

# TABLE OF CONTENTS

1	INTF	RODUCT	ΓΙΟΝ	1-1		2.6		RECLAIM AND ARATION	2-18
	1.1	PROJE	ECT OVERVIEW	1-1			2.6.1	Coal Reclaim, Crushing	2-10
		1.1.1	Purpose of this Report	1-1			2.0.1	and Screening	2-18
		1.1.2	Background	1-1			2.6.2	Coal Handling and	
		1.1.3	Project Summary	1-1			2.0.2	Preparation Plant	2-18
		1.1.4	Site Location and Tenure	1-5			2.6.3	Beneficiation Circuit	2-18
		1.1.5	Project Snapshot	1-8			2.6.4	Surface Mobile Plant	2-19
		1.1.6	Proponent	1-8		2.7	PROD	UCT COAL TRANSPORT	2-19
	1.2		ONMENTAL ASSESSMENT				2.7.1	Road Transport	2-19
			IREMENTS	1-8			2.7.2	Rail Transport	2-19
	1.3	DOCU	MENT STRUCTURE	1-8		2.8	COAL	REJECT MANAGEMENT	2-19
	1.4	PROJE	ECT CONSULTANTS	1-11			2.8.1	Coal Reject Production	2-20
2	PRO	JECT D	ESCRIPTION	2-1			2.8.2	Emplacement at Glenlee Washery	2-20
		0) (=0)					2.8.3	Beneficiation Circuit	2-20
	2.1		VIEW OF THE EXISTING OPOLITAN COLLIERY	2-1			2.8.4	Underground Goaf Injection	2-20
		2.1.1	Underground Mining				2.8.5	Approved Camp Gully Emplacement	2-22
		0.4.0	Operations	2-1		2.9	WATE	R MANAGEMENT	2-22
		2.1.2	Major Surface Facilities Area and Supporting Infrastructure	2-1			2.9.1	Existing Water Management System	2-22
		2.1.3	Coal Reclaim and	2-1			2.9.2	Project Water Management System	2-24
		2.1.4	Preparation Product Coal Rail				2.9.3	Water Consumption and Water Supply	2-24
		2.1.5	Transport Product Coal Road	2-1		2.10		R INFRASTRUCTURE AND DRTING SYSTEMS	2-25
		0.4.0	Transport	2-1				Administration	2-25
		2.1.6	Coal Reject Management	2-1				Bath House and Lamproom	2-26
		2.1.7	Electricity Supply and Distribution	2-4				Workshops	2-26
		2.1.8	Equipment Transport and Workforce Access to the					Access Road	2-26
			Underground	2-4				Potable Water	2-26
		2.1.9	Historical Mining Areas	2-4				Sewage and Waste	
	2.2	2 COAL RESOURCE AND MAJOR GEOLOGICAL FEATURES		2-4		2.11	MANA	Disposal GEMENT OF DANGEROUS	2-26
	2.3						GOOD	S	2-27
		ARRANGEMENT		2-6		2.12	WORK	FORCE	2-27
	2.4	PROJECT CONSTRUCTION/ DEVELOPMENT ACTIVITIES		2-7	3		_	INING FRAMEWORK AND PROJECT	
		2.4.1	Longwall Mining Machinery Upgrades	2-9		JUST	ΓΙΓΙCΑΤ	ION	3-1
		2.4.2	Materials Handling System			3.1	MAJOF	R PROJECTS	3-1
		2.4.3	Upgrades Coal Handling and Preparation	2-9			3.1.1	Application of Other Provisions of the Environmental Planning	
			Plant Upgrades	2-9				and Assessment Act, 1979	3-2
		2.4.4	Electricity Supply Upgrades	2-12			3.1.2	Other Approvals	3-2
		2.4.5	Coal Reject Paste Plant and Underground Backfill			3.2		ONMENTAL PLANNING UMENTS	3-3
			Infrastructure	2-12			3.2.1	Illawarra Regional	0.0
	2.5		RGROUND MINING ATIONS	2-13			3.2.2	Environmental Plan No 1 Greater Metropolitan Regional	3-3
		2.5.1 2.5.2	Provisional Mine Schedule Coal Mining and ROM Coal	2-13				Environmental Plan No 2 —Georges River Catchment	3-7
			Handling	2-14			3.2.3	Drinking Water Catchments Regional Environmental	
		2.5.3	Major Underground Equipment and Mobile Fleet	2-16				Plan No 1	3-11
		2.5.4	Ventilation Systems	2-17			3.2.4	Wollongong LEP	3-12
		2.5.5	Coal Seam Gas Management	2-17			3.2.5	State Environmental Planning Policies	3-23
		256	Mine Dewatering	2-17 2-17			3.2.6	Section 94 Contribution Plan	3-29

