology	16
5.1.2 Vegetation Description	16
5.1.3 Impacts on Vegetation	16
5.2 Fauna 17	
5.2.1 Methodology	17
5.2.2 Fauna and Fauna Habitats	17
5.2.1 Impacts on Fauna of the Creek	18
6. Downstream Users	19
6.1 Consultation with Landholders and Irrigators	19
7. Cumulative Impacts	19
8. Archaeological	20
9. Discharge Point	20
10. Conclusion	21
11. References	22

List of Tables

Table 2-1 Modelled Catchment Node Areas and Locations	4
Table 2-2 Hydrology t_c Method	5
Table 2-3 Hydrology 24 hour Duration Method	6
Table 2-4 Hydrology Maximum Daily Runoff Method	7
Table 3-1 Hydraulics t_c method	11
Table 4-1 Salinity 24 hour Duration Method	14

List of Figures

- Figure 1 Discharge Point Locations EPL 640
- Figure 2 Existing Drainage Layout
- Figure 3 Original and Current Catchments
- Figure 4 Selected Channel Profiles

List of Plates

- Plate 1: Chainage 10 to 100
- Plate 2: Abandoned Monitoring Weir Chainage 60
- Plate 3: Outside of Bend Chainage 180
- Plate 4: Chainage 225
- Plate 5: View Downstream from Ch. 320
- Plate 6: View Downstream from around Ch. 650
- Plate 7: Panorama Ch. 680 – Ch. 780
- Plate 8: Ch.840 Looking Upstream
- Plate 9: Ch.900 Looking Upstream
- Plate 10: Ch.900 Looking Upstream
- Plate 11: Scour at About Ch.750 Looking Upstream

Executive Summary

HVO proposes to increase the rate at which it can release saline water from the Lake James (Dam 15S) discharge point from 120 megalitres per day to 200 megalitres per day to assist ongoing open cut coal mining operations at HVO South. Dam 15S is the licensed Hunter River Salinity Trading Scheme (HRSTS) discharge point for HVO South.

This Stream Impact Assessment (SIA) has been prepared to support an application by Coal & Allied to modify development consent DA 06-0261 to enlarge Dam 15S to increase mine water storage and increase the daily discharge rate from the Dam 15S discharge point.

The discharge channel from Dam 15S to the discharge point on the Hunter River was inspected on 14th May 2009 and found to be in excellent condition with no erosion or channel instability of any significance. The inspection indicated that current licensed discharge facility, which has been releasing water into the discharge channel for some 16 years has had no observable impact.

The habitat along the stream has been adversely impacted by past land use practices, and there is very little remnant vegetation.

Subsequent hydrological, hydraulic and geomorphologic reviews support the evidence from the site inspection. The proposed increased discharges under the ongoing operation of the discharge point are not expected to adversely impact upon flora or fauna.

The following recommendations aim to prevent and mitigate the risks of erosion as a result of the proposed increase in discharge rates:

- That the civil design of the upgraded discharge point address the risk of scour in vicinity of the road culvert at Chainage 00;
- Regular inspections of the discharge channel (at least annual, or after discharge events) be implemented to detect erosion, and management measures implemented if erosion develops

It is also recommended that an investigation by monitoring be carried out to re-determine the downstream distance at which full mixing of saline water into the Hunter River flows is achieved.

1. Background Information

1.1 Introduction

Hunter Valley Operations (HVO) open cut mine currently produces about 15.7 million tonnes per annum of run-of-mine coal using open cut mining methods. HVO operates three water discharge points under the Hunter River Salinity Trading Scheme (HRSTS) to release excess water which may otherwise interfere with coal production.

Lake James (Dam 15S) is the licensed HRSTS discharge point for HVO South. HVO proposes to increase the rate at which it can release saline water from the Dam 15S discharge point to assist ongoing open cut operations at HVO South.

This Stream Impact Assessment (SIA) has been prepared to support an application by Coal & Allied to modify development consent DA 06-0261 to enlarge the storage capacity of Dam 15S, and increase the daily discharge rate from Dam 15S to the Hunter River.

1.2 Proposed Discharge

HVO has advised that the enlarged Dam 15S has a proposed capacity of up to 730 megalitres (ML), currently Dam 15S has a capacity of 315 ML. The increased capacity is to compensate in part for the loss of Dam 20S which had a capacity of 3,500 ML.

The current Dam 15S discharge point is licensed to release 120 ML per day. Approval to discharge up to 200 ML per day is being sought. The increased discharge rate is required to dispose of excess water accumulated since a 1:100 Average Recurrence Interval (ARI) rainfall event in 2007. That event filled mine water storages across HVO to capacity, and caused large volumes of water to be stored in open cut voids. A discharge rate of 200 ML over 24 hours equates to an average discharge flow rate of 2.31 m³/s.

The discharge point is located in close proximity to the Hunter River; 3.4km downstream of the confluence with Glennies Creek (refer to Figure 1). The Glennies Creek confluence is the divider between the Middle and Lower Sectors for the HRSTS. A full description of the HRSTS sectors; Scheme operation and management can be found at the web site of the Department of Environment Climate Change and Water (DECCW). The web address is:

<http://www.environment.nsw.gov.au/licensing/hrsts/index.htm>

1.3 Salinity of Proposed Discharge and Hunter River

The electrical conductivity (EC) of mine water stored in Dam 15S has ranged from 1,600 to 6,000 microsiemens per centimetre ($\mu\text{S}/\text{cm}$). Averages of EC readings in a typical dry year are around 5,000 to 5,500 $\mu\text{S}/\text{cm}$, and in more recent wetter years the average is around 2,000 – 2,500 $\mu\text{S}/\text{cm}$. Recorded pH values are typically between 8.5 and 9.5.

Water quality in the Hunter River is measured regularly at Station H2, just upstream of the confluence of the Dam15S discharge channel and the Hunter River. Water quality at H2 is directly influenced by management of the regulated Hunter River upstream. Irrigation water released from Glennies Creek Dam tends to keep EC lower at H2. When Glennies Creek Dam is not releasing water, EC trends upwards at H2, as the main influence then becomes the through-flow from Glenbawn Dam, which is located in the upper reaches of the Hunter River. By the time water from Glenbawn reaches the H2 station, irrigation abstraction and natural accession of saline ground water has generally increased the salinity to around 800 $\mu\text{S}/\text{cm}$.

Average annual EC at the H2 station has ranged between 490 $\mu\text{S}/\text{cm}$ and 820 $\mu\text{S}/\text{cm}$ since 2004. Average annual pH has been steady between 7.9 and 8.2 over the same period.

