



Résumé - Chris Lane – Principal

Land & Marine Geological Services Pty Ltd (L&MG SPL) ABN 15 009 320 870

SUMMARY



Chris is Director and Principal Consultant (Engineering and Environmental Geologist) of L&MG SPL with broad experience in civil construction fields, including site investigation of land based and marine based developments, and particular expertise in large resource projects.

He has more than 30 years' experience in resource projects including site investigation and construction of infrastructure (plant sites, heap leach facilities, roads, railways and airstrips and tailing storage facilities (TSFs)).

Chris has completed many strategy studies and financial analysis of TSF options (including concept designs from project start up through to project closure).

His involvement with TSFs covers aspects of design, construction, auditing and tailings/residue management reviews for a large number of projects covering a range of commodities including: alumina residue, bauxite residue, base metals (copper, lead and zinc), coal, gold, graphite, iron ore, manganese, nickel (sulphide and laterite), phosphate residues, rare earth residues, uranium and vanadium.

Special interests are:

- Dry stacked tailings storage facilities (DSTSF);
- Inpit TSFs; and
- Integrated waste landforms (IWL), which is a TSF within a mine waste dump.

Chris has experience in the following countries:

- United Kingdom;
- Middle East (Egypt, Iran, Oman, Saudi Arabia and the United Arab Emirates);
- Armenia;
- Pakistan;
- Southeast Asia (Indonesia, Malaysia, Papua New Guinea, Philippines and Vietnam);
- West Africa (Burkina Faso, Ghana, Ivory Coast, Mali, Senegal), East Africa (Ethiopia, Tanzania) and Southern Africa (Mozambique, South Africa and the Democratic Republic of Congo);
- South America (Brazil, Chile, Guyana and Uruguay).

Chris has experience in the following climatic regimes:

- Tropical (high rainfall);
- Humid Savannah (high seasonal rainfall);
- Temperate;
- Semi-arid;
- Arid; and
- Hyper Arid.



EXPERIENCE

| | |
|----------------|---|
| 2013 - present | Principal Consultant, L&MG SPL, WA |
| 2011 - 2013 | Principal Consultant, WorleyParsons, WA |
| 2006 - 2011 | Senior Principal, Coffey Mining, WA |
| 2005 - 2006 | General Manager Operations, Coffey Geosciences Pty Ltd |
| 2003 - 2005 | Principal Engineering and Environmental Geologist, Regional Manager of Coffey WA (following the acquisition of Soil & Rock Engineering by Coffey in October 2003) |
| 1991 - 2003 | Managing Director, Soil & Rock Engineering Pty Ltd, WA |
| 1990 - 1991 | Director, Soil & Rock Engineering Pty Ltd, WA |
| 1988 - 1990 | Associate Director, Soil & Rock Engineering Pty Ltd, WA |
| 1985 - 1988 | Specialist Engineering Geologist, Soil & Rock Engineering Pty Ltd, WA |
| 1982 - 1985 | Contracts Manager, Al Otaiba Foundation Engineering Limited |
| 1981 - 1982 | Contracts Manager, Foundation Engineering Limited, Hong Kong |
| 1979 - 1981 | Project Manager, Foundation Engineering Limited, United Arab Emirates |
| 1978 - 1979 | Site Agent/Geologist, Foundation Engineering Limited, United Kingdom |
| 1977 - 1978 | Contract Geologist, C.R.A. Exploration, Cobar, New South Wales |
| 1975 - 1977 | Assistant Research Officer, Commonwealth Department of Environment, Housing and Community Development, Canberra |

MAJOR PROJECTS

Mahenge Graphite (Tanzania)

Project Geotechnical Consultant to Black Rock Mining Limited and CPC Engineering for their proposed Dry Stacked Tailings Storage Facility (DSTSF). Evaluation of FS data prepared by others and preparation of recommendations on dry stacking for the 32-year life of project.

Balama Graphite (Mozambique)

Project Geotechnical Consultant to Twigg Mining and Exploration Limitada for their proposed conversion from thickened tailings to a Dry Stacked Tailings Storage Facility (DSTSF). Evaluation of data and preparation of the preliminary study leading to the PFS for dry stacking for the remaining 38-year life of project.

Ravenswood Project (North Queensland, Australia)

Project Geotechnical Consultant to Resolute Mining Limited for their proposed (DSTSF). Evaluation of data and preparation of design concept with recommendations for dry stacking for the 10-year life of project.

