ACADEMIC CURRICULUM VITAE

for

David John Williams

1 BACKGROUND

David John Williams was born in Melbourne in 1954, and graduated with first Class Honours in Civil Engineering from Monash University in 1975. In 1979, he was awarded a PhD in Soil Mechanics from the University of Cambridge, supported financially by a Commonwealth Scholarship.

During his first degree, David was a Cadet Engineer with the then Country Roads Board of Victoria (CRB), gaining widespread experience of the Board's activities across Victoria during university vacation employment and following graduation. After his PhD studies, David returned briefly to the CRB, before joining the international Geotechnical, Mining and Environmental Consulting Engineering Company Golder Associates Pty Ltd, commencing in their Melbourne Office in mid-1980. In 1982, the company transferred David to their Brisbane Office, where his responsibilities expanded to include the management of civil engineering, mining infrastructure and mine waste disposal projects. His work with Golder took him throughout Australia and to Bougainville Copper Mine in PNG.

In mid-1983, David joined the Department of Civil Engineering at The University of Queensland (UQ) as the sole Lecturer in Geomechanics, being promoted to Senior Lecturer in January 1990 and to Reader in January 1994. During his continuing appointment, David's research, teaching and service to the University and the profession have earned him an international reputation in the field of geotechnical engineering, specialising in the geomechanics of mine waste disposal and management, and mine site rehabilitation.

Initially at UQ, much of his time was devoted to re-building the University's commitment to Geotechnical Engineering, through undergraduate teaching, new postgraduate courses, the development of an active team of research students and postdoctoral appointments, and through a very successful series of continuing professional education courses. He also attempted to raise the profile of geomechanics, obtaining industry funding to elevate an advertised position in geomechanics to Professor level. Total funding of $ 85,000 was committed to by John Wagstaff Piling and the James N. Kirby Foundation in 1986.

David continues to very actively pursue research opportunities in civil engineering and mining geomechanics. His early research effort was directed at a wide range of civil engineering topics covering the behaviour of expansive clays, road pavement behaviour, slope stability analyses, the use of lateritic soils in road pavements, and piled foundations. In 1986, he initiated research into the physical processes governing the behaviour of coal mine tailings. Until that time, little research effort had been devoted to the application of geomechanics principles of mine waste management and

mine site rehabilitation worldwide. David developed this field from scratch, and continues to make significant contributions to research and industry practice, for which he has developed an international research, teaching and consulting reputation over the last 18 years.

2 EDUCATIONAL QUALIFICATIONS AND PROFESSIONAL AFFILIATIONS

2.1 Educational Qualifications

- ***BE (Hons I)***, Civil Engineering, Monash University, Australia, 1975.
- ***PhD***, Soil Mechanics, University of Cambridge, England, 1979.

2.2 Professional Affiliations

1. Member, Institution of Engineers, Australia (IEAust) and Certified Professional Engineer (CPEng).
2. Member, Australian Geomechanics Society (AGS).
3. Member, International Society of Soil Mechanics and Foundation Engineering (ISSMFE).
4. Australasian Vice-President, International Society of Environmental Geotechnology (SEG).
5. Sustainable Minerals Institute (SMI), The University of Queensland.
6. Centre for Mined Land Rehabilitation (CMLR), The University of Queensland.
7. Australian Centre for Minerals Extension and Research (ACMER), Brisbane.
8. International Network for Acid Prevention, INAP.

3 EMPLOYMENT HISTORY, MAIN DUITES AND RESPONSIBILITIES AND ACHIEVEMENTS

Though based at The University of Queensland for much of his career, Dr Williams has enjoyed a diverse range of career experiences through his adjunct appointments and his widely-travelled pursuit of his research, teaching and consulting interests.

3.1 Current Appointment

Dr Williams' current appointment at The University of Queensland, ratified in August 2007, is Golder Professor of Geomechanics in the Division of Civil Engineering within the School of Engineering. In this role, his main educational duties and responsibilities include the following.

- Senior responsibility for the teaching and assessment of geomechanics at undergraduate and postgraduate levels to Civil, Environmental and Mining Engineering students, including undergraduate project and thesis supervision.