1.4 Proposed Discharge Point

The existing Dam 15S discharge point is located just downstream of the dividing point between the Upper and Lower Sectors for the HRSTS, refer to Figure 1. Dam 15S is located on the western side of the Hunter River, within the bounds of Environment Protection Licence 640 (EPL 640).

The existing 600mm diameter discharge pipe outlet valve is located about 235 metres in a straight line from the top bank of the Hunter River. The drainage channel from the discharge valve to the river is some 950m long and runs mostly parallel to the Hunter River, joining the river some 450 metres downstream of the discharge pipe, refer to Figure 2.

The outlet valve is identified as Monitoring Point 8 in EPL 640, and described as *“Outlet of discharge pipe from Lake James storage dam as shown on plan titled Hunter Valley Operations Monitoring Location Plan HVOEPA-2”, dated January 2005.* The existing outlet valve lies immediately upstream of a culvert under a public access road, refer to Plate 1.

An energy dissipating structure will be installed just downstream of the public access road to lower the velocity of water entering the discharge channel. The approximate location will be between markers Ch 00 and Ch 60 on Figure 2.

The upgrade to the discharge point is currently being designed. The existing discharge system will be replaced by a system with capacity to discharge up to

200 ML/day. The final pipe configuration has not been selected at the time of preparation of this report.

1.5 Adjacent Operations

1.5.1 Hunter River Catchment

In the HRSTS, the Hunter River regulated reach is divided into three sectors under the HRSTS, these are known as:

1. The Upper Sector, upstream of Denman as far as Glenbawn Dam;
2. The Middle Sector, upstream of the Glennies Creek Junction to Denman; and
3. The Lower Sector, upstream of Singleton to the Glennies Creek.

A full description and a map of the HRSTS sectors can be found at the DECCW web site – refer Section 1.2 for the web address. The locations of the three HRSTS licensed discharge points (EPL 640) for HVO are shown on Figure 1. Dam 15S is the uppermost discharge point in the Lower Sector of the HRSTS.

Water from Macquarie Generation, Liddell Mine and Ravensworth–Narama HRSTS licensed discharge points enters the Hunter River at the Bayswater Creek confluence about 6 km upstream of Dam 15S. HVO discharges from Point 3 (HVO Dam 11) and Point 4 (HVO Parnells Dam) of EPL 640 join the Hunter River some 9.8 km and 29.4 km upstream respectively. These are the nearest upstream discharge points to Dam 15S, and all are located in the Middle Sector of the HRSTS.

1.5.2 Dam 15S Catchment

Dam 15S lies in the lower part of the catchment of an un-named tributary of the Hunter River. The pre-mining catchment was small at only 291 ha and only flowed intermittently, generally after heavy rain. Refer to Figure 3 to view the catchment boundaries.

The current catchment has been modified by mining at HVO South. The catchment has more or less reached its final shape and is almost all rehabilitated. Some 258 ha of this catchment discharges freely to the Hunter River, except for some small sedimentation structures which will remain in place until mining is completed. The currently “closed” catchment of Dam 15S (refer to Figure 2) will increase the ultimate size of this catchment to 281 ha at the cessation of mining. The final catchment area is very similar in size to the pre-mining catchment.

2. Hydrology

2.1 Hydrological Modelling Methodology

2.1.1 Modelled Catchment Node Locations

Modelling was generally conducted at two locations within the Dam 15S catchment, where the discharge point flows combine with existing catchment runoff, and at the confluence with the Hunter River.

The two locations are detailed in Table 2–1, and are shown on Figure 2.

Table 2–1 Modelled Catchment Node Areas and Locations

Node	Natural Catchment Area (ha)	Current Mining Catchment Area (ha)	Node Location
Ch. 00	270	237	Proposed Upgraded Discharge Point
Ch. 950	291	258	Discharge Point of Watercourse into the Hunter River

Note: Areas shown are cumulative.

2.1.2 Peak Discharge Determination

Peak discharges within the catchment were determined at the two modelled locations for the 1, 10 and 100 year ARI storm events using the Probabilistic Rational Method detailed in Australian Rainfall and Runoff Volumes 1 and 2 (1987).

Rainfall intensity-frequency-duration (IFD) data for the area around HVO was generated by the method described in AR&R [1] (1987), except for the 24 hour rainfall data, which was taken from Mackie Environmental Research 2007¹.

Two approaches were taken for hydrological modelling of the Dam 15S catchment:

- Peak flows as determined by the critical storm duration equivalent to the time of concentration (t_d) equal to that of the catchment; and
- Discharges occurring when the Hunter River is under high flow conditions – this was assumed to occur during a 24-hour storm.

¹ IFD statistics for durations 1 day and greater were prepared for Coal & Allied July 2007, based on 119 years of rainfall data for Jerrys Plains.

2.1.3 Maximum Daily Runoff Determination

The maximum daily runoffs from the Dam 15S catchment were determined by running the entire 120 years of the Jerrys Plains rainfall record through a calibrated, computerised daily rainfall runoff model. Daily runoffs at the two modelled locations for the 1, 10 and 100 year AEP runoff events were selected from the annual series and used for analysis.

2.2 Hydrology

Calculations were performed for both the catchment “time of concentration” (t_c) storm as well as the 24-hour storm for the 1, 10 and 100 year ARI events.

2.2.1 Hydrology t_c Method

Peak flows at the two locations of interest in the Dam 15S catchment are summarised in Table 2-2.

Table 2-2 Hydrology t_c Method

ARI	Location		Ch. 00	Ch. 950
1	Peak Flow from Natural Catchment	m ³ /s	7.7	8.0
	Peak Flow from Current Mining Catchment	m ³ /s	6.9	7.3
	Peak Flow Including Proposed D15S Discharge	m ³ /s	9.2	9.6
	Change in Peak Flow (%) compared to Natural Flow	%	+20%	+20%
	Change in Peak Flow (%) compared to Current Mining Catchment Flow	%	+33%	+32%
10	Peak Flow from Natural Catchment	m ³ /s	23.3	24.7
	Peak Flow from Current Mining Catchment	m ³ /s	21.7	22.6
	Peak Flow Including Proposed HVO Discharge	m ³ /s	24.0	24.9
	Change in Peak Flow (%) compared to Natural Flow	%	+3%	+1%
	Change in Peak Flow (%) compared to Current Mining Catchment Flow	%	+11%	+10%
100	Peak Flow from Natural Catchment	m ³ /s	54.0	57.6
	Peak Flow from Current Mining Catchment	m ³ /s	50.4	52.7
	Peak Flow Including Proposed D15S Discharge	m ³ /s	52.7	55.0
	Change in Peak Flow (%) compared to Natural Flow	%	-2%	-5%
	Change in Peak Flow (%) compared to Current Mining Catchment Flow	%	+5%	+4%

Table 2–2 indicates that peak flows in the discharge channel after allowing for the proposed Dam 15S discharge will exceed peak flows within the discharge channel from the natural (pre–mining) catchment for the 1 year and 10 year ARI event. The increases for the 10 year ARI are negligible.

