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11 February 2020

Department of Planning, Industry and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Mr Mike Young

Dear Mr Young

RE: WAMBO COAL MINE DEVELOPMENT CONSENT (DA 305-7-2003) – APPOINTMENT OF SUITABLY QUALIFIED AND EXPERIENCED PERSONS AND INTERACTION WITH COMPLEX-WIDE MANAGEMENT PLANS

Interaction between Longwalls 21 to 24 Extraction Plan and Complex-wide Management Plans

Wambo Coal Pty Ltd (WCPL) is currently preparing an Extraction Plan for the next set of longwall panels at the South Bates Extension Underground Mine (i.e. Longwalls 21 to 24). Longwall 21 is scheduled for commencement on 19 October 2020. To allow for the 90 business day assessment period, the Longwalls 21 to 24 Extraction Plan is anticipated to be submitted by the end of April 2020.

The modified Development Consent issued after the determination of the United Wambo Joint Venture Project (MOD 16) requires the preparation of updated complex-wide management plans. This includes the Water Management Plan (and associated sub-plans) and Biodiversity Management Plan which are also referenced as components of WCPL's Extraction Plans.

The complex-wide management plans are required to be updated and approved prior to the commencement of Phase 2 of the United Wambo Joint Venture Project. This is currently anticipated to commence in December 2020.

WCPL is developing these plans with the aim of targeting submission to the Department in July 2020 following consultation with the relevant parties specified in the Development Consent. This timing is aimed at providing the Department reasonable time for assessment prior to commencement of Phase 2 in December 2020.

Development of the complex-wide management plans includes time consuming components such as updating modelling (including the groundwater model), incorporating outcomes of the Longwalls 21-24 Extraction Plan and other works required to address new/revised Development Consent conditions.

Given this, WCPL anticipates that the complex-wide management plans will be in the process of being updating after the Extraction Plan for Longwalls 21 to 24 has been submitted (end April 2020).

WCPL does not envisage any issues relating to the South Bates Extension Underground Mine, and specifically the Longwalls 21 to 24 Extraction Plan, to arise during the update of the complex-wide management plans. This is because the updates will be primarily related to removing the open cut aspects of the site following approval of the United Wambo Joint Venture Project

Once the complex-wide management plans are assessed and approved, WCPL will review the Longwalls 21 to 24 Extraction Plan for any material inconsistencies and propose updates, as required. This would be undertaken in consultation with the Department.

Notwithstanding, WCPL is able to include some of the complex-wide management plans that require more simple updates in the Longwalls 21-24 Extraction Plan. A summary table of the plans that will be updated and included in the Longwalls 21-24 Extraction Plan is provided below.

Plan	Updated for LW21-24 Extraction Plan
Longwalls 21-24 Water Management Plan	✓
Surface Water Monitoring Program*	×
Groundwater Monitoring Program*	×
Surface and Groundwater Response Plan*	×
Erosion and Sediment Control Plan*	×
Site Water Balance*	×
Longwalls 21-24 Land Management Plan	✓
Biodiversity Management Plan	✓
Heritage Management Plan	✓
Longwalls 21-24 Built Features Management Plan	✓
Longwalls 21-24 Public Safety Management Plan	✓
Longwalls 21-24 Coal Resource Recovery Plan	✓
Longwalls 21-24 Subsidence Monitoring Program	✓
Rehabilitation Management Plan/Mining Operations Plan	✓

*Currently approved version will be included in the LW21-24 Extraction Plan

Both the Longwalls 21 to 24 Extraction Plan and the complex-wide management plans require endorsement by the Secretary of suitably qualified and experienced person/s. The below sections describe the teams that WCPL propose to prepare these documents.

Extraction Plan for Longwalls 21 to 24 – Suitably Qualified and Experienced Persons

WCPL is currently preparing an Extraction Plan for Longwalls 21 to 24 at the South Bates Extension Underground Mine.

We refer to Condition B7, Schedule 2 of the Development Consent (DA 305-7-2003) for the Wambo Development Project:

> *B7. The Applicant must prepare an Extraction Plan for all second workings on the site to the satisfaction of the Planning Secretary. Each Extraction Plan must:*
>
> *(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;*
>
> *…*

In accordance with Condition B7, Schedule 2 of the Development Consent (DA 305-7-2003), WCPL kindly requests the endorsement of the Secretary of the team outlined in this letter and listed below, as suitably qualified and experienced persons for the review and preparation of the Longwalls 21 to 24 Extraction Plan.

Complex-wide Water Management Plan and Biodiversity Management Plan – Suitably Qualified and Experienced Persons

WCPL is also currently preparing updated versions of the complex-wide Water Management Plan and Biodiversity Management Plan.

We refer to Conditions B66 and B75, Schedule 2 of the Development Consent (DA 305-7-2003) for the Wambo Development Project:

> *B66. The Applicant must prepare a Water Management Plan for the Wambo Mining Complex to the satisfaction of the Planning Secretary. This plan must:*
>
> *(a) be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;*
>
> *…*
>
> *B75. The Applicant must prepare a Biodiversity Management Plan to the satisfaction of the Planning Secretary. This plan must:*
>
> *(a) be prepared by a suitably qualified and experienced person/s;*
>
> *…*

In accordance with Conditions B66 and B75, Schedule 2 of the Development Consent (DA 305-7-2003), WCPL kindly requests the endorsement of the Secretary of the team outlined in this letter and listed below, as suitably qualified and experienced persons for the preparation of the complex-wide Water Management Plan and Biodiversity Management Plan.

Background of Suitably Qualified and Experienced Persons

WCPL considers that the proposed team is suitable for preparation of the Extraction Plan, Water Management Plan and/or Biodiversity Management Plan. The curriculum vitae of the primary contributing suitably qualified and experienced persons are attached with a summary provided below.

Team Member	Role
Dr James Barbato (Mine Subsidence Engineering Consultants)	Preparation of relevant subsidence components, including prediction of subsidence effects and assessment of potential impacts.
Dr Noel Merrick (SLR Consulting Pty Ltd)	Preparation of relevant groundwater components.
Mr Rohan Lucas (Alluvium)	Preparation of relevant surface water components.
Mr Peter Kuskie (South East Archaeology)	Provision of advice on monitoring and management of Aboriginal cultural heritage sites.
Mr Martin Sullivan (Eco Logical Australia)	Provision of advice on biodiversity monitoring and management measures.
Mr Joshua Hunt (Resource Strategies)	Preparation of management plans and overall Extraction Plan documentation.

The following experienced WCPL employees would also be involved in preparation of the Extraction Plan, Water Management Plan and/or Biodiversity Management Plan.

Team Member	Role
Mr Peter Jaeger (Manager: Environment & Community)	Responsible for review, sign-off and implementation of the Extraction Plan.
Mrs Nicole Dobbins (Senior Environmental Advisor)	Review of management plans and overall Extraction Plan documentation.
Mr Michael Berry (Technical Services Manager)	Review of management plans and overall Extraction Plan documentation.
Mr Malcolm Walker (Registered Mine Surveyor)	Preparation of survey plans.