3.3	_	R APPLICABLE STATUTORY	0.00	4	ENV	'IRONM	ENTAL ASSESSMENT	4-1
		OVALS	3-29		4.1	LAND	RESOURCES, CLIMATE	
	3.3.1	Mining Act, 1992	3-30		4.1		BUSHFIRE REGIME	4-1
	3.3.2	Dams Safety Act, 1978	3-32			4.1.1	Existing Environment	4-1
3.4		CONMENT PROTECTION AND				4.1.2	Potential Impacts	4-7
	ACT, 1		3-32			4.1.3	Mitigation Measures, Managemen and Monitoring	
	3.4.1	Matters of National	2 22		4.2	CLIDE	IDENCE	4-10
2.5		Environmental Significance CONMENTAL ASSESSMENT	3-33		4.2	4.2.1	Prediction Methodology	4-10
3.5		ULTATION  Objectives of the Project	3-41			4.2.2	Maximum Systematic Subsidence Predictions for Longwalls 20	
	3.3.1	Consultation Programme	3-41				to 44	4-11
	3.5.2	Southern Coalfield Inquiry	3-41			4.2.3	Non-Systematic Subsidence	
	3.5.3	State Government Agencies	3-43				Movements	4-11
	3.5.4	Local Government Agencies	3-48			4.2.4	Subsidence Impact Assessment	
	3.5.5	Federal Government					for Key Surface Features	4-12
		Agencies	3-49			4.2.5	Mitigation Measures, Managemen	
	3.5.6	Infrastructure Owners	3-49		4.0	0001	and Monitoring	4-16
	3.5.7	Non-Government			4.3		NDWATER	4-18
		Organisations	3-49			4.3.1	Existing Environment	4-18
	3.5.8	Public Consultation	3-49			4.3.2	Potential Impacts	4-24
3.6		RONMENTAL RISK				4.3.3	Mitigation Measures, Managemen and Monitoring	t 4-26
	ANAL'		3-51		4.4	CLIDE	ŭ	
3.7		ONSIDERATION OF THE			4.4		ACE WATER	4-27
		MMENDATIONS OF THE HERN COALFIELD PANEL				4.4.1	Existing Environment	4-27 4-42
	REPO		3-51			4.4.2	Potential Impacts	
	3.7.1	Assessment and Regulatory				4.4.3	Mitigation Measures, Managemen and Monitoring	ι 4-44
		Processes	3-52		4.5	ΔΟΙΙΔ	TIC ECOLOGY	4-46
	3.7.2	Subsidence Impact			4.5	4.5.1	Existing Environment	4-46
		Management	3-56			4.5.2	Potential Impacts	4-49
	3.7.3	Prediction of Subsidence				4.5.3	Mitigation Measures, Managemen	
		Effects and Impacts	3-57			4.5.5	and Monitoring	์ 4-53
	3.7.4	Environmental Baseline Data	3-58			4.5.4	Compensatory Measures	
3.8		ECT GREENHOUSE GAS	0.50				and Ecological Initiatives	4-55
		IDERATIONS	3-58		4.6	TERRI	ESTRIAL FLORA	4-55
	3.8.1	International Framework	3-58			4.6.1	Existing Environment	4-55
	3.8.2	Commonwealth and NSW Framework	3-60			4.6.2	Potential Impacts	4-61
	3.8.3	Project Greenhouse Gas	3-00			4.6.3	Mitigation Measures, Managemen	t
	5.0.5	Assessment	3-62				and Monitoring	4-65
3.9	PROJI	ECT JUSTIFICATION	3-66			4.6.4	Compensatory Measures	
	3.9.1	Scale and Development					and Ecological Initiatives	4-68
		Profile of the Project	3-66		4.7		ESTRIAL FAUNA	4-68
	3.9.2	Consideration of Project				4.7.1	Existing Environment	4-68
		Alternatives	3-66			4.7.2	Potential Impacts	4-72
	3.9.3	Ecologically Sustainable Development Considerations	3-74			4.7.3	Mitigation Measures, Managemen and Monitoring	t 4-76
	3.9.4	Consideration of the Consistency of the Project				4.7.4	Compensatory Measures and Ecological Initiatives	4-78
		with the Objects of the EP&A Act	3-79		4.8		IGINAL HERITAGE	4-78
	3.9.5	Summary Conclusion of the	070			4.8.1	Existing Environment	4-78
	5.5.0	Potential Impacts and Benefits				4.8.2	Potential Impacts	4-85
		of the Proposal	3-81			4.8.3	Mitigation Measures, Managemen and Monitoring	t 4-87
					4.9		ABORIGINAL HERITAGE	4-90
						4.9.1	Background	4-90
						4.9.2	Existing Environment	4-91
						4.9.3	Potential Impacts	4-91
						4.9.4	Mitigation Measures and Management	4-95