In comparison to the current catchment, the increase in peak flow will exceed peak flows within the discharge channel for the 1, 10 and 100 year ARI event.

It is a significant observation that whilst the above comparisons are both illuminative and valid, the normal situation at Dam 15S is for HRSTS discharge opportunities to occur whilst the catchment of interest is not discharging. This is because Dam 15S is located towards the lower end of the HRSTS management area, and the discharge opportunity (flood) generally arrives a day or so after the causative rainfall event, when rainfall has almost always ceased. Excluding the cumulative effect of simultaneous discharges occurring, the HRSTS discharge rate is about 30% of the estimated 1 year ARI peak discharge from the pre–mining catchment.

2.2.2 Hydrology 24–hour Method

The 24–hour flows at the two locations of interest in the Dam 15S catchment are summarised in Table 2–3.

Table 2–3 Hydrology 24 hour Duration Method

ARI	Location		Ch. 00	Ch. 950
1	Peak Flow from Natural Catchment	m ³ /s	5.44	5.87
	Peak Flow from Current Mining Catchment	m ³ /s	4.78	5.20
	Peak Flow Including Proposed D15S Discharge	m ³ /s	7.09	7.51
	Change in Peak Flow (%) compared to Natural Flow	%	+30%	+28%
	Change in Peak Flow (%) compared to Current Mining Catchment Flow	%	+48%	+44%
10	Peak Flow from Natural Catchment	m ³ /s	10.9	11.8
	Peak Flow from Current Mining Catchment	m ³ /s	9.6	10.4
	Peak Flow Including Proposed D15S Discharge	m ³ /s	11.9	12.7
	Change in Peak Flow (%) compared to Natural Flow	%	+9%	+8%
	Change in Peak Flow (%) compared to Current Mining Catchment Flow	%	+24%	+22%
100	Peak Flow from Natural Catchment	m ³ /s	15.3	16.5
	Peak Flow from Current Mining Catchment	m ³ /s	13.4	14.6
	Peak Flow Including Proposed D15S Discharge	m ³ /s	14.9	16.0
	Change in Peak Flow (%) compared to Natural Flow	%	–3%	–3%
	Change in Peak Flow (%) compared to Current Mining Catchment Flow	%	+11%	+10%

Table 2–3 suggests that peak flows in the Dam 15S discharge channel after inclusion of the proposed HVO discharge may:

- Exceed natural catchment flows for the 1 and 10 year ARI 24 hour intensity storm; and
- Be less than natural catchment flows for the 100 year ARI 24 hour intensity storm.

It is a significant observation that whilst the above comparisons are both illuminative and valid, the normal situation at Dam 15S is for HRSTS discharge opportunities to occur whilst the catchment of interest is not discharging. This is because Dam 15S is located towards the lower end of the HRSTS management area, and the discharge opportunity (flood) generally arrives a day or so after the causative rainfall event, when rainfall has almost always ceased. Excluding the cumulative effect of simultaneous discharges occurring, the HRSTS discharge rate is about 40% of the estimated 1 year ARI 24 hour peak discharge from the pre-mining catchment.

2.2.3 Hydrology Maximum Daily Runoff Method

Maximum daily flows at the two locations of interest in the Dam 15S catchment are summarised in Table 2–4 .

Table 2–4 Hydrology Maximum Daily Runoff Method

ARI	Location		Ch. 00	Ch. 950
1	Max. Daily Runoff from Natural Catchment	MI/day	7	9
	Max. Daily Runoff from Current Mining Catchment	MI/day	6	7
	Max. Daily Runoff Including Proposed D15S Discharge	MI/day	206	207
	Change in Max. Daily Runoff (%) compared to Natural Flow	%	+2943%	+2300%
	Change in Max. Daily Runoff (%) compared to Current Mining Catchment Flow	%	+3433%	+2957%
10	Max. Daily Runoff from Natural Catchment	MI/day	92	108
	Max. Daily Runoff from Current Mining Catchment	MI/day	74	81
	Max. Daily Runoff Including Proposed D15S Discharge	MI/day	274	281
	Change in Max. Daily Runoff (%) compared to Natural Flow	%	+298	+260%
	Change in Max. Daily Runoff (%) compared to Current Mining Catchment Flow	%	+370%	+347%
100	Max. Daily Runoff from Natural Catchment	MI/day	171	202

ARI	Location		Ch. 00	Ch. 950
	Max. Daily Runoff from Current Mining Catchment	MI/day	138	158
	Max. Daily Runoff Including Proposed D15S Discharge	MI/day	338	358
	Change in Max. Daily Runoff (%) compared to Natural Flow	%	+198%	+177%
	Change in Max. Daily Runoff (%) compared to Current Mining Catchment Flow	%	+245%	+227%

Table 2–4 suggests that the maximum daily flows for the discharge channel after inclusion of the proposed Dam 15S discharge exceed natural catchment flows in all instances, significantly so for the 1 year ARI event.

It is a significant observation that whilst the above comparisons are both illuminative and valid, the normal situation at Dam 15S is for HRSTS discharge opportunities to occur whilst the catchment of interest is not discharging. This is because Dam 15S is located towards the lower end of the HRSTS management area, and the discharge opportunity (flood) generally arrives a day or so after the causative rainfall event, when rainfall has almost always ceased.

Excluding the effect of simultaneous discharges occurring, the HRSTS discharge rate is still greater or equal to natural catchment flows in all instances.

This is a significant effect for the 1 year ARI storm, in that whilst the discharge flow is only about 30% of the estimated peak flow, the daily flow is equivalent to a 1:100 year event, and volumetrically 23 times bigger than the natural event. Whilst the drain inspection indicates that the current discharge point has operated without impact for 16 years, Table 2–4 indicates a risk of erosion. The recommended action to mitigate the risk from potential erosion is to implement regular inspections of the discharge channel, at least annually (possibly after discharge events?), so that preventative actions can be taken if erosion develops.

2.2.4 Average Yearly Runoff

Issues associated with the hydrology for average yearly runoff include:

- Reduced area is available for run-off due to mining activities. This reduces the total volume leaving the catchment in an average year; and
- By releasing mine water into Dam 15S catchment, peak flows are increased and the volume of runoff closer approximates that of the natural (pre-mining) catchment.