Dr Barbato

Mine Subsidence Engineering Consultants Pty Ltd (MSEC) is a private engineering consultancy company specialising in the fields of mine subsidence prediction and mine subsidence impact assessment. Dr Barbato is an associate director at MSEC and has written or co-written more than 300 subsidence prediction and assessment reports. Dr Barbato has significant experience at Wambo, having undertaken subsidence assessments in support of several Extraction Plan and Modification applications.

Dr Barbato has been involved in recent subsidence studies for the Wambo Coal Mine, including development of the subsidence components of the approved South Bates Extension Underground Mine Extraction Plan for Longwalls 17 to 20.

Dr Merrick

Dr Merrick is a senior groundwater modeller, hydrogeologist and geophysicist with decades of experience in groundwater science. Dr Merrick has extensive experience with numerical modelling, assessment and modelling of groundwater/surface water interactions and groundwater impact assessment for infrastructure and mining projects.

As author of the peer review section of the Murray Darling Basin Commission groundwater flow model guidelines, Dr Merrick has been heavily involved in peer reviewing modelling studies for coal mines in New South Wales, Victoria and Queensland, and he actively builds groundwater models for open cut and longwall mines. Dr Merrick has been involved in recent groundwater studies for the Wambo Coal Mine, including development of the groundwater components of the approved South Bates Extension Underground Mine Extraction Plan for Longwalls 17 to 20, and completion of the Groundwater Assessment for MOD 17.

Mr Lucas

Mr Lucas has 25 years of experience in environmental and natural resource management with a focus on waterways. This experience has been gained in a consulting role to government and industry in Australia and Asia-Pacific. Mr Lucas is a Registered Professional Engineer Queensland (RPEQ).

Mr Lucas has significant experience in designing and managing diversions. In addition, he has experience in modelling, assessment, design and documentation of subsidence impact management on waterways and diversions. Alluvium staff (principally Rohan Lucas and Ross Hardie) were the authors of the ACARP diversion projects (C8030 and C9068) in 1999-2002 that have been adopted by the Queensland government as a guideline against which diversions have been assessed and licensed since. This body of work has recently been updated to provide current leading practice guidance on constructed diversions through ACARP projects C20017 and C23030.

Mr Lucas was also principal author of the *Isaac River cumulative impacts assessment of mine developments* (2008). This project developed the hierarchy for assessing subsidence impacts on waterways which has been adopted by Queensland Government as their guidance and is now routinely utilized in subsidence impact assessments, including the extraction plans at Wambo Coal Mine.

Mr Lucas has been involved in recent surface water studies for the Wambo Coal Mine, including development of the surface water components of the approved South Bates Extension Underground Mine Extraction Plan for Longwalls 17 to 20.

Mr Kuskie

Mr Kuskie is the director of South East Archaeology with 29 years experience in Aboriginal cultural heritage issues, Aboriginal community consultation, and legislative requirements. Mr Kuskie's experience includes conducting surface surveys, salvage collections and excavations. He has prepared Indigenous and non-Indigenous components of environmental impact statements, Aboriginal Heritage Impact Permit applications, Aboriginal Heritage Management Plans and Aboriginal Heritage Impact Assessments compliant with Office of Environment and Heritage, Department of Planning and Environment and other Government requirements. Mr Kuskie has strong familiarity with the area, having completed surveys at the Wambo Coal Mine.

Any updates to the Heritage Management Plan based on the advice of Mr Kuskie will be implemented by WCPL and subject to consultation with the Aboriginal community and the Office of Environment and Heritage.

Mr Sullivan

Mr Sullivan is the Principal Ecologist and Discipline Leader Ecology & Impact Assessment for Eco Logical Australia with more than 10 years of experience in biodiversity related issues. Mr Sullivan has been involved in the preparation of multiple Biodiversity Management Plans, Rehabilitation Management Plans and monitoring programs. Eco Logical Australia has been involved at the Wambo Coal Mine for a number of years and has a comprehensive understanding of the site.

Updates to the Biodiversity Management Plan will be based on the advice of Mr Sullivan and subject to consultation with DPIE and the Office of Environment and Heritage.

Mr Hunt

Mr Hunt has extensive experience in environmental impact assessment for the mining sector, and was project manager for the Wambo Development Project Environmental Impact Statement (Resource Strategies, 2003) and the currently approved South Bates Extension Underground Mine Extraction Plan for Longwalls 17 to 20 (as well as other previously approved Extraction Plans at Wambo Coal Mine). Mr Hunt has also managed the preparation of a number of Metropolitan Coal Subsidence Management Plans and Extraction Plans.

Summary

It would be greatly appreciated if the Department would consider the above details regarding the qualifications and experience of the persons proposed to review and prepare the Extraction Plan, Water Management Plan and/or Biodiversity Management Plan and provide the Secretary's endorsement in accordance with Conditions B7(a), B66(a) and B75(a), Schedule 2 of the Development Consent (DA 305-7-2003).

It would also be appreciated if the Department could confirm if the interaction between the Longwalls 21 to 24 Extraction Plan and complex-wide management plans (and associated timing) outlined above is suitable.

If you have any queries or would prefer to organise a meeting to discuss, please do not hesitate to contact Nicole Dobbins, Senior Environmental Advisor on (02) 6570 2209.

Yours faithfully

Peter Jaeger
Manager: Environment & Community
WAMBO COAL PTY LIMITED

Enclosure 1. Dr James Barbato's Curriculum Vitae.
Enclosure 2. Dr Noel Merrick's Curriculum Vitae.
Enclosure 3. Mr Rohan Lucas' Curriculum Vitae.
Enclosure 4. Mr Peter Kuskie's Curriculum Vitae.
Enclosure 5. Mr Martin Sullivan's Curriculum Vitae.
Enclosure 6. Mr Joshua Hunt's Curriculum Vitae.

ENCLOSURE 1

DR JAMES BARBATO'S CIRRICULUM VITAE

Dr James Barbato, Associate Director

Company:	Mine Subsidence Engineering Consultants Pty Ltd
Profile:	James Barbato has had 8 years' experience as a structural engineer and 15 years' experience as a specialist in mine subsidence engineering. His roles include the prediction, assessment and management of mine subsidence due to underground mining. Specialist advice is provided to manage potential impacts to surface infrastructure and natural features and to minimise risk to public safety.
Education:	Bachelor of Engineering (Civil, Hons.), 1995 UNSW – School of Civil Engineering Doctorate of Philosophy (PhD), 2017 UNSW – School of Mining Engineering
Affiliations:	MIEAust, CPEng, NER

James joined Mine Subsidence Engineering Consultants (MSEC) in July 2004 and has worked on many subsidence studies and reports, some of which are listed below. He has extensive experience in the prediction of mine subsidence parameters, the assessment of mine subsidence impacts on natural features and built features and the development of strategies to manage the potential impacts from mine subsidence.

He has been deeply involved in developing the analytical methods to improve the speed and reliability of subsidence predictions. Software has been developed using C++, Java and SQL for the subsidence prediction models, survey database and libraries. The survey database is now one of the largest collections of ground monitoring data for underground longwall mining in Australia.