	4.10	NOISE		4-96			5.2.6	Environmental Control	
		4.10.1	Background	4-96				Measures and Reporting	5-11
			Existing Environment	4-98			5.2.7	Response and Contingency Measures	5-12
		4.10.3	Applicable Noise, Overpressure and Vibration Criteria	4-98		5.3		BILITATION OF SURFACE	F 44
		4.10.4	Potential Impacts	4-102				IRBANCE AREAS	5-14
		4.10.5	Mitigation Measures, Managemen				5.3.1	Erosion and Sediment Control	5-14
			and Monitoring	4-107			5.3.2	Revegetation	5-14
	4.11	AIR QL	AIR QUALITY				5.3.3	Rehabilitation Monitoring, Maintenance and Reporting	5-15
		4.11.1	Background	4-109		- A	DELIA		5-15
			Existing Environment Potential Impacts	4-110 4-112		5.4		BILITATION OF MINE IDENCE EFFECTS	5-15
			1.4 Mitigation Measures, Manageme			5.5	MINE	CLOSURE AND LEASE	
		4.11.4	and Monitoring	4-117			RELIN	RELINQUISHMENT	
	1 12	TRANS	ŭ	4-117		5.6	COMP	ENSATORY MEASURES AND	
	4.12		Existing Environment	4-117			ECOL	OGICAL INITIATIVES	5-16
			Potential Impacts	4-120					
			•	Ö		STA	TEMEN	T OF COMMITMENTS	SOC-1
		4.12.3	12.3 Mitigation Measures, Management and Monitoring		_				
	<i>I</i> 13	REGIO	NAL ECONOMY	4-123 4-124	7	REF	ERENC	ES	7-1
	7.10		Existing Environment	4-124	0	400	DE\	CIONO AODONIVANO AND	
			Potential Impacts	4-125	8		SSARY	TIONS, ACRONYMS AND	8-1
	111		EMPLOYMENT, POPULATION AND						_
	4.14		UNITY INFRASTRUCTURE	4-126		8.1	ABBR	EVIATONS AND ACRONYMS	8-1
			Existing Environment	4-126		8.2	GLOS	SARY	8-4
			Potential Impacts	4-128					
			Mitigation Measures	0	LIST	OF T	ABLES		
			and Management	4-131	Table	1-1	Pr	oject Snapshot	
	4.15	HAZAF	RD AND RISK	4-131	Table	1-2	Dii	Director-General's Environmental	
		4.15.1	Hazard Identification and Risk Assessment	4-131				sessment Requirements – Refer ımmary	ence
		4.15.2	Mitigation Measures and Management	4-132	Table	2-1		ovisional Surface Mobile Fleet for onstruction/Development Works	r
	4.16	VISUA	L CHARACTER	4-132	Table			ovisional Mine Schedule	
		4.16.1	Existing Environment	4-133					Mahila
		4.16.2	Potential Impacts	4-133	Table	2-3		ajor Underground Equipment and eet	MODILE
		4.16.3	Mitigation Measures and	4-135	Table	2-4		ajor Surface Mobile Fleet	
			Management		Table			ovisional Project Coal Reject	
5	۵۵۵۱	)   DTI\/E	MANAGEMENT AND		Table	2-3		anagement Strategy	
J		ABILITA	_	5-1	Table	2-6	_	oject Water Supply System	
	5.1	METRO	AM RESTORATION AT THE OPOLITAN COLLIERY	5-1	Table	2-7		astes Likely to be Generated by t oject	he
		5.1.1	Environmental Management and	E 1					
		5.1.2	Monitoring Hydraulic Conductivity of the Rock Bar and Pool Behaviour	5-4 5-4	Table	3-1	Ga	llues of the Royal National Park a arawarra State Conservation Area ational Heritage Place	
		5.1.3	Peer Review	5-6	Toble			· ·	
		5.1.4	Technology Transfer of	0 0	Table			tential Migratory Species	
		5.1.4	Restoration Techniques	5-6	Table			tential Marine Protected Species	
		5.1.5	Southern Coalfield Panel Report and Stream Restoration	5-6	Table	3-4	Ide	y Potential Environmental Issues entified in the Environmental Risk lalysis	
	5.2		TAH RIVULET ADAPTIVE GEMENT	5-7	Table	3-5		ernative Mine Orientation Layout	
		5.2.1	Evaluation Zones	5-9	Table	3-6		Immary of Predicted Maximum	
		5.2.2	Subsidence Assessment	5-9	1 0010			sidence and Closure	
		5.2.3	Monitoring	5-10 Table		ble 3-7	•		satory
		5.2.4	Trigger Mechanisms	5-10			Measures and Ecological Initiatives		
		5.2.5	Stream Restoration Commitment	5-11					