Although discharges are most likely following wet weather, the overall distribution of creek flows will be modified. As a result of the proposed discharges, the average yearly run-off will more closely approximate the annual runoff volumes experienced for the natural (pre-mining) catchment.

3. Geomorphology

A geomorphologic review of the existing watercourse was performed to determine the susceptibility of the existing creek formation to increased flows resulting from the proposed discharge.

The discharge channel is “man made” between Ch. 00 and about Ch. 80, the remainder of the discharge channel is a natural watercourse.

3.1 Geomorphology Assessment Methodology

The stability of the Dam 15S discharge channel bed and banks was assessed by considering peak flows and velocities within the discharge channel for the natural, current and proposed catchment flow regimes.

The susceptibility of the soil type to entrainment and the likelihood of a change in the natural channel flow regime as a result of the increased flows is discussed here.

The assessment of the geomorphology of Dam 15S discharge channel utilised the following:

- Discharge channel (creek) bed soil inspection; and
- Hydraulic modelling.

3.2 Creek Bed Soils

The watercourse or discharge channel was inspected by Environmental Scientists on the 14th May 2009. Channel cross sections were recorded at several locations (refer to Figures 2 and 4) and the general condition of the watercourse was noted and photographed (refer to Plates 1 to 11). The inspection determined that erosion is currently not a problem within the discharge channel, and further the creek bed was stable.

Field observations suggested that soils were generally able to withstand erosion, and exhibited a strong topsoil crust. Field observation indicated that the soils are not dispersive, and are expected to be even less so in the saline discharge water from Dam 15S.

There were two main soil types within the watercourse downstream of Dam 15S. The soils include mainly colluvial materials from the start of the discharge channel to about Ch.150, at the start of the oxbow (refer Figure 2). These colluvial soils are typical of the tributaries in the local area, and are generally siltier and more finely braided than the channel material further downstream. From Ch. 150 to 950 the channel bed was located in

Hunter River alluvium which typically comprises clays, silts, sands and gravels in deposits ranging in thickness from 10 to 20m. The creek bed soil was mainly silty or clayey loams with a dense vegetative cover of grasses, with a shrubby understorey developing downstream of Ch. 680, refer to Plate 7.

The change in soil types coincided with the channel bed gradually becoming more incised.

3.3 Hydraulics

3.3.1 Hydraulic Modelling Assumptions

Peak discharges within the creek were modelled for the 1, 10 and 100 year ARI time of concentration (t_c) storm events. Peak flows during the 24-hour intensity rainfall storm were not considered for hydraulic modelling as they represent lower flows and velocities.

Flow Regime

Normal flow regime was assumed to occur within the channel downstream of Dam 15S for the purpose of estimating velocities. This assumption is unlikely to occur due to backwater effects from the Hunter River when under flood conditions however, such an assumption does approximate conditions within the creek most of the times that would correspond to discharges. Velocities in the lower reaches of the channel during flood conditions would be less, because water backs up from the Hunter River.

Energy Loss Coefficients

Manning's 'n' value for friction losses for the defined channel line was assumed to be 0.04 for Ch. 00 to Ch. 680, and 0.11 for the remainder of the channel reach.

Cross Section Geometry

Simple creek cross sections were determined from measurements taken during the site inspection at specific locations. Cross sections detailed the defined creek line geometry but did not consider the overbank regions which varied considerably.

Creek Bed Slope

Creek bed slope was calculated from the topographical map. Creek bed slopes ranged from 0.67% between Ch. 00 and 680 steepening to around 2% at the confluence with the Hunter River at Ch. 950.

3.3.2 Hydraulics

Hydraulic calculations were done at three locations in the discharge channel for the catchment time of concentration (t_c) storm for the 1, 10 and 100 year ARI events.

The velocity in the Dam 15S discharge channel for each scenario was determined and is an indicator of the affects of the increased flows on creek stability.

Peak velocities in the discharge channel are summarised in Table 3-1.

Table 3-1 Hydraulics t_c method

ARI	Location		Ch. 60	Ch. 320	Ch. 780
1	Velocity from Natural Catchment	m/s	1.38	1.33	1.02
	Velocity from Current Mining Catchment	m/s	1.34	1.29	1.00
	Velocity Including Proposed D15S Discharge	m/s	1.45	1.43	1.05
	Change in Velocity (%) compared to Natural Flow	%	+5%	+8%	+3%
	Change in Velocity (%) compared to Current Mining Catchment Flow	%	+8%	+11%	+5%
10	Velocity from Natural Catchment	m/s	*	1.97	2.01
	Velocity from Current Mining Catchment	m/s	*	1.92	1.95
	Velocity Including Proposed D15S Discharge	m/s	*	1.99	2.02
	Change in Velocity (%) compared to Natural Flow	%	*	+1%	+0.5%
	Change in Velocity (%) compared to Current Mining Catchment Flow	%	*	+4%	+4%
100	Velocity from Natural Catchment	m/s	*	*	*
	Velocity from Current Mining Catchment	m/s	*	*	*
	Velocity Including Proposed D15S Discharge	m/s	*	*	*
	Change in Velocity (%) compared to Natural Flow	%	*	*	*
	Change in Velocity (%) compared to Current Mining Catchment Flow	%	*	*	*

* Not estimated – overbank flow.

Table 3-1 suggests velocities within the discharge channel after inclusion of the proposed increased Dam 15S discharge will marginally exceed velocities from the natural (pre-mining) catchment. Velocities including the proposed Dam 15S discharge are also marginally higher than for the current mining catchment.

At higher return intervals the channel banks start to overtop. Experience in the local area has shown that the Hunter River generally overtops its banks at return periods of between 10 and 20 years.

It is a significant observation that whilst these comparisons are both illuminative and valid, the normal situation at HVO is for HRSTS discharge opportunities to occur whilst the catchment of interest is not discharging. This is because HVO is located across the boundary of the Middle and Lower Sector of the HRSTS, and the discharge opportunity generally occurs a day or so after the causative rainfall event, and rainfall has almost always ceased. Excluding the cumulative effect of simultaneous discharges occurring, the HRSTS discharge rate is about 30% of the estimated 1 year ARI peak discharge from the pre-mining catchment.

Data from the US Bureau of Reclamation indicates that old constructed channels in colloidal alluvial silts will tolerate average velocities up to 1.5 m/s without scouring. The natural discharge channel has developed under the natural regime of velocities of 1.38 – 2.01m/s shown in Table 3-1 and is stable, proposed velocities range from 1.45 – 2.02m/s so erosion is not expected to increase with the marginal increase in velocities due to the proposed operation of the discharge point.