James has completed post graduate research at the University of New South Wales in 2017. The title of the thesis is *Development of improved methods for the prediction of horizontal movement and strain at the surface due to longwall coal mining*.

He has written or co-written more than 300 subsidence prediction and assessment reports and has been involved in a number of Technical Committees to manage the potential subsidence impacts on natural and built features.

Some recent projects in which James has been involved include the following:

- Appin Longwalls 705 to 710 – co-author of subsidence report to support the SMP Application, including mining beneath the M31 Hume Highway and the Main Southern Railway;
- Appin Longwalls 901 to 904 – subsidence report to support the Extraction Plan Application, including mining beneath the Main Southern Railway;
- Dendrobium Mine – subsidence reports to support the Modification, SMP and Extraction Plan Applications for Areas 2, 3A, 3B, 5 and 6;
- Integra Underground Longwalls 13 to 16 – subsidence predictions and the Management Plans for mining beneath the Mt. Owen Railway and Bridges;
- Maxwell Project – subsidence report to support the Environmental Impact Statement;
- Tahmoor Longwalls 26 to 30 – co-author of the subsidence report to support the SMP Application including mining beneath houses, services and other built infrastructure; and
- Wambo Coal Mine – subsidence reports to support the Modification and Extraction Plan Applications for the North Wambo Underground Mine, South Bates Underground Mine and South Bates Extension Underground Mine.

James is a current member of the Mine Subsidence Technological Society (MSTS) and has been involved in the preparation of the previous four conferences (2007, 2011, 2014 and 2017), which included the review of technical papers, compilation of the conference proceedings and organisation of the presentations.

He has also assisted in two ACARP Research projects and have presented or co-authored a number of technical papers including:

1. Waddington, A.A. and Barbato, J.P. *The Undermining of Railways*. Mine Subsidence Technological Society, Sixth Triennial Conference – Subsidence Management Issues. Maitland, October-November 2004, pp. 173-182.
2. Barbato, J.P., Kay, D.J., Pinkster, H. & de Somer, B. *Monitoring of subsidence movements at major infrastructure.* Seventh AusIMM Australasian Institute of Mining and Metallurgy Underground Coal Operators Conference on Sustainable Coal Mine Development. University of Wollongong, 2006, pp. 305-312.
3. Kay, D.J., Barbato, J.P., Brassington, G. & de Somer, B. *Impacts of Longwall Mining to Rivers and Cliffs in the Southern Coalfield*. Seventh AusIMM Australasian Institute of Mining and Metallurgy Underground Coal Operators Conference on Sustainable Coal Mine Development. University of Wollongong, 2006, pp. 327-336.
4. Kay, D.R., Barbato, J.P. & Mills, K.W. *Review of Mechanisms resulting in Observed Upsidence and Closure Movements.* Mine Subsidence Technological Society, Seventh Triennial Conference, University of Wollongong, Nov. 2007, pp. 197-205.
5. Barbato, J.P. & Sisson, S.A. *Analysis of Mining Induced Strains*. Mine Subsidence Technological Society, Eighth Triennial Conference, Management of Subsidence: State of the Art, Pokolbin, 15 to 17 May 2011, pp. 15-24.
6. Barbato, J.P. & Garlinge, S. *Continuous Monitoring of Longwall Undermining – Blakefield South LW1*. Mine Subsidence Technological Society, Eighth Triennial Conference, Management of Subsidence: State of the Art, Pokolbin, 15 to 17 May 2011, pp. 131-136.
7. Waddington, A.A., Barbato, J.P., Bullock, D.W. & Kay, D.J. *The Assessment of Subsidence Impacts on Building Structures*. Mine Subsidence Technological Society, Eighth Triennial Conference, Management of Subsidence: State of the Art, Pokolbin, 15 to 17 May 2011, pp. 155-166.
8. Barbato, J.P., Brassington, G. and Walsh, R. *Valley Closure Impact Model for Rockbar Controlled Streams in the Southern Coalfield.* Mine Subsidence Technological Society, Ninth Triennial Conference, Mine Subsidence: Risk Management in Action, Pokolbin, NSW, 11 to 13 May 2014.
9. Barbato, J., B. Hebblewhite, R. Mitra, and K. Mills (2016). *Review of horizontal surface movements due to longwall coal mining using numerical modelling*. In: Proceedings of the Coal Operators Conference. University of Wollongong, 10-12 February 2016, pp. 213-223.
10. Barbato, J., B. Hebblewhite, R. Mitra, and K. Mills (2016). *Prediction of horizontal movement and strain at the surface due to longwall coal mining*. In: International Journal of Rock Mechanics and Mining Sciences, Volume 84, April 2016, pp. 105-118. https://doi.Org/10.1016/j.ijrmms.2016.02.006.
11. Barbato, J., B. Hebblewhite, R. Mitra, K. Mills, and A. Waddington (2017). *Development of predictive methods for strain at the surface due to longwall coal mining*. In: Mining Technology, October 2017. http://dx.doi.org/10.1080/14749009.2017.1386815.
12. Barbato, J., et al. (2017). *Development of Predictive Methods for Horizontal Movement and Strain at the Surface due to Longwall Mining*. Proceedings of the tenth triennial Mine Subsidence Technological Society Conference, Pokolbin, Hunter Valley, NSW, 5-7 November 2017. pp. 207-222.

ENCLOSURE 2

DR NOEL MERRICK'S CURRICULUM VITAE

CURRICULUM VITAE

NOEL MERRICK

TECHNICAL DIRECTOR

HYDROGEOLOGY, Asia-Pacific

QUALIFICATIONS

PhD	2000	PhD, Groundwater Management, University of Technology, Sydney, NSW, Australia
Grad Dip	1980	Graduate Diploma, Data Processing, NSW Institute of Technology, NSW, Australia
M Sc	1977	Master of Science, Research (Geophysics), University of Sydney, NSW, Australia
B Sc	1971	Bachelor of Science, University of Sydney, NSW, Australia

EXPERTISE

- Peer Reviewer using groundwater flow modelling guidelines for mines in NSW, VIC, WA, QLD
- Groundwater modeller
- Hydrogeologist and geophysicist
- Water Resource Investigations
- Environmental Impact Assessment
- Contaminated Site Assessment
- Quarry Projects

Noel is a groundwater modeller, hydrogeologist and geophysicist with over 45 years of experience in groundwater science. He retired in May 2009 from the University of Technology, Sydney where he was Associate Professor and Director of the National Centre for Groundwater Management. He ran courses in Groundwater Modelling, Groundwater Geophysics and Groundwater Policy and Management. As a researcher, he pioneered methods for resource sustainability quantification and management, particularly using optimisation techniques and has been engaged in research projects with the Aquaculture, Rice, Cotton and Contaminant CRCs. He was a member of the NSW working group that drafted the State Groundwater Policy documents and advised the Office of Water on prescriptive elements of the Aquifer Interference Policy (2012).