Balama Graphite (Mozambique)

Project Geotechnical Consultant to Syrah Resources for the bituminous lined Tailings Storage Facility (TSF), plant site foundations and roads. Evaluation of DFS data prepared by others and preparation of recommendations, process water, mine waste and TSF for thickened tailings for the initial 40-year life of project. In mid-2018 consideration of the change to dry stacked tailings commenced.



Syama Tailings Storage Facilities. (Mali)

Project Manager for the Tailings Storage Strategy Study for 4 tailings streams from the Syama Project Mali. Evaluation of options for combined process streams, water recovery tailings handling (thickened and filtered) for the life of mine tailings storage.

Wafi Golpu Tailings Storage Facility (Papua New Guinea)

Project Manager for the Pre-Feasibility Optimisation Study for the tailings storage facility. Review and evaluation of data and development of conceptual design. Direction of design of the containment embankment evaluation reports, technical review and client liaison. Project Manager for the Tailings Storage Strategy Study for evaluation of options and selection of the “go forward option” for the Feasibility Study for thickened tailings for the first, 27 years, mine tailings storage. Review of the filtered, dry stack tailings alternative.

BC Iron Mardie Salt Project (Western Australia)

High level advice for the geotechnical aspects of the Prefeasibility Study for the design of the evaporation pond, crystallisers and process plant.

Peak Resources Ngualla Rare Earths Project (Tanzania)

Project reviewer for the DFS Tailings Storage Facility designed by others. Gaps in the design identified and recommendations provided for improvements to the design.

Hexagon Resources Limited McIntosh Flake Graphite Project (Western Australia)

Prefeasibility Study and conceptual design of the Tailings Storage Facility design.

GME Ni-West Laterite Nickel Heap Leach Project (Western Australia)

Prefeasibility Study for conceptual design of the Heap Leach Facility and Tailings Storage Facility.

Capricorn Resources Limited Karlawinda Gold Project (Western Australia)

3rd Party reviewer of the Tailings Storage Facility designed by CMW Geosciences. Gaps in the previous design by others identified and recommendations provided for improvements to the redesign which were implemented by CMW Geosciences.

Toro Gold Limited Mako Gold Project (Senegal)

Project reviewer for the DFS Tailings Storage Facility designed by others. Gaps in the design identified and recommendations provided for improvements to the design.

Ammaroo Phosphate Residue Facilities. (Northern Territory)

Project reviewer for the Residue Storage Facility the above ground and in pit residue streams for the Prefeasibility Study. Evaluation of options for the start-up and life of mine residue storage.

Pharsalus Tailings Storage Facility and Plant Site (Guyana)

Project Manager for the mine infrastructure plant site and tailings storage facility for the Pharsalus Project Guyana. Site visit and evaluation of borrow area for tailings storage, data review, and development of conceptual design. Direction of design of the containment embankment using insitu materials supplemented with mine waste, evaluation reports, technical review and client liaison.

TSF Strategy Study Sabodala Mine. (Senegal)

Review of the life of mine (LOM) tailings storage facility strategy and preparation of report for input to the Canadian NI 43-101 Stock Exchange Report.

Exxaro Super Fines Project Tailings Storage Facility. (Grootegeluk Muzi - South Africa)

Participation in the study and development of concept options for the design for the tailings storage facility using thickened tailings for the proposed HDPE lined Tailings Storage Facility. Review of design criteria and design documents for the final option.



Castle Hill Project for Phoenix Gold Limited. (Western Australia)

Project Manager for evaluation and design of a heap leach facility and IWL TSF (tailings storage facility within a waste dump) and geotechnical investigation of the plant site. Preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

TSF Strategy Study Edikan Mine. (Ghana)

Review of the life of mine (LOM) tailings storage facility strategy and preparation of report for input to the Canadian NI 43-101 Stock Exchange Report.

DeGrussa Oxide Project Sandfire Resources NL. (Western Australia)

Project Manager for evaluation and design of a heap leach facility and TSF (thickened tailings). Preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Dominga Tailings Storage Facility (Chile)

Review of the prefeasibility study design for the tailings storage facility using thickened tailings for the Dominga Project (magnetite / copper) as part of the 'gap analyses prior to the Definitive Feasibility Study.