- Principal supervision of postgraduate research students.
- The development of curricula and teaching material, particularly in his areas of research expertise.
- The development, teaching and assessment of a school-wide and external course in the geomechanics of mine waste management and mined landform design (MINE7000/4000), aimed at engineering and science undergraduates, postgraduates and practicing engineers and scientists worldwide.
- The development of MINE7000/4000 as a resource-based course to enhance the learning experience and make it accessible to external students.
- The mentoring of undergraduate and postgraduate students, postdoctoral appointments and early career academic colleagues on teaching and learning methods, and employment and career opportunities.

His main research duties and responsibilities in this role include the following.

- Undertaking research in civil engineering and mining geomechanics.
- Seeking and obtaining research funding from government and industry.
- The development and leadership of research projects with cognate and interdisciplinary groups, both within UQ and with external institutions, and with industry.
- The identification and development from scratch of research activity in the new field of geomechanics applied to mine waste management and mine site rehabilitation.
- The mentoring of postgraduate students, postdoctoral appointments and early career academic colleagues on research methods, on the writing of research grant applications and papers, and on employment and career opportunities.

His main duties and responsibilities in relation to the profession and industry include the following.

- Maintaining and developing strong relationships with professional bodies, including the Institution of Engineers, Australia (IEAust) and the Australian Geomechanics Society (AGS).
- Undertaking appropriate high-level consulting to implement leading edge research findings.
- Securing opportunities for commercial research and testing, based on unique skills and testing equipment.

His main administrative duties and responsibilities include the following.

- The mentoring of early career academic colleagues on university policies and procedures, providing leadership in geomechanics curriculum development within Civil Engineering, the School of Engineering and Earth Sciences, and initiating new research ventures within the Civil Engineering, the School of Engineering and beyond.

- Advancing Civil Engineering's involvement with the profession, through professional bodies, and with industry, including the mining industry, Golder Associates, Queensland Main Roads Department, and others.
- Representing Civil Engineering and the School of Engineering on School, Faculty and University-wide committees.

Dr Williams is keenly aware of the University's Code of Conduct the Code of Ethics of the IEAust, and both promotes and complies with these. He complies with the requirements of the Queensland Occupational Health and Safety Legislation, particularly as it relates to the Geomechanics Laboratory and research at mine sites Australia-wide. He is always willing to undertake duties as directed by the Head of Civil Engineering or the Head of the School of Engineering, and has served on many Division, School, Faculty and University-wide committees.

Dr Williams' main achievements in his position of Reader have included the following.

- The successful graduation of numerous Civil Engineering graduates, and PhDs and over 22 years.
- The successful graduation of 13 PhD candidates, 9 MEngSc candidates, 1 MEc candidate, 1 MPhil candidate, and 7 MEngSt candidates, giving a total of 31, with 2 PhD and 1 MPhil candidates currently under supervision.
- The development of the resource-based course MINE7000/4000.
- Success in attracting research grant funding totalling $ 4.65 million over 22 years, averaging $ 300,000/year since his appointment to Reader.
- 175 refereed publications over his 22 year academic career.
- Making numerous highly significant contributions to Civil Engineering and Mining Geomechanics practice through his research initiatives and developments.
- Dr Williams was personally responsible for the establishment of an Exchange Agreement between The University of Queensland and the University of Saskatchewan, Canada in 1996, and he has initiated moves to establish links with the Catholic University of Rio de Janeiro and the Federal University of Brasilia in Brazil.
- Mentoring, through his teaching, research and consulting activities, and his position as an Academic Fellow of St John's College, UQ, his numerous undergraduate and postgraduate students, his three postdoctoral appointments (spanning over 10 years) and early career academic colleagues, many of whom have maintained contact long after leaving UQ.

3.2 Previous Appointments

Dr Williams' previous appointments are summarised in the following.

Jan 1994 to Aug 2007: Associate Professor (continuing),
Department of Civil Engineering,
The University of Queensland

Solely responsible for much of this time for all undergraduate and postgraduate teaching of soil mechanics, and for conducting research in soil mechanics related to Civil Engineering, and mine waste disposal and mine site rehabilitation. The research effort in mine waste disposal and mine site rehabilitation became his major research interest.