Noel has participated on a number of expert panels as the water expert for the NSW government. He regularly reviews groundwater resource models for Commonwealth, WA, QLD, VIC and SA government departments. He has been longtime member of the Murray-Darling Basin Independent Audit Group – Salinity, covering the ACT and the basin States and on a Technical Advisory Panel for the Department of Environment, Land, Water and Planning (Victoria)

Currently, he is a member of the Surat CMA Technical Advisory Panel for the Office of Groundwater Impact Assessment (Queensland). He has presented expert witness opinions at several court cases; NSW Land and Environment Court (Sydney, Singleton), QLD Land Court (Brisbane, Townsville), New Zealand High Court (Wellington) and NZ Environment Canterbury Water Allocation Hearing (Christchurch).

Having authored the peer review section of MDBC groundwater flow modelling guidelines, he has been heavily involved in peer reviewing modelling studies for mines in New South Wales Victoria, Western Australia and Queensland.

PROJECTS

	Suitably Qualified Expert
Foxleigh Mine Groundwater Monitoring Plan	Federal Department of the Environment.

Wilpinjong Coal Surface and Ground Water Response Plan	Department of Planning and Environment.
Metropolitan Mine, Extraction Plans	Department of Planning and Environment – Metropolitan Mine LW20-22, LW23-27, LW301-303 Extraction Plans.
Stratford Coal Mine Groundwater Management Plan	Department of Planning and Environment.
	Mining Projects
Development of Longwall Coal Models	South Galilee and Galilee (QLD), Metropolitan, Bulli Seam Operations. Dendrobium and Tahmoor (Southern Coalfield), Ulan and Wilpinjong (Western Coalfield), Narrabri and Caroona (Gunnedah Coalfield), Wambo, Spur Hill and Doyles Creek (Hunter Coalfield, NSW).
Development of Open Cut Models	Duralie and Stratford (Gloucester), Tarrawonga and Vickery (Gunnedah), Ensham (QLD).
Development of Lithium Mine, Argentina	Development of density-coupled solute model for lithium mine.
Peer Reviews of numerous mining models	Carmichael (Galilee, Qld), Clermont Qld, Kestrel Gregory Crinum Qld, Coppabella Qld, Latrobe Vic, Phulbari (Bangladesh), Bickham, Abel, Moolarben, Wilpinjong, Boggabri, Ulan, Dendrobium, Ashton, Narrabri, Maules Creek, Caroona, Watermark, Mt Owen, Liddell, Drayton South, West Wallsend, Neubeck, Mandalong, Werris Ck, Airly, United, Gloucester Gas Project, Brandy Hill, Bylong, Awaba, Dartbrook, United, Integra, Mangoola, Glendell (all NSW), etc.
	Quarrying Projects
Somersby Fields Project (Sand Quarry)	Membership of the IHAP Panel for the Somersby Fields Project.
Calga Sand Quarry	Development of a groundwater model
Expert Witness Testimony	Rocla's Calga Sand Quarry; Carwell Limestone Quarry, East End Limestone Quarry.
Peer Review of groundwater assessments	Central Coast Sands Quarry, Somersby; Brandy Hill Quarry, Raymond Terrace; Balranald mineral sands; Hawsons iron.
	Water Resource Investigations
Development of Finite element groundwater flow model	Port Botany reclamation; Sydney Airport Third Runway; Eastern Distributor & Airport Link tunnels (Sydney)
Development of Regional Water Resource Models	Lower Namoi, Mooki, Botany Sands, Buronga (all NSW).

Development of Solute Transport Models	Buronga, Helensburgh.
Peer Reviews of numerous models and groundwater investigations	▪ Infrastructure (Badgery's Creek airport, Epping-Chatswood Rail Link), ▪ Water supply: Parkes-Forbes, Upper Namoi, Murrumbidgee, Upper Nepean (NSW); Perth, Pilbara, Albany (WA); Bribie Island. North Stradbroke Island, Pioneer (Qld); Adelaide Plains (SA); Corangamite, Loddon, Campaspe, Anglesea (Vic); Murray-Darling Basin (3 states); Canterbury (NZ); Baruun Naran (Mongolia), ▪ Sewage (Gerringong; Cronulla) and waste (Castlereagh), ▪ Contamination (Botany; Mascot; Homebush; Pasminco & Incitec Newcastle), ▪ Irrigation (Swagman-Farm software; Coleambally NSW; Werribee Vic) and salinity (Padthaway SA, Eastern Mallee NSW/Vic), ▪ Seawater intrusion (Pioneer Qld; Uley SA; Albany WA), swamps (Newnes NSW).
	Environmental Impact Assessment
Preparation of groundwater assessments	Baralaba, Galilee and South Galilee (Qld); Metropolitan, Bulli Seam
Development of water level and water quality triggers management plans	Metropolitan Mine NSW; Duralie NSW; Stratford NSW; Springvale NSW; Angus Place NSW. Peer review: Foxleigh, Qld.
	Contaminated Site Assessment
Development of groundwater contamination models	Botany Sands (Orica); Boolaroo (Pasminco); Boolaroo (Incitec); Sydney Domestic Airport; Mt Piper (Delta Electricity); Blenheim (NZ).

PROFESSIONAL TRAINING

Supervisor	Supervision of 20 PhD research projects
Supervisor	Supervision of 72 Masters research projects.
Presenter	Specialist introductory and advanced modelling short courses from 1997
Chairman/presenter	"Water in Coal Mining" schools 2011 (Brisbane), 2012 (Newcastle)
Chairman/presenter	"Water in Mining" school 2013 (Adelaide)
Academic Lecturer	From 1987 to 2009
Presenter	National Groundwater Schools (1975+)

PUBLICATIONS	Insert details of any publications here. Delete section if not required
	Keynote Speaker at seven conferences (four international)
	500 report and journal publications.
	Associate Editor for international *Hydrogeology Journal* (5 years)

ENCLOSURE 3

MR ROHAN LUCAS' CURRICULUM VITAE

Rohan Lucas

Education and training:

Bachelor of Engineering (Honours) (Environmental)
University of Melbourne, 1996

Bachelor of Science (Earth Sciences)
University of Melbourne, 1994

Other ongoing training in river sciences and engineering

Industry affiliations:

Registered Professional Engineer Queensland (RPEQ)

Engineers Australia

Professionals Australia

Institute of Engineers in Papua New Guinea

Rohan is a Principal Consultant – Environmental Engineering and Geomorphology and Director of Alluvium Consulting. He has over 20 years' experience in environmental and natural resource management with a focus on waterways. This experience has been gained in a consulting role to government and industry in Australia and Asia-Pacific for the assessment, design, review and implementation of waterway management and rehabilitation programs and of the interactions of resource and infrastructure projects with surface water systems and the risks posed to each other.

Rohan has had extensive involvement in the planning and implementation of catchment and watercourse management programs for Catchment Management Authorities or equivalents in Queensland, Victoria, South Australia and New South Wales. Rohan also has extensive experience with private industry clients including mining and gas companies and infrastructure developers and associated regulator engagement across Australia and parts of the Asia-Pacific.