Syama Tailings Storage Facilities (Mali)

Project Manager for the OTSF and FTSF (oxide and flotation tailings) for Syama Project Mali. Site visit and evaluation of borrow area for tailings storage, data review, development of conceptual design and adjustments to the adjacent aerodrome design to accommodate the OTSF. Direction of design of the containment embankment using insitu materials supplemented with mine waste, evaluation reports, technical review and client liaison.

Sabodala Tailings Storage Facility (Senegal)

Project Manager for the optimisation of TSF1 for the Sabodala Project Senegal. Site visit for annual geotechnical review works, and evaluation of borrow area for tailings storage optimisation, data review, development of conceptual design and aerodrome design to accommodate TSF1. Direction of design of the containment embankment using insitu materials supplemented with mine waste, evaluation reports, technical review and client liaison.

Kintyre Uranium Project. (Australia)

Project Manager for the value engineering study of the residue storage requirements for the Kintyre Uranium Project. Data review, development of conceptual design based on the implementation of an integrated waste landform (IWL) as an alternative to the existing concept design for the residue storage facilities which resulted in significant cost savings for the project by optimising the containment embankments.

Lynas Residue Storage Facilities. (Malaysia)

Project Manager for the evaluation of the residue storage requirements for the Lynas Residue Optimisation Project. Site visit and evaluation of site area for residue storage, data review, development of conceptual design based on the use of geotubes and adjustments to the existing residue storage facilities. Direction of conceptual design of the containment embankments, technical review and client liaison.

Solomon TSF1 for Fortescue Metals Group (Australia)

Project Manager for the TSF for the Valley of the Kings and Firetail tailings. Evaluation of data and design of the containment embankment using insitu colluvial materials supplemented with a geotextile filter zone. Preparation of concepts, evaluation reports, technical review and client liaison.

Ma'aden Aluminium Project for Ma'aden Projects (Saudi Arabia)

Project Manager for the Stage 1 Residue Storage Facility (RSF) at the refinery site. Evaluation and design of the HDPE lined facilities (Cells 1 and 2) for the refinery waste. Preparation of concepts, evaluation reports, technical review and client liaison.

Various Magnetite and Iron Ore Projects (Australia)

Provision of input for tailings and water balance studies for various magnetite projects (Eyre Iron – South Australia, Crosslands and Extension Hill – Western Australia); and iron ore (Roy Hill, Flinders, and FMG Nyidinghu – Western Australia). Work has involved evaluation of existing concepts (start up through to closure); development of new concepts; evaluation of tailings testwork; technical review and client liaison.



Valentines Magnetite Project for Zamin Resources Limited (Uruguay)

Project Manager for evaluation of valley type TSF integrated with water storage facility constructed with segregated process plant waste. Preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Esaase Project for Keegan Resources Inc. (Ghana)

Project Manager for evaluation of valley type TSF including preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Tengrela / Sissingue Project for Perseus Mining Limited. (Ivory Coast)

Project Manager for evaluation of integrated waste landform TSF including preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison. Project Manager for the 2015 revised design of integrated waste landform TSF including preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Kipoi Project for Tiger Resources Limited. (Democratic Republic of Congo)

Project Manager for evaluation of heap leach and valley type, HDPE lined TSF for flotation tailings, access road and plant site. Preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Marillana Project for Brockman Resources Limited

Project Manager for evaluation of in-pit tailings integrated with mine waste options (start up through to closure). Preparation of evaluation reports, technical review and client liaison.

South Balmoral Project for Australasian Resources Ltd / International Minerals Pty Ltd

Project Manager for evaluation of filtered tailings integrated with mine waste options (start up through to closure). Preparation of evaluation reports, technical review and client liaison.

Jabal Sayid Project for Bariq Mining, Saudi Arabia

Project Manager for the geotechnical aspects of mine infrastructure, including the plant site and the tailings storage facility. Evaluation of filtered tailings for dry stacking in a HDPE lined valley TSF (start up through to closure). Preparation of evaluation reports, technical review and client liaison.

Balla Balla Project for Aurox Limited

Project Manager for evaluation of filtered tailings integrated with mine waste options including preparation of conceptual designs (start up through to closure) evaluation reports, technical review and client liaison.

Ayanfuri Project for Perseus Mining Limited. (Ghana)

Project Manager for evaluation of valley type TSF for flotation tailings and a double HDPE lined TSF for concentrate tailings including preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Kanmantoo Project for Hillgrove Copper Limited

Project Manager for IWL design (double HDPE lined) design and documentation including co-ordination of fieldwork, laboratory test work and preparation of concepts (start up through to closure); evaluation reports; technical review; presentations for regulatory authorities and public meeting; and client liaison.