LIST OF TAB	LES (Continued)	LIST OF TAE	LIST OF TABLES (Continued)			
Table 4-1	Bureau of Meteorology Monitoring Station Locations and Recording	Table 4-25	Air Quality Standards/Assessment Criteria for Particulate Matter Concentrations			
Table 4-2	Periods Relevant Meteorological Information	Table 4-26	Average Dust Deposition Rates (g/m²/month)			
Table 4-3	Summary at Shallow Groundwater Monitoring Sites (March 2007 to	Table 4-27	Average Weekday Daily Traffic Volumes by Haulage Route (veh/day)			
Table 4-4	February 2008) Waratah Rivulet, Woronora River and	Table 4-28	Average Annual Traffic Growth Rates (1994 to 2003)			
Table 4-5	O'Hares Creek Gauging Stations Summary of Water Quality Monitoring	Table 4-29	Relevant Intersection Performance – Surveyed Traffic Flows 2007			
Table 4-6	Sites – Waratah Rivulet  Pollution Reduction Programmes	Table 4-30	Predicted Average Weekday Traffic Flows on the Local Road Network			
	Related to Surface Water Management	Table 4-31	Contributions to Gross Regional Product,			
Table 4-7	Vegetation Communities Identified within the Project Underground Mining Area and Surrounds		Employment and Output by Industry Sector – Illawarra SD and NSW (2005 to 2006)			
Table 4-8	Threatened Flora Species Recorded during Baseline Flora Surveys	Table 4-32	Illawarra and NSW Observed and Predicted Population Growth Rate			
Table 4-9 Table 4-10	Native Terrestrial Fauna Species Threatened Terrestrial Fauna Species	Table 4-33	Distribution of the Illawarra Population by Age Group			
Table 4-10	Recorded during Baseline Fauna	Table 4-34	Unemployment in the Illawarra Region			
Table 4-11	Surveys Summary of the Previous and Project	Table 4-35	Housing Stock in the Illawarra Region (Occupied Dwellings Only)			
	Aboriginal Heritage Consultation/Survey Programme	Table 4-36	Illawarra Region Hotels and Motels			
Table 4-12	Known Aboriginal Heritage Sites within	Table 4-37	Education in the Illawarra Region			
the Project Underground Mining Area and Surrounds		Table 4-38	Employment in Health and Community Services in the Illawarra SD			
Table 4-13	Archaeological Significance of	Table 5-1	Congris Trigger and Response Plan			
	Aboriginal Heritage Sites within the Project Underground Mining Area and Surrounds	Table 5-2	Generic Trigger and Response Plan  Metropolitan Coal Project Compensatory  Measures and Ecological Initiatives			
Table 4-14	Identified Items of Heritage Significance at Metropolitan Colliery Surface		•			
T-1-1- 4.45	Facilities	LIST OF FIG	LIST OF FIGURES			
Table 4-15	Identified Items of Heritage Significance Located in Close Proximity to the Project Underground Mining Area	Figure 1-1	Regional Location			
Table 4-16	Potential Impacts on Listed Items of Heritage Significance within the Major	Figure 1-2	Aerial Photograph of the Project Area and Surrounds			
T.I. 4.47	Surface Facilities Area	Figure 1-3	Aerial Photograph of the Metropolitan Colliery Major Surface Facilities Area			
Table 4-17	Relative Scale of Various Noise Sources	Figure 1-4a	Relevant Land Ownership Plan			
Table 4-18	Noise Environment for Project Assessment Purposes	Figure 1-4b	Relevant Land Ownership List			
Table 4-19	Unattended Traffic Noise Logger Results	Figure 2-1	General Arrangement of the Project			
Table 4-20	Project Specific Intrusive Noise Assessment Criteria	Figure 2-2	General Arrangement of the Major Surface Facilities Area			
Table 4-21	Project Specific Amenity Noise	Figure 2-3	Indicative Stratigraphy in the Project Area			
	Assessment Criteria – Non-Residential Landuses	Figure 2-4	Project Development Schedule			
Table 4-22	Applicable Road Traffic Noise Goals	Figure 2-5	Materials Handling Schematic Flowsheet			
Table 4-23	Relevant Rail and Road Damage and	Figure 2-6	CHPP Schematic Flowsheet			
Table 4-24	Annoyance Vibration Criteria  Predicted Number of Dwellings in the	Figure 2-7	Longwall Mining Method - Conceptual Cross Section and Plan			
Table 4-24	Noise Affectation and Noise  Management Zones Existing	Figure 2-8	Project Water Management Schematic			
	Metropolitan Colliery and Project Years 3 and 15	Figure 3-1	Wollongong Local Environmental Plan Zoning			
		Figure 3-2	Mine Plan Orientation - Alternative Layouts			