Key skill areas:

- Fluvial geomorphology, hydrology and hydraulics
- Design, rehabilitation and monitoring of waterway diversions for mining companies
- Watercourse rehabilitation program priority setting, design and implementation of works
- Waterway crossing assessments for large linear infrastructure projects
- Mining related subsidence impact assessment and management measures for waterways
- Development impact assessment on waterways
- Programs – RORB, HECRAS, 12d Model, Chute, RipRap

Relevant projects:

Project	Description	Role	Client	Year
Surface Water Technical Report for South Bates Underground Extraction Plan	Geomorphology and surface water exisiting conditions and impact assessment of longwalls LW11-16 at Wambo Coal Mine.	Project Director, Geomorphologist	Wambo Coal	2016-17
North Wambo Creek Diversion review of condition	Development and implementation of a monitoring program to understand diversion condition and condition trajectory.	Principal Engineer /Geomorphologist	Wambo Coal	2016-18
Wilpinjong Mine final landform	Regional assessment of geomorphology of valley and waterway character and behaviour to inform design of final landforms and their hydrologic and geomorphologic characteristics.	Principal Engineer /Geomorphologist	Wilpinjong Coal	2016-18

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Project	Description	Role	Client	Year
waterway requirements				
Murragamba and Eastern Creek diversion designs	Concept designs of diversions at Moolarben Coal Mine that optimise environmental outcomes associated with the mine plan and final landforms	Principal Engineer /Geomorphologist	Moolarben Coal	2017
Sydney Basin Bioregional Assessment	Workshop to determine impacts of underground coal mining on water resources of the Sydney Basin Bioregion	Technical expert	Australian Government	2017
Sydney drinking water catchment audit	As required by legislation an audit of Sydney's drinking water supply catchments is required every three years.	Mining impacts chapter	NSW Government	2017
Western Slopes Pipeline EIS	Geomorphologic and flood behaviour assessments to inform the EIS of the Western Slopes Pipeline EIS from Narrabri to central southern NSW.	Geomorphologist	APA	2017-18
MRA diversion of Walker Creek	To allow continuation of the South Walker Creek mine in central Queensland a significant diversion of Walker Creek was required. This was undertaken from concept design, detail design, approvals and construction. Capital cost ~$25M.	Technical Director and principal Owners Engineer	BHP	2014-2017
Diversions at Roy Hill Mine	Review of designs, development and implementation of monitoring programs for diversions	Project Director, Engineer, Geomorphologist	Roy Hill	2016
Marillana Creek diversion	Expert review of proposed diversions of Marillana Creek at Yandi Mine	Project Director, Engineer, Geomorphologist	BHP Billiton	2016
Design and rehabilitation criteria for Bowen Basin River Diversions	Undertaken for the Australian Coal Association Research Program (ACARP) this project (C9068) developed design and rehabilitation criteria for diversions in mining in Australia. Prior to that design of diversions was often undertaken to empirical northern hemisphere rules of thumb. This resulted in very poor performance and a moratorium from the Queensland Government for 5 years. The criteria developed in the project have been adopted and utilised by the Queensland Government since as their guidelines.	Geomorphologist	ACARP	2001-2
Criteria for functioning river landscape units in mining and post mining landscapes	ACARP (http://acarp.com.au/abstracts.aspx?repId=C20017). This project reviewed the performance of diversions implemented since the C9068 project a decade earlier and incorporated best practice improvements internationally into a revised set of criteria for diversions in the mining industry. The project clearly demonstrated those implemented to the C9068 standard are performing much better than those which don't meet the standard.	Project director, geomorphologist	ACARP	2012-14
Collaborative performance trajectories for diversion approvals relinquishment	ACARP (http://acarp.com.au/abstracts.aspx?repId=C23030). This project developed a stakeholder assessment tool for assessing diversion condition and suitability for relinquishment of approvals by mining companies. The project also developed a vegetation condition trajectory tool to assist in the relinquishment process.	Project director	ACARP	2014-16
Subsidence Management Plans	Modelling, assessment, design and documentation of subsidence management plans for 4 major underground coal mines in central Queensland. These focus on the management of impacts to the waterways impacted by subsidence.	Project Director, Engineer, Geomorphologist	AAMC, Peabody, BMA	2011-2016
Waterway rehabilitation programs	Investigation, prioritisation, design and implementation of waterway rehabilitation programs for Victorian Catchment Management Authorities and River Murray Water	Geomorphologist, Engineer	CMA's	1998-2006
Isaac River cumulative impact assessment of mine developments	See https://www.ausimm.com.au/publications/epublication.aspx?ID=5407 as an explanation of project outcomes. QLD government have adopted the outcomes to utilise in a set of guidelines for subsidence impact assessment and management (Draft Central West Water Management and Use Regional Guideline 'Watercourse Subsidence – Central Qld Mining Industry')	Project manager, Geomorphologist	BHP Billiton Mitsubishi Alliance, Anglo American Metallurgical Coal and QLD government	2007-2009
Grosvenor EIS	Specialist waterway impact assessment input to EIS for proposed Grosvenor underground longwall mine near Moranbah, central	Project Director / Geomorphologist	AAMC	2010-2011