Prominent Hill Project for Oxiana Limited

Project Manager for IWL design and documentation including co-ordination of fieldwork, laboratory test work and preparation of concepts (start up through to closure), evaluation reports, technical review and client liaison.

Olympic Dam TSFs - BHP Billiton Olympic Dam

Project Reviewer for existing TSFs and reviewer for TSF Scoping Study Expansion Project.

Groote Eylandt for GEMCO

Project Manager for IWL design and documentation including co-ordination of fieldwork; laboratory test work and preparation of concepts (start up through to closure); evaluation reports; technical review; presentations for regulatory authorities and client liaison.



Project Magnet for OneSteel – Iron Duke

Project Manager including geotechnical investigations (boreholes and testpits) for the proposed plant site and TSF design concepts (start up through to closure) and documentation including co-ordination of fieldwork, laboratory test work and preparation of factual and evaluation reports, technical review and client liaison.

Tethyan Copper Project – Reko Diq Pakistan

Project Manager for Coffey Geosciences Team for environmental, hydrogeological and geotechnical studies. Specialist geotechnical responsibilities included geotechnical investigations (boreholes and testpits) for the proposed plant site, TSF, access road, airstrip and pipeline route. Geological reconnaissance work for the access road and pipeline route. Contract administration including co-ordination of fieldwork, laboratory test work and preparation of factual and evaluation reports, technical review and client liaison.

Austeel Iron Ore Project – Cape Preston WA and Newcastle

Responsibilities included Geotechnical investigations (boreholes and testpits) for the proposed plant site and TSF at the mine site south of Cape Preston; Geological reconnaissance work for the quarry site and access to the proposed port facility; Contract administration including co-ordination of fieldwork, laboratory test work and preparation of factual and evaluation reports, technical review and client liaison. Project Director responsible for the investigation works undertaken for the Steel Mill at Tomago near Newcastle NSW.

West Angelas Project – Newman WA

Geotechnical investigations (geological mapping boreholes, costeans and testpits) for the proposed 370km railway line and infrastructure at West Angelas and Cape Lambert.

Windimurra Vanadium Project – Mt Magnet WA

Extensive tailings testing programme for tailings from the magnetic separation and calcine tailings circuits; Design of TSF; Liaison and site visits during construction to monitor the progress of the works; Co-ordination of fieldwork, laboratory test work and preparation of factual and evaluation reports, technical review and client liaison.

Midwest Iron and Steel Project – Talling Peak WA

Geotechnical investigations (geological mapping boreholes, costeans and testpits) for the proposed plant site at Oakajee and the 140km railway line from Oakajee to Talling Peak; Design of TSF at Talling Peak; Co-ordination of fieldwork, laboratory test work and preparation of factual and evaluation reports, technical review and client liaison.

Yandi Stage 2 Iron Ore Project – Newman WA

Project Manager with responsibility for Geotechnical investigations (geological mapping boreholes, costeans and testpits) for the proposed 10km railway line, load out facility and bridge. Organisation of all fieldwork for more than 10 cuttings along the railway alignment, laboratory test work and preparation of factual and evaluation reports. Liaison and site visits during construction to monitor the progress of the works.

Yakabindie Nickel Project – Leinster WA

Project Manager for the Yakabindie Nickel Project with responsibility for: Geotechnical investigations of the plant site tailings storage and flood diversion channels including supervision of all fieldwork, laboratory testing and preparation of reports. Preparation of the Consultative Environmental Review for the project including management of sub-consultants for fauna, flora, groundwater, surface water and ethnographic studies and preparation of the final report. Liaison with Department of Mines, Environmental Protection Authority and other Government Departments, Process Consultants and clients. Design of the project tailings storage facilities.

Mesa J Iron Ore Project – Pannawonica WA

Project Director / Project Manager with responsibility for Extensive tailings testing programme and design of the Inpit TSF. Geotechnical investigations (boreholes and testpits) for the plant sites (PP1 and PP2). Liaison with client and Governments for tailings storage approvals. Liaison and site visits during construction to monitor the progress of the works.

Brockman Iron Ore Project – Tom Price WA

Project Manager Brockman with responsibility for Fieldwork (costeans and testpits) for 46km of rail alignment. Organisation of laboratory testwork and preparation of reports.