3.3.3 Travel Time to River

Based on the average velocities in Table 3-1 for a 1 year ARI flow, the average travel time from the discharge point to the Hunter River is about 12 minutes.

After the commencement of discharge the first water will likely reach the river in less than 12 minutes due to the steeper initial energy gradient that will exist until the channel fills i.e. the channel achieves full depth (i.e. full discharge rate). The full discharge rate will take a little more than 12 minutes to achieve.

4. Salinity

4.1 Salinity Levels

4.1.1 Natural Catchment

The Dam 15S catchment runoff can be assumed to be of low salinity. The pre-mining catchment was very similar to the adjacent Comleroi Creek catchment, the undisturbed remnants of which have been monitored long term by Coal & Allied.

Environmental monitoring carried out by Coal & Allied for Comleroi Creek gives an average electrical conductivity (EC) of 475 $\mu\text{S}/\text{cm}$ (275 ppm) since the start of 2006.

4.1.2 Current Mining Catchment

The current mining catchment consists of mainly mature rehabilitated land. Monitoring data from similar rehabilitated sites at HVO demonstrate similar EC values to undisturbed land.

4.2 Mining Catchment with Proposed Discharge

4.2.1 Salinity Modelling

Salinity in the discharge channel including the proposed discharges from Dam 15S were estimated at 2 node locations within the creek. Instantaneous complete mixing was assumed to occur. Whilst the Dam 15S catchment has varied salinity levels throughout; and different salinity levels after different rainfall events, a single salinity of 250mg/l (~380 $\mu\text{S}/\text{cm}$) was used as a background level for the entire creek. This allows the dilution effects to be more clearly demonstrated.

4.2.2 Salinity 24-hour Method

Salinity levels at the two locations of interest in the Dam 15S catchment are detailed in Table 4-1, for a discharge during the 24-hour duration storm – refer Table 2-3 for flow rates.

Table 4–1 Salinity 24 hour Duration Method

ARI	Location		Ch. 00	Ch. 950
1	Watercourse Salinity from Natural Catchment	mg/l	250	250
	Watercourse Salinity from Current Mining Catchment	mg/l	250	250
	Water Salinity from upgraded Dam 15S Discharge Point	mg/l	3,575	3,575
	Salinity Including D15S Discharge – Natural Catchment	mg/l	1241	1189
	Salinity Including D15S Discharge – Current Catchment	mg/l	1333	1273
	Change in Salinity (%) compared to Natural Catchment	%	+496%	+476%
	Salinity Change (%) compared to Current Catchment	%	+533%	+509%
10	Watercourse Salinity from Natural Catchment	mg/l	250	250
	Watercourse Salinity from Current Mining Catchment	mg/l	250	250
	Water Salinity from upgraded Dam 15S Discharge Point	mg/l	3,575	3,575
	Salinity Including D15S Discharge – Natural Catchment	mg/l	831	794
	Salinity Including D15S Discharge – Current Catchment	mg/l	895	854
	Change in Salinity (%) compared to Natural Catchment	%	+333%	+318%
	Salinity Change (%) compared to Current Catchment	%	+358%	+342%
100	Watercourse Salinity from Natural Catchment	mg/l	250	250
	Watercourse Salinity from Current Mining Catchment	mg/l	250	250
	Salinity Including D15S Discharge – Natural Catchment	mg/l	3,575	3,575
	Salinity Including D15S Discharge – Current Catchment	mg/l	686	658
	Salinity Including Proposed Dam 15S Discharge	mg/l	739	704
	Change in Salinity (%) compared to Natural Catchment	%	+274%	+263%
	Salinity Change (%) compared to Current Catchment	%	+296%	+282%

Table 4–1 suggests a large increase in salinity levels in the watercourse above the current mining catchment salinity. This occurs because the average salinity within Dam 15S is higher than that of the receiving water body. The more likely discharge scenario however, is discharging into the watercourse while there is negligible flow from rainfall runoff, in which case the salinity will reflect the salinity in Dam 15S.

Under both circumstances, the resultant salinity within the discharge channel would be significantly higher than that of the natural (pre-mining) catchment. The elevated salinity of the discharge water in the discharge channel is considered a minimal impact for two reasons: any affected native vegetation species in the vicinity of the channel can be classified as moderately salt tolerant; and the length of exposure is short, limited to the extent of the discharge. This is discussed in more detail in Section 5 below.

The impact of the salinity of the proposed discharge on the Hunter River is discussed below, but is generally outside the scope of this document because these impacts were considered during the development of the Scheme, and this report is only required to address the tributary stream. The HRSTS requirement for use of salinity credits applies for both the High and Flood Flow Condition in the Hunter River, and as long as maximum salt load limits (i.e. Total Allowable Discharge or TAD) issued by DECCW are adhered to; the operation of the Scheme will cap the maximum average salinity in the Hunter River to 900 EC in the Lower Sector.

4.3 Mixing with Hunter River Flows

Assuming instantaneous mixing occurs, a discharge rate 200 ML/day at 3575 ppm salt concentration would increase the salinity of the Hunter River by about 65ppm (100EC) at the lower limit for the HRSTS Flood Flow condition (10,000 ML/day). Instantaneous mixing between the discharge water and the flows in the Hunter River will not occur.

Instantaneous mixing will not occur, and a concern that arose during the HRSTS Trial was that incomplete mixing of waters had the potential to allow a plume of saline discharge water to flow long distances downstream in the Hunter River with potential adverse impacts on flora, fauna and irrigators. These potential impacts are discussed in the following sections.

At the commencement of the regulated HRSTS, DECCW required all licensed operators to measure how far downstream this plume of elevated salinity extended when they made their first discharge. This has been done for the current discharge points at HVO and accepted by DECCW.

Observations of aerial photographs indicate that two nick points exist 100 metres and 850 metres downstream of the point where the Dam 15S discharge channel enters the Hunter River. These nick points would be expected to promote mixing of the saline discharge with the fresh river water.

However, it is appropriate to re-do mixing investigations once the discharge point is upgraded, to determine the distance at which full mixing of the discharge with the river water is achieved. This action is normally required by EPLs for new discharge points.

5. Ecological

5.1 Flora

5.1.1 Methodology

No detailed vegetation survey was undertaken along the discharge channel reach, apart from observations noted during the detailed hydraulic and hydrological inspection.

5.1.2 Vegetation Description

Aquatic species in the upper Hunter River include *Typha orientalis* and *Phragmites australis*. Riparian trees include *Casuarina cunninghamiana* and *Eucalyptus camaldulensis*. Shrubs such as *Leptospermum flavescens*, *Melaleuca armillaris* and *Callistemon citrinus* can also be found close to the Hunter River. The CSIRO guidebook: *Trees for Saltland (Marcar et al 1995)*, indicates that the trees and shrubs are of moderate salt tolerance and the aquatic species are noted for salt tolerance.