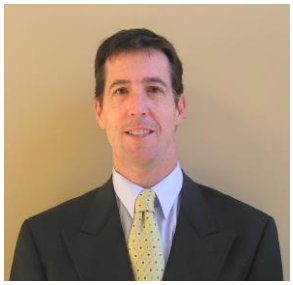
Project	Description	Role	Client	Year
	Queensland. Baseline condition assessment, monitoring program and modeling of potential impacts of proposed mine development.			
Murray River scoping study and implementation of management programs	A scoping study to manage the Murray River downstream of the major water storages and upstream of major offtakes. Development of actions plans with multi-stakeholder drivers to mitigate the impacts regulated river flow on river health, landholder values and economic benefit.	Project Engineer and Geomorphologist	River Murray Water	2000-2003
PNG-Queensland Gas Pipeline Feasibility Study	Geomorphic and hydrologic assessment of waterway crossings on pipeline route from Cape York to Gladstone and Charters Towers to Ballera (over 3,500km). Assessment of untreated and treated risk to the environmental values of the waterway and the in-service integrity of the pipe for in excess of 1,000 waterway crossings. Assessment involved digital aerial photography assessment in GIS, helicopter and ground survey.	Project Engineer and Geomorphologist	AGL-Petronas consortium	2005-06
Wallace South surface water management (Cloncurry)	Assessment of hydrologic, hydraulic and geomorphic character and behaviour of surface water systems at proposed mine development. Assessment and design of potential watercourse diversions to facilitate development.	Project Director and Geomorphologist	Copperchem and Exco	2015-
Cannington Mine open cut expansion studies	Surface water studies for the EIS involving hydrology, hydraulics, geomorphology and ecology of the surface water systems in the vicinity of the mine. Included assessment and design of multiple options for diversion of local river.	Project Director and Geomorphologist	BHP Billiton	2007-2011 and 2015-
Lady Annie Mine – Anthill project	Assessment of hydrologic, hydraulic and geomorphic character and behaviour of surface water systems at proposed mine development. Assessment and design of potential watercourse diversions to facilitate development.	Project Director and Geomorphologist	CST Minerals	2012-2014
Monitoring program for waterways and diversions in central Queensland mines	Development and application of best practice guidelines for design and rehabilitation of waterway diversions in central Queensland. Associated baseline condition and impact assessment, monitoring and evaluation.	Project director, Geomorphologist /Engineer	Mining companies and ACARP	Ongoing
Caval Ridge Diversions – Horse & Caval Creeks	Functional and detailed design of waterway diversions to facilitate open cut mine development. Following regulatory approval, diversions and associated levees are currently under construction with Alluvium providing oversight.	Project Director / Geomorphologist	BMA/Bechtel	2010 - ongoing
Back Creek Diversion detailed design and monitoring	Back Creek diversion attempts to recreate the natural features of the existing Back Creek as best as possible and includes a low flow channel, floodplain and terrace features constructed through spoil. A revegetation plan for the Diversion was developed and baseline monitoring undertaken in 2008. The diversion is being progressively constructed with the first round of construction monitoring undertaken in 2013.	Project Director / Geomorphologist	Millmerran Power Partners	2007 - ongoing
Bath Creek & Breaker Creek diversion design	Functional and detailed design of realignment options for existing diversions to meet new mining requirements and site closure requirements at Blair Athol mine.	Project Director / Geomorphologist	Rio Tinto	2009 - 2012
Foxleigh Plains EIS & Cockatoo Creek Diversions	Surface water component of EIS including, baseline assessment of waterway condition and processes through the proposed Foxleigh Plains MLA and existing Foxleigh mine operation. Project also included concept and functional designs for watercourse diversions on Cockatoo Creek, flood protection requirements and cumulative impact assessment.	Project Director / Geomorphologist	AAMC	2009 - 2012
Carlo Creek Diversion	Baseline condition assessment, monitoring program implementation, functional and detailed design of a diversion for Carlo Creek to allow open cut mine expansion.	Project Director / Geomorphologist	Ensham Resources	2008 - ongoing
Waterway Rehabilitation	Assessment, development of strategies and design of works to address impacts of flood event in early 2008 on the Nogoa River system through the mine site.	Project Director / Geomorphologist	Ensham Resources	2008
Spring Creek Diversion	Functional design of options to divert Spring Creek around proposed mining operations and rehabilitate an old reach of diverted creek. Geomorphic, hydrologic and hydraulic assessment of Spring Creek in	Project Director / Geomorphologist	BMA	2004-2005

Project	Description	Role	Client	Year
	the vicinity of the mine. Detailed design, technical specification and construction drawings.			
Boggy Creek Diversion Rehabiliation	Functional design of rehabilitation options for Boggy Creek diversion (2005). Design of rehabilitation measures for rock chutes in the diversion to meet licensing requirements, risk to mining operations and improved environmental management.	Project Director / Geomorphologist	Ensham Resources	2005
Crossbed Creek Diversion Rehabilitation	Functional design of rehabilitation options to meet environmental and mining requirements. Detailed design and implementation of monitoring program.	Project Director / Geomorphologist	BMA	2004 - 2007
Cherwell Creek Diversion Rehabilitation	Functional design of rehabilitation options to meet environmental and mining requirements for Cherwell Creek Diversion 1. Implementation of ongoing monitoring.	Project Director / Geomorphologist	BMA	2006
New Chum Creek Diversion Design	Functional design of options to divert New Chum Creek around proposed open cut coal mining operations. Geomorphic, hydrologic and hydraulic assessment of existing creek and potential diversion options.	Geomorphologist /Engineer	BMA	2005-2006
Harrow Creek Diversion Rehabilitation	Functional design of rehabilitation options to meet environmental and mining requirements. Detailed design, monitoring programme, technical oversight of construction, identifications of maintenance requirements for the Harrow Creek diversion through the mine site.	Geomorphologist /Engineer	BMA	2003-2006
Burdekin fish barriers	Fish barrier assessment and prioritisation project for the Burdekin River catchment	Geomorphologist	Dry Tropics NRM	2006-8
Bohle River environmental values	Assessment of values and threats in the Bohle River catchment, Townsville	Geomorphologist	Townsville City Council	2007

ENCLOSURE 4

MR PETER KUSKIE'S CURRICULUM VITAE

CURRICULUM VITAE



NAME: **(Mr) KUSKIE, PETER JAMES**

Position: Director, South East Archaeology Pty Limited

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Hughes ACT 2605

Telephone: (02) 6260 4439
Facsimile: (02) 6260 4439
Mobile: (0417) 691 231
Email: *peter@southeastarchaeology.com.au*
Web: *www.southeastarchaeology.com.au*

Relevant Employment Experience:

Consultant Archaeologist, South East Archaeology, 1989 - present.

Key projects as principal consultant include:

- Part 3A assessment of Ulan Coal Mine's Continued Operations Project near Mudgee, involving extensive survey of a 50 square kilometre area over 21 weeks, with in excess of 900 Aboriginal sites recorded, including open artefact sites, rock shelters, grinding grooves, scarred trees, stone arrangements and art sites (UCML/Glencore);
- Survey over a five week period, with over 1,000 Aboriginal sites recorded, and salvage excavations over a 27 week period at the 37 square kilometre Mount Arthur North Coal Mine (URS Australia, BHP Billiton);
- Part 3A and Part 4.1 State Significant Development assessments of major coal mining Projects, Extensions and Modifications including at Spur Hill (Spur Hill Management / Resource Strategies), Tasman (Donaldson Coal), Abel Mine (Ellemby Resources / Donaldson Coal), Bloomfield (Bloomfield Colliery), Wilpinjong (Peabody) and Moolarben (Yancoal);
- Part 3A assessment of the Australian Rail Track Corporation's 32 kilometre Maitland to Minimbah and 11 kilometre Minimbah to Wittingham rail upgrades in the Hunter Valley, involving surveys and mitigation measures (Hunter 8 Alliance);
- Pacific Highway Upgrades, including extensive survey and test excavations of the 37 kilometre Oxley Highway to Kempsey route near Port Macquarie and survey of the 27 kilometre Woolgoolga to Wells Crossing route near Coffs Harbour (GHD/RTA);
- Surveys, test excavations and salvage excavations for large residential developments at Thornton North in the Hunter Valley (Investa Property Group, County Property Group and Defence Housing Australia);
- Surveys and mitigation projects for numerous water and sewerage pipeline routes in the Hunter Valley and Central Coast (GHD, Hunter Water Corporation, Department of Commerce, Wyong Shire Council);
- Surveys and mitigation projects for The Vintage residential golf course (Stevens Group);
- Salvage and test excavations over an 18 week period for 'The Dairy' ('The Lakes') residential development near Ulladulla (Elderslie Property Investments) and over a 10 week period for Australian Property Growth Fund;