Yandi Stage 1 Iron Ore Project – Newman WA

Project Manager with responsibility for Geotechnical investigations (geological mapping boreholes, costeans and testpits) for the proposed 32km railway line, load out facility and accommodation facility. Organisation and supervision of all fieldwork for more than 20 cuttings along the railway alignment, laboratory test work and preparation of factual and evaluation reports. Liaison and site visits during construction to monitor the progress of the works.

Marandoo Iron Ore Project – Tom Price WA

Project Manager with responsibility for: Fieldwork for the selecting and proving of a quarry site for aggregates suitable for concrete, road sealing and ballast, investigation of a 120km rail alignment and 22km access road. Coordination and management of geotechnical team, liaison with Project Design Team, preparation of reports for all aspects of the project. Liaison and site visits during construction to monitor the progress of the works.

Channar Iron Ore Project – Paraburdoo WA

Project Manager with responsibility for: Geotechnical investigation for all major structures. Primary Crusher, Primary Stockpile, Secondary Crusher, 25km Conveyor, access roads and aggregate survey. Supervision and organisation of fieldwork (geological mapping, borehole, costean and testpit excavations). Organisation of laboratory testing and preparation of factual and evaluation reports.



TAILINGS STORAGE PROJECTS

Advice on design concepts (start up through to closure), operation, audits, inspections, management reviews, advice on seepage, stability, tailings deposition, water recovery and preparation of tailings disposal strategy plans have been undertaken at the following locations:

Projects outside Australia

- Mahenge Graphite Project (DSTSF), Tanzania
- Balama Graphite Project (DSTSF), Mozambique
- Birimian, Goulamina Li Project, Mali
- Balama Graphite Project, Mozambique
- Bonikro Gold Project, Cote D'Ivoire
- Mensin Bibiani Gold Project, Ghana
- Ngualla Rare Earths Project, Tanzania
- Mako Project, Senegal
- Sukari Gold Mines, Egypt;
- Wafi Golpu Project, Papua New Guinea
- Exxaro Super Fines Project, South Africa
- Dominga, Chile
- Minas Rio Project, Brazil
- Pharsalus Project, Guyana
- Syama Project, Mali, West Africa
- Lynas Project, Malaysia
- Askaf Iron Ore Project, Mauritania
- El Aouj Iron Ore Project, Mauritania
- Ma'aden Aluminium Project, Saudi Arabia
- Kipoi Project, Democratic Republic of Congo
- Valentines Project, Uruaguay
- Sissingue (Tengrela) Project, Ivory Coast, West Africa
- Sabodala Project, Senegal, West Africa
- Edikan (Ayanfuri), Ghana, West Africa
- Jabal Sayid, Saudi Arabia
- Yubdo Platinum Mine, Ethiopia
- Reko Diq, Pakistan
- Rapu Rapu, Philippines
- North Mara Mine, Tanzania
- Tulawaka Mine, Tanzania
- Geita Gold Mine Tanzania
- Sukt Gold Project, Armenia
- Ararat Gold Project, Armenia
- Mt Muro Gold Project, Indonesia
- Miduk Copper Project, Iran
- Sarcheshmeh Tailings Storage, Iran
- Bogosu Gold Project, Ghana, West Africa
- Iduapriem Project, Ghana, West Africa
- Sansu Sulphide Project, Ghana, West Africa
- Cikondang Gold Project, Cikondang, Indonesia
- Abooso Gold Project, Ghana, West Africa
- Obenemase Gold Project, Ghana, West Africa
- Amansie Resources Gold Project, Ghana, West Africa
- Ayanfuri Gold Project, Ghana, West Africa