LIST OF FIGURES (Continued)				
Figure 4-1	Annual and Seasonal Wind Roses – Metropolitan Colliery			
Figure 4-2	Diagrammatic Representation of Subsidence Related Flow Diversion			
Figure 4-3	Groundwater Monitoring Locations			
Figure 4-4	Schematic - Longwall Mining and Subsidence Profile			
Figure 4-5	Mapped Upland Swamps in the Project Underground Mining Area and Surrounds			
Figure 4-6	Surface Water Monitoring Locations			
Figure 4-7	Comparative Streamflow Graphs of Waratah Rivulet, Woronora River and O'Hares Creek			
Figure 4-8	Recorded Stream Flow Hydrograph – Waratah Rivulet and Comparison of Modelled Flow Losses			
Figure 4-9	Woronora Reservoir Cumulative Inflows and Recorded Iron Concentrations			
Figure 4-10	Observed Iron Concentrations Waratah Rivulet			
Figure 4-11	Observed Manganese Concentrations Waratah Rivulet			
Figure 4-12	Observed Electrical Conductivities Waratah Rivulet			
Figure 4-13	PUR Restoration Graphs Pools – A, F and H			
Figure 4-14	Aquatic Ecology Sampling Locations			
Figure 4-15	Mapped Vegetation Communities			
Figure 4-16	Threatened Flora Recorded During the Surveys			
Figure 4-17	Threatened Fauna Recorded During the Surveys			
Figure 4-18	Aboriginal Heritage Sites			
Figure 4-19	Relevant Non-Aboriginal Heritage Areas, Traffic Noise and Air Quality Monitoring Sites			
Figure 4-20	Year 3 Predicted Project Night-time L <sub>Aeq(15minute)</sub> Intrusive Noise Contours – Calm Conditions			
Figure 4-21	Year 3 Predicted Project Night-time L <sub>Aeq(15minute)</sub> Intrusive Noise Contours – North Wind			
Figure 4-22	Year 15 Predicted Annual Average Dust Deposition Concentrations (g/m²/month) from the Project			
Figure 4-23	Year 15 Predicted Maximum 24-hour Average $PM_{10}$ Concentrations ( $\mu g/m^3$ ) from the Project			
Figure 4.24	Voor 15 Prodicted Appual Average PM.			

Year 15 Predicted Annual Average  $PM_{10}$  Concentrations ( $\mu g/m^3$ ) from the Project

### LIST OF FIGURES (Continued)

Waratah Rivulet – Rock Bars WRS1, WRS3 and WRS4 to WRS8
Drill Core - Filling of Cracks with PUR
PUR Restoration Graphs – Pools A, F and H
Adaptive Management Approach – Risk Management Zones
Adaptive Management Approach – Contingency Measures

#### LIST OF ATTACHMENTS

Attachment 1	Director-General's Environmental Assessment Requirements
Attachment 2	Project Application Area
Attachment 3	Peer Review Letters

#### LIST OF APPENDICES

Appendix A	Subsidence Assessment
Appendix B	Groundwater Assessment
Appendix C	Surface Water Assessment
Appendix D	Aquatic Ecology Assessment
Appendix E	Baseline Flora Survey
Appendix F	Terrestrial Vertebrate Fauna Survey
Appendix G	Terrestrial Flora and Fauna Impact Assessment
Appendix H	Aboriginal Cultural Heritage Assessment
Appendix I	Non-Aboriginal Heritage Assessment
Appendix J	Noise Impact Assessment
Appendix K	Air Quality Impact Assessment
Appendix L	Traffic Assessment
Appendix M	Socio-Economic Assessment
Appendix N	Preliminary Hazard Analysis
Appendix O	Environmental Risk Analysis

Figure 4-24