- Salvage excavations over a 12 week period at Lemington Mine, near Singleton (Lemington Coal Mines);
- Salvage excavations over a 14 week period of two Aboriginal sites along the F3 Freeway (M1) at Black Hill, near Maitland (RTA);
- Survey of BHP Petroleum and Westcoast Energy Australia's 740 kilometre long Eastern Gas Pipeline, from Longford, Victoria, to Wilton, NSW;
- Surveys of Optus Communications' mobile telecommunications network throughout NSW and Queensland and fibre optic cable network from Sydney to Brisbane and Cootamundra to Canberra (Optus Communications, Landscan);
- Survey for Dorrigo Three Year Environmental Impact Study (State Forests of NSW);
- Heritage studies at Coffs Harbour (Coffs Harbour and District Local Aboriginal Land Council), Bingie Bingie Point (Cobowra LALC) and the Hunter Valley (Mindaribba LALC);
- Excavations in Guam, Micronesia, USA (Dames and Moore, National Heritage Studies);
- Acting Senior Conservation Officer, Australian Heritage Commission (1993);
- Additional sub-surface investigations and salvage projects in NSW at numerous locations, including Rothbury (RTA), Thornton (GHD, Beechwood Homes, CPG, UrbisJHD), St. Georges Basin (Shoalhaven City Council), Cudmirrah National Park (DECCW), Bewong (Cowman Stoddart), Wollongong (Wollongong City Council), Merimbula (Ridge Consolidated, Bega Valley Shire Council, RTA and Bega Traditional Aboriginal Elders Council), Old Erowal Bay (Matrix Planning), Fishermans Paradise (Matrix Planning) and various locations (Optus Communications).
- Additional surveys throughout NSW, including:
  - Hunter Valley - numerous locations, such as Anna Bay, Bayswater, Beresfield, Cessnock, Fishermans Bay, Jerrys Plains, Lemington, Maitland, Rothbury, Singleton, Thornton, Tomago, Wambo and Wyong - for clients including Egis, Devine Erby Mazlin, GHD, HWC, Lemington Mine, MPE, Newcastle City Council, Rail Access Corporation and Umwelt;
  - Central Coast - numerous locations, including Wyong, Warnervale, Mardi, Wamberal, Ourimbah, Dora Creek, Toronto, Fennell Bay, Boolaroo, West Wallsend and Woy Woy - for clients including GHD, Department of Commerce, Wyong Shire Council and Connell Wagner;
  - South Coast - numerous locations, including Batemans Bay, Bendalong, Berry, Bewong, Broulee, Callala Beach, Cobargo, Congo, Conjola, Cudmirrah, Dapto, East Nowra, Eurobodalla NP, Fishermans Paradise, Jervis Bay NP, Kangaroo Valley, Lake Conjola, Milton, Moruya, Nowra, Potato Point, St. Georges Basin, West Dapto, Wollongong - for clients including Bullock Walters & Associates, Cowman Stoddart, Crescent Home Plan & Design Service, Eurobodalla Shire Council, Forbes Rigby, Glenshaw Holdings, Grenon-Walker, Horseshoe Pastoral Company, Matrix Planning, Maunsell, Miltonbrook, Niche Environmental Information, DECCW, P.W. Rygate & West, Shoalhaven City Council, State Forests of NSW, Town & Country Real Estate and Travers Morgan;
  - Far South Coast - numerous locations, including Bournda NP, Dalmeny, Bega, Merimbula, Tuross Falls - for clients including Bega Valley Shire Council, Great Southern Energy, GHD, Caddey Searl and Jarman, DECCW and RTA;
  - Southern and Central Tablelands - numerous locations, including Goulburn, Marulan, Yass, Snowy Mountains, Tallaganda, Gundagai, Cowra and Ulan - for clients including Ulan Coal Mine, Cowra Shire Council, Matrix Planning, Cowman Stoddart, SMEC, State Forests of NSW, DECCW and Gundagai Shire Council;
- Surveys in the ACT at Mitchell, Hume, Conder, Banks, Gungahlin and West Belconnen (ACT Government) and ACT site mapping project (Canberra Archaeological Society).

Professional Skills:

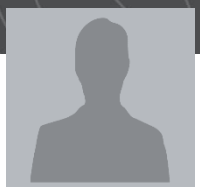
- Managing and conducting large-scale and small-scale Aboriginal heritage projects;
- Planning and conducting archaeological surveys of Aboriginal and non-indigenous heritage sites;
- Planning and conducting archaeological excavations of Aboriginal sites, including artefact scatters, shell middens and rock shelters;
- Preparation of OEH Section 90 applications and the conduct of sub-surface investigations and mitigation measures;
- Preparing Aboriginal heritage management plans and Aboriginal heritage impact assessment reports compliant with the OEH, Department of Planning and Environment and other Government requirements;
- Liaising with Aboriginal communities, clients and government agencies;
- Assessing heritage site significance;
- Analysing shell midden deposits and stone artefacts; and
- Statistical analysis of archaeological data.

Academic Qualifications:

Tertiary degree: Bachelor of Arts (Honours) Australian National University
Result, 1989 Prehistory IV Honours: H2A

ENCLOSURE 5

MR MARTIN SULLIVAN’s CURRICULUM VITAE



Martin Sullivan PRINCIPAL ECOLOGIST, DISCIPLINE LEADER ECOLOGY & IMPACT ASSESSMENT

Principal Ecologist and Discipline Leader Ecology & Impact Assessment with a high level of technical expertise, I am responsible for leading large multidisciplinary teams to deliver nationally significant projects for key clients in Government, resources, infrastructure and urban development sectors. I'm motivated by delivering the best possible environmental and project outcomes with no compromises. With each project I seek to understand our clients' unique challenges and objectives and use an innovative and robust scientific approach to solve problems and navigate complex regulatory requirements. Responsive and timely project management is always at the centre of every project I undertake, with the highest standards applied to each deliverable, ensuring a quality result from start to finish. My specialities include: Vegetation mapping, Major Project Ecological Impact Assessment, biodiversity offsets including Bio-Banking and Bio-certification projects, federal approvals, revegetation and landscape management, biodiversity monitoring and species habitat modelling. Passion: I'm passionate about all aspects of ecology, but particularly in applying innovative techniques (such as 3D vegetation mapping), threatened species survey and habitat modelling, and definitely orchids. My latest passion is leading the ecology and impact assessment discipline and working with such an amazing team of ecologists across the country. Regions of expertise include: all of NSW (with particular specialisation in western NSW), northern Victoria and southern QLD.

QUALIFICATIONS

- Bachelor of Science (Biodiversity and Conservation), Macquarie University, 2004
- Biodiversity Assessment Method (BAM) Accredited Assessor

PROJECT EXPERIENCE

MANAGEMENT PLANS/ STRATEGIES

- Narrabri Gas Project Biodiversity Management Plans (draft), Santos Limited
- Mt Arthur Coal Biodiversity Management Plan Update, BHP
- Ingleside Chase Escarpment Plan of Management (PoM), Pittwater Council
- Warriewood and Nareen Wetlands Plans of Management, Pittwater Council.
- Central West Catchment Environmental Weeds Strategy, Central West Catchment Management Authority.