Projects within Australia

- Beacon Mining Limited, Coolgardie
- Deflector Mining Limited, Gullewa
- Doray Mining Limited, Meekatharra
- Norton Gold Fields Paddington Operations, Kalgoorlie
- Ammaroo Phosphate, Northern Territory
- Phoenix Gold, Western Australia
- Sandfire, Western Australia
- Kintyre Uranium, Western Australia
- TSF1 Solomon, Western Australia
- Olympic Dam, South Australia
- Balla Balla, Western Australia
- Kanmantoo, South Australia
- Ravenswood, Queensland
- Prominent Hill, South Australia
- Project Magnet, Iron Duke
- Bulong Nickel, Kalgoorlie
- Windimurra, Mt Magnet
- Mesa J, Pannawonica
- Yilgarn Star, Southern Cross
- Marymia Gold Operations, Meekatharra
- Plutonic Gold Operations, Mt Morgans, Laverton
- Hill 50 Gold Mine, Mt Magnet
- Bannockburn Gold Mine, Leonora
- WMC Resources Ltd, Kambalda Nickel Operations, Kambalda
- Central Norseman Gold Corporation Limited, Norseman
- Chalice Gold Mine, Norseman
- Higginsville Gold Mine, Norseman
- Agnew Gold Mine, Leinster
- Big Bell, Cue
- Mt Dimer, Southern Cross
- Youanmi Gold Mine, Mt Magnet
- Palm Springs Gold Project, Halls Creek
- Cockatoo Island Iron Ore Beneficiation Project, Cockatoo Island
- Gidgee, Sandstone
- Granny Smith, Laverton
- Mt Pleasant, Kalgoorlie
- Lady Bountiful Extended, Kalgoorlie
- Newcrest, Telfer, Kalgoorlie and Ora Banda
- Paddys Flat Gold Mine, Meekatharra
- Plutonic Gold Mine, Meekatharra
- Mawson Pacific, Southern Cross



LATERITE NICKEL PROJECTS

Geotechnical advice, reviews and design for laterite nickel tailings storage facilities (above ground and in-pit) at the following projects in Australia. Laterite nickel tailings are unusual in that they have a very low settled in-situ dry density and high in-situ moisture content and when dry have a dry strength sufficient to support light vehicles and light construction equipment loads.

Bulong Nickel Project – Kalgoorlie WA

Geotechnical review and advice for the above ground tailings storage facility and evaporation pond. Extensive tailings testing programme for in-pit tailings to the Criterion and Federal Pits including design work for these tailings storage facilities. Liaison and site visits during construction to monitor the progress of the works; Technical review and client liaison during operation; Geotechnical investigations after the site was closed to assess the in-situ material properties (strength and density).

Cause Nickel Project – Kalgoorlie WA

Geotechnical review and advice for the above ground tailings storage facility. Liaison and advice for the implementation of the in-pit tailings storage program.

Murrin Murrin Nickel Project – Leonora WA

Geotechnical review and advice for the above ground tailings storage facilities and evaporation ponds. Extensive tailings testing programme for tailings deposition to the 2/3 Pit Tailings Storage Facility (2/3PTSF) and the proposed 9/1, 9/2 and 9/7 In-pit Tailings Storage Facilities (ITSF). Liaison and site visits during in-pit embankment construction to monitor the progress of the works. Technical review and client liaison during operation.

HEAP LEACH PROJECTS

Geotechnical advice on slope design (stability), liner design for heap leach pads and associated ponds for various heap leach projects including both permanent stacks and on/off stacks and involvement in assessment of flux leakage rates from HDPE liners. Involvement with projects at the following locations:

Projects outside Australia

- Kipoi Copper Project, Democratic Republic of Congo.
- Bannerman Resources, Etango Project, Namibia.
- Union Resources, Mehdiabad Zinc Heap Leach Project, Iran
- Grumesa, Ghana, West Africa
- Aboe, Ghana, West Africa
- North Mara Mine, Tanzania

Projects within Australia

- Jervois Mining Limited, Nico Project, Young New South Wales.
- GME Ni-West Project, Leonora Western Australia
- Phoenix Gold Limited, Western Australia.
- Sandfire Resources NL, Western Australia.
- Ranger Uranium, Northern Territory.
- Nifty Copper Project, Western Australia
- Sherlock Bay Nickel Heap Leach,
- Radio Hill Nickel Bacterial Leach, Karratha.
- WMC St Ives Dump Leach, Kambalda.
- Newcrest Telfer.
- Newcrest Heap Leach Trial New Celebration Mine, Kalgoorlie.



ACID MINE DRAINAGE (ARD) PROJECTS

Geotechnical advice on liner and underdrainage for ARD mine waste and ARD tailings storage facilities and involvement in assessment of flux leakage rates from HDPE liners. Involvement with projects at the following locations:

Projects outside Australia

- North Mara Gokona and Nybagenia Mine Waste, North Mara Mine, Tanzania

Projects within Australia

- Kanmantoo Copper Project, South Australia
- Sally Malay Project, Western Australia.
- Nifty Copper Project, Western Australia
- Radio Hill Nickel Project, Western Australia.
- Ravenswood Project, Queensland.