Further from the river species such as *Eucalyptus tereticornis*, *Eucalyptus melliodora*, *Eucalyptus blakelyi* occur.

The vegetation along the discharge channel primarily consists of introduced exotic grasses and weeds. Woody weeds dominate the channel section closer to the river (Crown Land), while Ch. 00 to 680 is dominated by grasses and some shrubby weeds – see photographs Plates 1 to 11. There is little to natural riparian vegetation due to past land use activities. There are four (4) eucalypts on the channel banks between Ch. 00 and 400, a scattering of acacia from Ch. 680 – 900 and a small stand of about ten (10) she-oaks near Ch. 950. The dominant tree species are willows, mainly in the lower 200 metres of the channel reach near the river.

The channel bed and banks are characterised by a dense cover of vegetation with only five bare areas observed, four were located on channel bends, filled with water, and one minor scour was located at around Ch. 750 where the bed had cut back to a tightly packed gravel base, refer to Plate 11. The batter on the outside of the channel bend at about Ch. 180 also has some exposure on the steep bank caused by active undercutting refer to Plate 3.

5.1.3 Impacts on Vegetation

The current discharge point has been in operation since the start of the trial HRSTS in 1993, some 16 years. The increased rate of flow is unlikely to introduce new or more severe impacts than those currently experienced

from the operation of the discharge point. Comparisons of aerial photographs from 1975 and 2008 do not indicate a deterioration of vegetation along the channel reach, rather an increase in vegetative cover in the channel reach nearest the river.

The remnant vegetation that occurs along discharge channel and at the Hunter River is already tolerant to salinity levels and due to the intermittent nature of natural runoff flows in the creek is more likely to be sourcing water from groundwater or soil moisture from more frequent rainfall. The additional saline water entering the creek during discharge flow periods is considered unlikely to affect the plant composition or structure downstream of the discharge point. The frequency of high salinity flows within the discharge channel will increase only marginally, as the goal of the project is to increase the daily flow rate rather than the frequency of discharges which are constrained by the HRSTS rules.

The saline discharge plume that will extend some distance downstream of the confluence between the discharge channel and the Hunter River will result in a short term pulse of salinity in the river. The will extend for a period that is a little longer than the length of any discharge – minimum 1 day. A review the CSIRO publications *Trees for Saltland (Marcar et al 1995)* and *Managing Groundwater and Surface Water for Native Terrestrial Vegetation Health in Saline Areas (Jolly et al 2002)* suggest that a short term saline pulse of the nature of the proposed discharges is unlikely to adversely affect current vegetation in the river downstream of the discharge point.

5.2 Fauna

5.2.1 Methodology

No fauna surveys were undertaken along the discharge channel reach, apart from observations noted during the detailed hydraulic and hydrological inspection.

5.2.2 Fauna and Fauna Habitats

Two primary fauna habitats occur along the watercourse, the channel bed and its associated aquatic habitat and the riparian vegetation that provides terrestrial habitats. These two habitat types are discussed below.

Aquatic Habitats

This habitat consists of the channel bed and vegetation within the watercourse. The channel bed is one of an ephemeral stream so it would be normally dry. The channel would not be an important water source for most

faunal groups in the area as the Hunter River immediately adjacent would provide a more reliable and palatable drinking water supply.

The ponds in the channel bends may persist for several months after flow events and provide suitable habitat for amphibians and a variety of macro-invertebrates. These ponds would naturally become more saline through evaporation, and the elevated salinity of the water remaining after a discharge event should not adversely impact the value of these ephemeral habitats.

Terrestrial Habitat

The riparian vegetation provides foraging resources for seed-eating and insectivorous birds. The vegetation growing in the channel bed closest to the river may also provide an important food source for birds in the area. The area would also be likely to provide high quality habitat for insectivorous bats. Some of the eucalypt in the area contained tree hollows that may be suitable for bats, birds and mammals. Parts of the watercourse nearest the river contain sufficient density of understorey to provide habitat for reptiles and ground-dwelling mammals, although other parts would have low habitat values for these species.

5.2.1 Impacts on Fauna of the Creek

The majority of fauna using the riparian vegetation are unlikely to be impacted by the proposed increase to the daily rate of saline discharge. The current discharge point has been in operation from the start of the Trial HRSTS which commenced in 1993, some 16 years ago. The increased rate of flow is unlikely to introduce new or more severe impacts than those currently experienced from the operation of the discharge point.

The main faunal group that may be more adversely affected by the proposed discharge is amphibians. Most amphibian species can be susceptible to changes to saline levels and may only be able to tolerate small incremental changes in salinity. However, any frog species using the watercourse are likely to be tolerant to the higher salinity levels that already occur in the ephemeral ponds in the channel bed.

The proposed increased discharge rate of saline water into the Hunter River is unlikely to impact upon fish and other aquatic species as the channel bed is almost always dry. No formal survey was undertaken for these species, however given that the watercourse is an ephemeral creek and rarely flows, it is very unlikely that any fish species occur.

6. Downstream Users

6.1 Consultation with Landholders and Irrigators

There are no downstream water users on this small tributary to the Hunter River. The land from Ch. 00 to approximately Ch. 680 is owned by Coal & Allied. The land downstream of Ch. 680 to the Hunter River is Crown Land.

Consultation with landholders along Hunter River opposite and downstream of HVO was not required as it is outside the scope of this assessment, which needs only consider the stream on which the discharge point its located.

Impacts of HRSTS discharges on the Hunter River landholders are managed under the operation and rules of the Scheme and were. The HRSTS caps the amount of salt that can be emitted during any event to maintain a maximum salt level in the Hunter River less than 900 $\mu\text{S}/\text{cm}$ and the modification of this discharge point will not change this impact.

Coal & Allied owns all the land on the western side of the Hunter River for some 7.5km downstream of the confluence of the discharge channel and the Hunter River. The western side of the river will be the side that is affected by any elevated salinity due to streaming. Full mixing is expected to be achieved within 850 metres of the entry point to the Hunter River, consequently no downstream landholders on the Hunter River will be affected by streaming.

7. Cumulative Impacts

The increased daily discharge rate proposed for the discharge point is unable to have a cumulative impact under the operation of the HRSTS. The HRSTS operates with a fixed number of credits and this caps the amount of salt that can be emitted during any event to maintain a maximum salt level in the Hunter River less than 900 $\mu\text{S}/\text{cm}$.