REHABILITATION PLANS / STRATEGIES

- Narrabri Gas Project Rehabilitation Strategy, Santos Limited
- Authority to Prospect (ATP) 940P Rehabilitation Strategy, Cooper Creek QLD, Drillsearch Limited
- Lower Hunter Recycled Water Initiative – Tree planting for carbon offsetting, Hunter Water
- Rockley Falls Quarry Rehabilitation and Vegetation Offset Management Plan, Abigroup
- Hume Highway Duplication, Table Top to Mullengandra – Landscape Manager and Botanist, RTA.

MONITORING

- Narrabri Gas Project Rehabilitation Monitoring 2012-2019, Eastern Star Gas and Santos Limited
- Drayton Mine Annual Biodiversity Monitoring, Drayton Management
- Dewhurst and Bibblewindi Biodiversity Monitoring 2014-2019, Santos Limited
- Baseline waterway monitoring Gunnedah and Narrabri, Santos Limited
- Liddell Coal Operations Annual Flora and Fauna Monitoring, Xstrata NSW
- Greta Train Support Facility Project Ecologist, Abigroup

- Rockley Falls Quarry Annual Vegetation Offset Monitoring 2009-2013, Hume Highway Woomargama Alliance
- Metropolitan Colliery - Vegetation Monitoring, Metropolitan Coal.
- Pre and Post Flow Release Vegetation Monitoring at Avon Dam, Sydney Catchment Authority.

ECOLOGICAL IMPACT ASSESSMENT

- Nine Corehole Project, Santos NSW (Eastern) Pty Ltd
- Bonshaw Solar Farm Preliminary Environmental Assessment, APA Group
- Narrabri South Mine Baseline Biodiversity Assessment, Whitehaven Coal
- Western Slopes Pipeline Preliminary Environmental Assessment, APA Group
- Narrabri Gas Project, Santos NSW (Eastern) Pty Ltd
- Dewhurst and Bibblewindi CSG Pilots Ecological Assessment, Eastern Star Gas
- E&A Program, Santos NSW (Eastern) Pty Ltd
- Cumulative Impact Assessment, Santos limited
- Oceanic Coal Continued Operations Project, OCAL Pty Ltd
- Liddell Coal Operations MOD 5 expansion, Glencore Xstrata
- Boco Rock Wind Farm Transmission Line Ecological Constraints Study, Wind Prospect.
- Great Western Highway Upgrade (Mount Victoria to Lithgow) Preliminary Ecological Assessment, RTA.
- Edmondson Park Release Area Ecological Constraints Investigation, Sydney Water.
- Erskine Park Link Road Network Flora and Fauna Impact Assessment, Department of Planning.
- Caloundra Mooloolaba Road (MMTC) Ecological Impacts Study, Main Roads Queensland.
- Gunning Windfarm Transmission Line Ecological Impact Assessment, Gunning, Acciona Energy.
- Leonay/ Emu Plains - Wallacia Borefield Investigation Study, Sydney, Sydney Catchment Authority.
- Ecological and hydrogeological Investigation for a Proposed Irrigation Development, Avoca Station, Wentworth

VEGETATION SURVEY AND MAPPING

- Central Coast Local Government Area Plant Community Type Equivalences, Central Coast Council
- Vegetation Survey, Analysis & Mapping in Barool National Park, Linton Nature Reserve, Hobden Hill National Park, Woodsreef State Conservation Area and Serpentine Ridge National Park, NPWS/OEH
- Goonoo Reserves vegetation survey and mapping, NPWS/OEH
- Validation and accuracy assessment of Groundwater Dependent Ecosystem vegetation across the Hunter, Namoi and Lachlan Catchments, NSW DPI, Water
- Breelong and Drillwarrina National Parks vegetation survey and mapping, NPWS/OEH
- Narrabri Gas Project vegetation survey and mapping, Santos NSW (Eastern) Pty Ltd
- Baseline Biodiversity Assessment, ATP940P far south-west QLD, Drillsearch Limited
- Murrumbidgee Plot Data Collection. Vegetation survey across the South West Slopes, DEWHA.

BIOBANKING AND BIOCERTIFICATION

- Nooroo Biodiversity Stewardship Agreement, Hillbrad Pty Ltd
- Wyong Strategic Lands Biocertification Assessment, Wyong Shire Council
- Clarencetown BioBank Agreements, HillBrad Pty Ltd
- Narrabri Gas Project Major Project Credit Calculations, Santos Limited

ENCLOSURE 6

MR JOSHUA HUNT'S CURRICULUM VITAE

JOSHUA HUNT

mine project approvals
environmental management
regulatory approvals
environmental impact assessment

EDUCATION

Bachelor of Engineering (Civil)

PROFESSIONAL HISTORY

- Resource Strategies (Brisbane), Principal, 1999 to present.
- Mouchel Consulting Limited (London), Environmental Engineer, 1998 to 1999.
- Resource Strategies (Brisbane), Environmental Project Manager, 1997 to 1998.
- Woodward-Clyde (Brisbane), Civil Engineer, 1996 to 1997.
- Fujita Corporation (Singapore), Project Engineer 1994 to 1996.
- MPA Williams & Associates (Melbourne), Civil Engineer.

EXPERIENCE

Josh has extensive professional experience as a civil and environmental engineer. He has specialist experience in environmental impact assessment in the mining industry.

A civil engineer with a broad range of experience in engineering and environmental management for the mining industry, including:

- broad based environment studies and environmental impact assessment in relation to the approval and ongoing statutory requirements of mining projects.
- project feasibility and risk assessment studies.
- environmental auditing and compliance reporting.
- conceptual design of environmental management systems (particularly water management systems).
- management of consultation and negotiation processes with government and non-government stakeholders.

PROFESSIONAL EXPERIENCE – RELEVANT ENVIRONMENTAL/SUBSIDENCE ASSESSMENTS

Bulli Seam Operations – Appin and West Cliff Mines (BHP Billiton - Illawarra Coal)

- Bulli Seam Operations Environmental Assessment (NSW).
- Bulli Seam Operations Environmental Impact Statement (Commonwealth).
- Submission to the Bulli Seam Operations Review Panel of the Planning Assessment Commission.

Tasman Extension Project, NSW

- Tasman Extension Project Environmental Impact Statement.

Metropolitan Coal Mine, NSW

- Metropolitan Coal Project Environmental Assessment.
- Submission to the Metropolitan Coal Project Review Panel of the Planning Assessment Commission.
- Metropolitan Mine Longwalls 20-22 Extraction Plan.
- Metropolitan Mine Longwalls 23-27 Extraction Plan.
- Metropolitan Colliery Longwalls 18-19A Subsidence Management Plan Application.
- Metropolitan Colliery Longwalls 14-17 Subsidence Management Plan Application.

Wambo Coal Mine, NSW

- Wambo Development Project Environmental Impact Statement.
- Various modification applications for the North Wambo Underground Mine.
- North Wambo Underground Mine Longwalls 1 to 6 Subsidence Management Plan Application.
- North Wambo Underground Mine and South Bates Underground Mine Extraction Plan Applications.
- Referral of the Wambo Development Project under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

Abel Underground Mine, NSW

- Contributions to modifications and Subsidence Management Plan approvals.