OTHER PROJECTS

Mining Projects

- Agnew Gold Mine, Leinster
- Lawlers Gold Mine, Leinster
- Kambalda Nickel Operations New Concentrator, Kambalda
- Central Norseman Gold Corporation, Norseman
- Yilgarn Star, Marvel Loch
- Mt Morgans Gold Project, Laverton
- Telfer Gold Mine, Telfer
- New Celebration Gold Mine, Kalgoorlie
- Granny Smith, Laverton
- Sons of Gwalia, Leonora
- Western Mining Corporation, Leinster
- Plutonic Gold Mine, Meekatharra

Civil Construction Projects

- Low Rise Buildings, Warehouses, Perth
- Earthworks Projects, Western Australia

Route Investigations Gas Pipelines

- South Eastern Gas Pipeline, Sydney (NSW) to Sale (Victoria)
- Goldfields Gas Pipeline, Western Australia
- Pipeline Dredging, Saladin Oilfield
- Route Investigation Perch and Dolphin, Bass Strait
- Tubridgi Gas Field Development, Onslow

Route Investigations Rail Alignments

- West Angelas, Western Australia
- Mid West Iron and Steel, Western Australia
- Yandi Stage 1 and Stage 2, Western Australia
- Brockman, Western Australia
- Mesa J, Western Australia
- Marandoo, Western Australia



EDUCATION

Bachelor Applied Science, Canberra University, 1975

Executive Master of Business Administration, Australian Graduate School of Management, 2002

REGISTRATIONS/AFFILIATIONS

Fellow of the Geological Society London, 1980

Corporate Member of the Institute of Geologists (United Kingdom), 1987

Member of the Australian Institute of Geoscientists, 1987

Chartered Geologist, 1990

Member of the Australasian Institute of Mining and Metallurgy, 1990

Registered Professional Geoscientist – The Australian Institute of Geoscientists, 1997

Chartered Professional (Geotechnical) Australasian Institute of Mining and Metallurgy, 2012.

Registered Professional Engineer Queensland (RPEQ 13083) Geotechnical (Mining), 2012.

PUBLICATIONS/PRESENTATIONS

Rafty M., and Lane J. C. Water Balance 101. In the AusIMM Mine Waste and Tailings Conference 2018 Proceedings, Brisbane, Australia, 23 – 24 July 2018.

Lane J. C. Tailings Storage Management 101: Design, Operating Essentials, Signs of Problems. In the GEMG Proceedings Environmental Management Workshop, Kalgoorlie, Australia, 16 – 18 May 2018.

Chafy, A., Tidswell, M., Lane, C., Case study: project start-up for thickened graphite tailings, storage and water recovery strategies, In the Paste 2018, Perth, Australia, 11 – 13 April, 2018.

Lane J. C. Integrated Waste Landforms Design, Construction, Operation and Management. In ACG Seminar on Management, Operation and Relinquishment of Tailings Storage Facilities, Perth, Australia, 27 - 28 April, 2017.

Amtsberg, M., Buckley, J., Lane, C Research and Analysis of Geosynthetics for Tailings Storage Application. In Proceedings 7th International Congress on Environmental Geotechnics, 10 – 14 November, 2014.

Rafty M., and Lane J. C. (2014) Water balance 101. In 2014 Workshop on Environmental Management, Workshop Proceedings, Kalgoorlie, Australia, 21 – 23 May 2014.

Lane, J.C. (2013): In-pit tailings deposition (storage). In: 'Advanced Tailings Management'. Australian Centre for Geomechanics, Perth, W.A., 22 March, 2013.

Lane, J.C. (2011): In-pit tailings deposition – aspects to be considered. In: 'Total Tailings Management'. Australian Centre for Geomechanics, Perth, W.A., 1-3 December, 2011.

McDonald L., and Lane J. C. (2010) Consolidation of Inpit Tailings. In Mine Waste 2010, Proceedings of the First International Seminar on Reduction of Risk in the Management of Tailings and Mine Waste, Perth, Australia, 29 September – 1 October 2010.

Lane, J.C. (2009) Tailings Storage Management: Essential Operating Principles. In: 'Practical Soil Mechanics in Mining and Tailings Management for Operators'. Australian Centre for Geomechanics, Perth, W.A., 1-3 December, 2009.