Jan 1990 to Dec 1993: Senior Lecturer in Geomechanics (tenured),
Department of Civil Engineering,
The University of Queensland

Solely responsible for much of this time for all undergraduate and postgraduate teaching of soil mechanics, and for conducting research in soil mechanics related to Civil Engineering, and mine waste disposal and mine site rehabilitation. The research effort in mine waste disposal and mine site rehabilitation became his major research interest.

June 1983 to Dec 1989: Lecturer in Geomechanics (tenured),
Department of Civil Engineering,
The University of Queensland

Solely responsible for much of this time for all undergraduate and postgraduate teaching and research in soil mechanics, developing much of this from scratch. Initiating research into the geomechanics of mine waste disposal and mine site rehabilitation from scratch from 1986.

June 1982 to June 1983: Senior Geotechnical Engineer,
Golder Associates Pty Ltd, Brisbane

Responsible for the planning and management of geotechnical investigations for commercial and residential developments, and for stability investigations and geotechnical investigations for mining industry infrastructure. Major projects included management of geotechnical investigations for tailings and water supply dams, and a haul road levee at Newlands Coal Project, Queensland; rail and creek diversions, plant sites and tailings disposal areas at Gloucester Coal Project, New South Wales; and for Jupiter's Casino Project at Broadbeach, Queensland.

June 1980 to June 1982: Geotechnical Engineer
Golder Associates Pty Ltd, Melbourne

Experience included foundation investigations for a number of structures in Victoria; stability investigations in Victoria, Tasmania, and Bougainville; and offshore investigations in Western Australia. Major projects included investigation and design of rock-socketed piles for West Gate Freeway, Melbourne; and supervision of the investigation for a levee to be constructed on tailings at Bougainville.

Dec 1979 to June 1980: Engineer
Country Roads Board of Victoria, Melbourne

Attached to the Foundation Investigation Section, responsible for road bridge and embankment investigations. Engaged in load testing of rock socketed piles for West Gate Freeway, Melbourne.

Oct 1976 to Oct 1979: PhD Student / Commonwealth Scholar
Cambridge University, England

Tutoring and laboratory demonstration for undergraduate courses. Minor consultancy work for Lloyd's Register of Shipping Offshore Services Group, including observation of a pile testing program in the Netherlands and analysis of the results; and pile design for a wharf facility in Spain.

Nov 1975 to Oct 1976: Engineer
Country Roads Board of Victoria, Melbourne

Engaged in the development of a computer system to process data from road pavement testing equipment. Later, engineer attached to the Foundation Investigation Section, responsible for road bridge and embankment investigations, and briefly in charge of the soils testing laboratory.

Feb 1972 to Nov 1975: Undergraduate Student / Cadet Engineer
Monash University / Country Roads Board

Engaged in vacation training in various areas of the Board's activities.

3.3 Other Appointments

Other appointments held during Dr Williams' tenure at The University of Queensland include the following.

1. ***CNPq*** (Brazilian Government) Travel Grant, for 4 weeks in June 1999, which included visits to six universities in five cities, at which seminars and a short course were presented, and visits to the iron ore mining region of Minas Gerias.
2. ***Japan Society for the Promotion of Science Fellow***, for 2 weeks in November 1996, based around Kobe and Osaka Universities.
3. ***Australian Research Fellow (Industry)***, part-time for 1993, in collaboration with Golder Associates Pty Ltd in Brisbane. This allowed many operating coal mines in Queensland and New South Wales to be visited, aimed at applying recent research findings to improve mine waste disposal and mine site rehabilitation practices.
4. ***Masuda Fellow for Collaborative Research in Japan***, for 6 weeks over January to February 1990, which involved collaborative research with academics in Kobe University and Tokyo Institute of Technology, plus visits to civil engineering construction sites in the Osaka Bay region.
5. ***The University of Queensland Collaborative Research Travel Grant*** to London, UK, for 5 weeks over November to December 1989, which involved collaboration on the numerical modelling of the behaviour of mine tailings with Professor David Potts of Imperial College.

6. ***Academic Fellow of St John's College***, UQ, from 2005, following an association with the College spanning over 10 years.

3.4 Awards and Prizes

Awards and prizes achieved during Dr Williams' career include the following.