8. Archaeological

Coal & Allied has advised that the area proposed for the discharge point was assessed in 2006 and 2007 as part of the HVO South Project. The results of the assessments indicated that no archaeological sites were identified in the vicinity of the proposed discharge point and channel. The proposed modifications do not affect the discharge channel, except when water is discharged.

The channel is stable under the current operation of the discharge point, and it is expected to remain stable under the proposed regime, so archaeological impacts from scour or deposition are not expected.

9. Discharge Point

Upgrades to the storage reservoir and discharge infrastructure are currently being designed by Engineering Consultants commissioned separately by Coal & Allied.

The ultimate configuration of the discharge point will have minimal impact on this assessment, except the design should address potential scour and water level impacts at the road crossing immediately downstream of the discharge pipe outlet.

This assessment has considered velocity effects in the channel only. No hydraulic assessment of tail water effects in the vicinity of the discharge point has been done, or low or high velocity effects that may arise from interactions between the discharge point, nearby structures and the discharge channel in the areas of the discharge point. These localised hydraulic effects should be addressed in the design by the Engineering Consultant.

10. Conclusion

This SIA has been prepared to support an application by Coal & Allied to modify development consent DA 06-0261 to enlarge Dam 15S to increase mine water storage, and increase the daily discharge rate from the Dam 15S discharge point.

The discharge channel from Dam 15S discharge point to the Hunter River was inspected on 14th May 2009 and was found to be in excellent condition with no erosion or channel instability of any significance. The inspection indicated that the current licensed discharge facility, which has been releasing water into the discharge channel for some 16 years has had no observable impact.

The habitat along the stream has been adversely impacted by past land use practices, and there is very little remnant vegetation.

Subsequent hydrological, hydraulic and geomorphologic reviews support the evidence from the site inspection. The proposed increased discharges under the ongoing operation of the discharge point are not expected to adversely impact upon flora or fauna.

The following recommendations aim to prevent and mitigate the risks of erosion as a result of the proposed increase in discharge rates:

- That the civil design of the upgraded discharge point address the risk of scour in vicinity of the road culvert at Chainage 00; and
- Regular inspections of the discharge channel (at least annual, or after discharge events) be implemented to detect erosion, and management measures implemented if erosion develops.

It is also recommended that an investigation by monitoring be carried out to re-determine the downstream distance where full mixing of saline water into the Hunter River flows is achieved.

11. References

- 1 *Australian Rainfall and Runoff Volumes 1 and 2 (1987)*. The Institution of Engineers Australia
- 2 *Open Channel Hydraulics (1959)*. Ven Te Chow
- 3 *Hunter Valley No. 1 Mine South Pit Modifications Environmental Impact Statement (December 1998)* for Coal & Allied Operations Pty Ltd. ERM Mitchell McCotter
- 4 *Hunter Valley Operations South Coal Project Environmental Assessment Report (October 2007)* for Coal & Allied Operations Pty Limited. Environmental Resources Management Australia
- 5 *HVO - OPSIM Water Management Initial Investigations - June 2007* for Rio Tinto Coal Australia. Water Solutions Pty Ltd
- 6 *Trees for Saltland: a guide to selecting native species for Australia* Nico Marcar et al 1995
- 7 *Managing Groundwater and Surface Water for Native Terrestrial Vegetation Health in Saline Areas*. Jolly et al 2002

Figures

Discharge Point Locations EPL 640



Location: HVO South	Projection: MGA Z56	Date: 110809	Project: Lake James SIA
LGA: Singleton	Contour Interval: N/A	Plan By: JPP	Layout: A3
	Source: N/A	Version: 02	Our Ref: Job 8010



Legend

- EPL 640 Discharge Point
- EPL 640 Boundary
- Creek or River
- Other Stream Line