Lane, J.C. (2008) In-pit tailings deposition – opportunities, risks and processes. In: 'Tailings Management for Decision Makers'. Australian Centre for Geomechanics, Perth, W.A., 3-4 December, 2008.

Lane J. C. (2008) Inpit tailings deposition; what have we learned about this tailings storage option. In: 'Proceedings of Workshop on Environmental Management'. Goldfields Environmental Management Group, Kalgoorlie, W.A., 1-3 May, 2008.

Lane, J.C. (2007) Case histories of integrated waste landforms and in-pit deposition; what are the costs of these options? In: 'Total Tailings Management Seminar'. Australian Centre for Geomechanics, Perth, W.A., 5-7 December, 2007

Lacey, H. and Lane, J.C. (2007) Integrated landforms and waste stream management. In: 'Planning for Mine Closure'. Australian Centre for Geomechanics, Perth, W.A., 12-15 June, 2007.

Lane J. C. (2005) Use of completed open pits for tailings disposal. In Handbook on Mine Fill. Australian Centre for Geomechanics, Perth, W.A.

Lane, J.C. (2004) Integrated landforms – an alternative approach to tailings storage. In: 'Mine Closure-Towards sustainable outcomes'. Australian Centre for Geomechanics, Perth, W.A., 5-6 August, 2004.

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SPECIALIST COURSES

'AusIMM Mine Waste and Tailings Conference' Brisbane, Australia, 23 – 24 July 2018.

'Paste 2018 – 21st International Seminar on Paste and Thickened Tailings' Australian Centre for Geomechanics, Perth, Australia, 11 to 13 April 2018.

'Management, Operation and Relinquishment of Tailings Storage Facilities Seminar'. Australian Centre for Geomechanics, Perth, W.A. Australia, 27 - 28 April, 2017.

'AusIMM Tailings and Mine Waste Management for the 21st Century' Sydney, Australia, 27 – 28 July 2015.

'Paste 2016 – 19th International Seminar on Paste and Thickened Tailings' Australian Centre for Geomechanics, Santiago, Chile, Australia, 6 to 8 July 2015.

'Paste 2015 – 18th International Seminar on Paste and Thickened Tailings' Australian Centre for Geomechanics, Cairns, Australia, 5 to 7 May 2015.

7th International Congress on Environmental Geotechnics, 10 – 14 November, 2014.

'Paste 2014 – Seminar on Paste and Thickened Tailings' Australian Centre for Geomechanics, Vancouver, Canada, 8 to 12 June 2014.

'Paste 2013 Stacked, Thickened, Paste and Filtered Tailings' Australian Centre for Geomechanics, Belo Horizonte, Brazil, 16 to 20 June 2013.

'Advanced Tailings Management'. Australian Centre for Geomechanics, Perth, W.A. Australia, 22 March, 2013.

'Total Tailings Management'. Australian Centre for Geomechanics, Perth, W.A. Australia, 20 - 21 March, 2013.



'Environmental Geochemistry of Mine Site Pollution - An Introduction'. Australian Centre for Geomechanics, Perth, W.A. Australia, 18 - 19 March, 2013.

'Total Tailings Management'. Australian Centre for Geomechanics, Perth, W.A. Australia, 7 - 8 December 2011.

'Mine Waste 2010'. Australian Centre for Geomechanics, Perth, W.A. Australia, 29 September – 1 October 2010.

'8th International Conference Acid Rock Drainage'. SveMin and INAP, Skelleftea, Sweden, 23 to 26 June 2009.

'Short Course on Designing Sustainable Cover Systems and Final Landforms for Mine Waste Storage Facilities'. SveMin and INAP, Skelleftea, Sweden, 22 June 2009.

'Tailings Management for Decision Makers'. Australian Centre for Geomechanics, Perth, W.A. Australia, 3 - 4 December 2008.

'Total Tailings Management'. Australian Centre for Geomechanics, Perth, W.A. Australia, 5 - 7 December 2007.

'Mine Closure'. Australian Centre for Geomechanics, Perth, W.A. Australia, 14 - 15 June 2007.

'Tailings Management and Decommissioning'. Australian Centre for Geomechanics, Perth, W.A. Australia, 27 - 28 November 2003.

'6th International Conference Acid Rock Drainage'. AusIMM and ACMER, Cairns Queensland Australia, 14 to 16 July 2003.