1. Australian Minerals and Energy Environment Foundation (AMEEF) Travelling Scholarship, 1995 (valued at $ 15,000).
2. Inaugural AMEEF Environmental Excellence Award (Individual), 1992 (valued at $ 10,000).
3. Commonwealth Scholarship, UK, October 1976 to October 1979.
4. The James Hardie Engineering Prize, May 1976.
5. CRB Cadetship, 1972 to 1975.

3.5 Other Experience

Dr Williams is widely sought for his expert input to mine waste disposal and mine site rehabilitation at operating mines throughout Australia and overseas, and as an expert witness for Civil Engineering construction projects and failure investigations. He has been sponsored by mining companies and consultants to visit numerous mining regions and mine sites worldwide, both to impart and extend his knowledge. Since 2000, he has developed a relationship with the International Network for Acid Prevention (INAP), and has contributed to INAP-sponsored research and development projects and workshops involving mine sites in the USA, Canada, Australia and PNG.

The vast range of mining regions and mine sites that Dr Williams has visited worldwide include metalliferous mines in Tasmania, Bougainville Copper Mine in PNG, the Hunter Valley Coalfields in New South Wales, the Bowen Basin Coalfields in Central Queensland, the Ipswich Coalfields in South East Queensland, Syncrude Oil Sands operation in Alberta, Canada, gold mines in Western Australia, New South Wales and Victoria, the Latrobe Valley Brown Coal mines, the Witbank and Natal Coalfields in South Africa, the Johannesburg gold mining region in South Africa, the Lower Mongolian Coalfields in China, the North Eastern USA Coalfields, Mt Whaleback Iron Ore Mine and Telfer Gold Mine in Western Australia, Kidston Gold Mines in northern Queensland, the Sudbury nickel mining region in Ontario, Canada, the Noranda and Placer Dome metal mining operations in Northern Ontario and Quebec, Canada, Mt Leyshon Gold Mine, Pajingo base metal mine, and Mount Isa Mines in Queensland, the Rocky Mountains metal mining operations in Colorado, USA, the Utah Coalfields in the USA, the Southern Saskatchewan Lignite Coalfields in Canada, the Black Country Coalfields in Birmingham, UK, the Southern Wales Coalfields in the UK, the Cornwall tin mining and China clay regions in the UK, the Northern Territory Gold and Uranium mines, Navajo Coal Mine in Nevada, USA, Escondida Copper Mine in Chile, Osborne Mine in Queensland, Northern Saskatchewan Uranium mines in Canada, Southern Saskatchewan Potash mines in Canada, Century Nickel Project in Queensland, the Kalgoorlie region Nickel and Gold mines in Western Australia, Iron ore mines in Minas Gerais, Brazil, Alcoa operations in Western Australia, Cadia Hill Gold Mine in New South Wales, Misima

Gold Mines in PNG, Savage River iron Ore Mine in Tasmania, the Stuart Oil Shale Project in Queensland, and BHP Copper's operations in Arizona, USA.

4 RESEARCH ACHIEVEMENTS

Dr Williams has an internationally recognised and respected research profile, demonstrated through his highly significant and expanding research contributions to the improvement of Civil Engineering and Mining Geomechanics practices worldwide, his extensive refereed publication record, invitations to present lectures and papers worldwide, his research leadership and broadly-based research collaboration, and his very substantial research funding.

4.1 Significant Research Contributions and Impact

Dr Williams has made a number of ongoing highly significant research contributions. These have been widely and effectively applied, particularly in the minerals industry but with application to both Civil and Mining Engineering, both within Australia and overseas. These are described in the following paragraphs.

From 1986, Dr Williams has been engaged in the ***physical and numerical modelling of the beaching, hydraulic sorting, self-weight sedimentation and consolidation, and subsequent desiccation of mine tailings***. An understanding of these physical processes is essential for optimising the design, construction, raising, capacity and ultimate rehabilitation of a mine tailings storage facility. Dr Williams' research expertise in this area has found widespread application throughout the Australasian minerals industry, and is acknowledged internationally through invited lectures and papers, invited seminars and workshops to industry and consultants in Australiasia, Brazil, Canada, South Africa and the USA, and sponsored visits to operating mine sites worldwide.