Existing Drainage Layout

Location: HVO South
LGA: Singleton

Projection: MGA Z56
Contour Interval: 2m
Source: N/A

Date: 100809
Plan By: JPP
Version: 02

Project: HVO Lake James SIA
Layout: A3
Our Ref: N/A



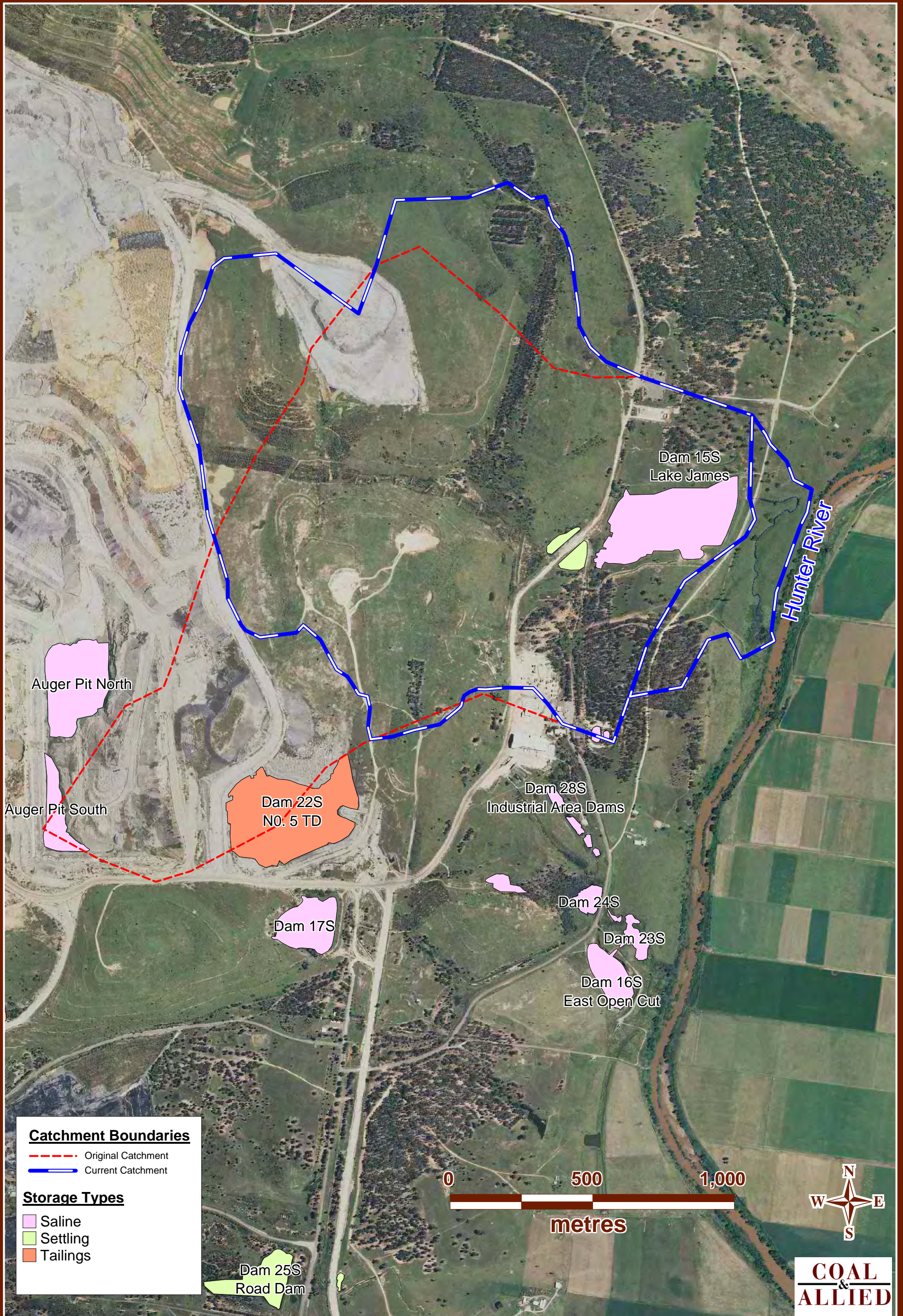
Original and Current Catchments

Location: HVO South
 LGA: Singleton

Projection: MGA Z56
 Contour Interval: N/A
 Source: N/A

Date: 100809
 Plan By: JPP
 Version: 02

Project: HVO Lake James SIA
 Layout: A3
 Our Ref: 9010



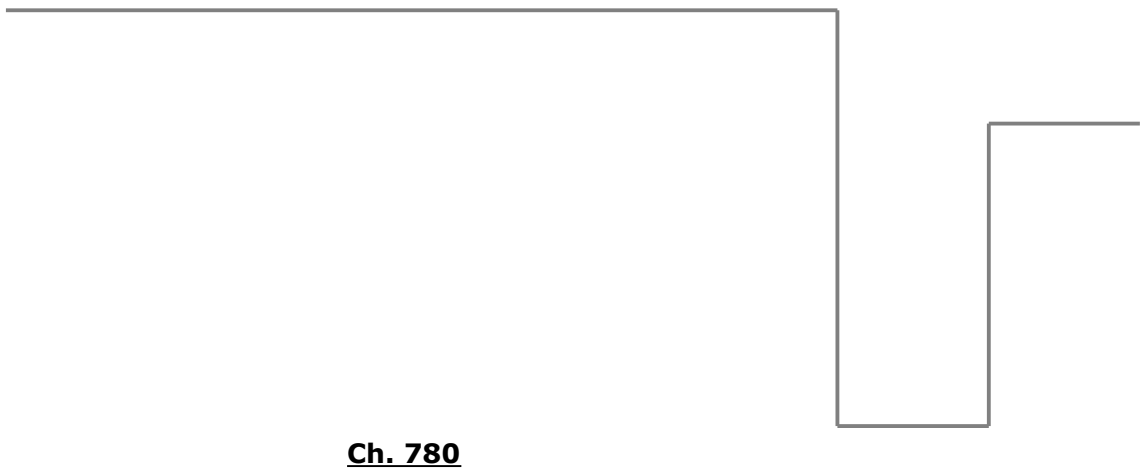
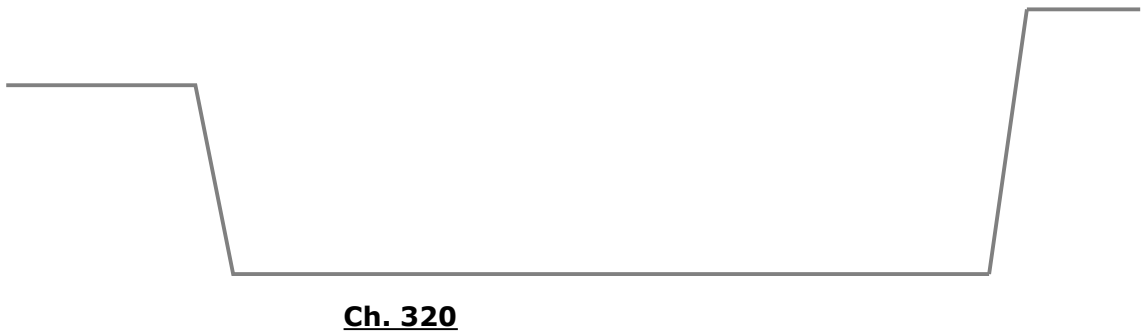
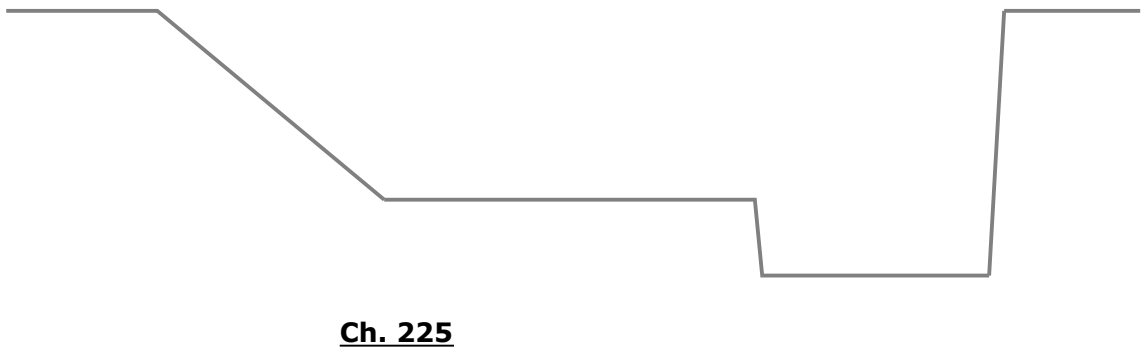
Catchment Boundaries

- Original Catchment (Red dashed line)
- Current Catchment (Blue solid line)

Storage Types

- Saline (Pink)
- Settling (Light Green)
- Tailings (Orange)





Scale 1:100 Approx. (A4)

Figure 4: Selected Channel Profiles



Plate 1: Chainage 10 to 100



Plate 2: Abandoned Monitoring Weir Chainage 60



Plate 3: Outside of Bend Chainage 180



Plate 4: Chainage 225



Plate 5: View Downstream from Ch. 320



Plate 6: View Downstream from around Ch. 650



Plate 7: Panorama Ch. 680 – Ch. 780



Plate 8: Ch.840 Looking Upstream



Plate 9: Ch.900 Looking Upstream



Plate 10: Ch.900 Looking Upstream



Plate 11: Minor Scour at About Ch.750 Looking Upstream