From 1990, Dr Williams developed the ***co-disposal of mine tailings and coarse-grained mining wastes*** to achieve improved engineering behaviour and the more efficient use of an available storage volume. This included the pumped co-disposal of coal mine washery wastes, and the combined disposal of waste rock and thickened tailings into disused open pits. The pumped co-disposal of coal mine tailings and coarse reject reduces the volume taken up by the wastes compared with their conventional separate disposal; potentially allows greater water recovery; leads to rapid drainage and strength gain of the co-disposed mixture; facilitates ready and progressive rehabilitation of the combined wastes; and may assist in reducing spontaneous combustion and acid mine drainage. It has been adopted at about ten coal mines in Australia and at a number of coal mines in Indonesia. The combined disposal of waste rock and thickened tailings is being investigated or employed at a number of mines in Australia, PNG, North America, and in Sweden.

From 1991 to 1997, Dr Williams researched ***moisture movement within coal mine spoil piles*** at MIM's Oaky Creek Coal Mine. These were rehabilitated using a new internally draining technique, and the research showed that rainfall infiltration into fine-grained spoil materials penetrated no more than about 8 m below the surface, and

was available for subsequent uptake by vegetation. This technique has been adopted at two of MIM's open cut coal mines.

From 1994 to 2000, Dr Williams researched the ***analysis of the vane shear strength test***. Laboratory and field vane shear strength testing of soils and mine tailings has led to the development of a new theoretical model for the vane shear strength test. This takes into account measured pore pressures induced by the insertion of the vane into the soil and by subsequent shearing of the soil.

From 1995, Dr Williams has been researching ***scale effect in assessing acid mine drainage***. The potential for mine wastes to generate acidity is generally assessed using Acid Base Accounting and Net Acid Generating laboratory tests, with laboratory column testing used to assess time rate effects. These laboratory-based tests may not well represent or simulate field conditions. Research has been carried out at both laboratory and field scales to better relate field acid mine drainage to laboratory test conditions, allowing more accurate and reliable prediction of field performance from laboratory test results. The relative merits of the various laboratory test methods used has also been investigated, with a view to standardising the test equipment and methods.

From 1996, Dr Williams developed the ***store/release cover system*** suited to seasonally dry climates, for application to covering acid generating rock dumps at Kidston Gold Mine in north Queensland, and has had a long-term involvement in researching and monitoring this cover system, as evidenced by his numerous papers on his research on this topic. The store/release cover system on the tops of the Kidston rock dumps has been shown to limit percolation to less than 1% of rainfall, and to support a sustainable vegetation cover comparable to that occurring along water courses in the area. He was also involved in the development of a rehabilitation strategy for the side slopes of the rock dumps at Kidston designed to maximise geotechnical and erosional stability while promoting vegetation, and analysed the wetting up by rainfall infiltration and subsequent drain-down of and seepage from the rock dumps. Store/release covers have now been adopted at numerous mine sites in dry climates worldwide.

From 1996, Dr Williams developed the ***engineered rehabilitation of coal mine spoil piles***. While considerable effort and expense has been devoted to the rehabilitation of spoil piles in the Bowen Basin Coalfields of central Queensland, the results have not proved entirely successful. Conventional rehabilitation of spoil piles has been driven by the vision of a post-mining grazing land-use, requiring the regrading of angle of repose slopes (about 37^{o} or 75%) to 8.5^{o} or 15%, the construction of temporary drainage works, and topsoiling and seeding with introduced pasture grasses. It has proved difficult to successfully revegetate reshaped spoil, and erosion rates have been excessive. There is a need to focus instead on minimising the offsite impacts of spoil piles and to apply engineering techniques to best achieve this aim. This approach is being incorporated into the rehabilitation plans for many open cut coal mines.

From 1999, Dr Williams has ***applied high-resolution digital stereo-photography to the monitoring of erosion from mined landscapes***, and to monitoring the evolution of mine landscapes over time. High-resolution digital stereo-photography is a powerful tool for readily and cost-effectively monitoring erosion and sedimentation from mined

landscapes. It can be carried out aerially for an overall assessment, and from the ground for more detailed studies of particular features. Capturing digital images of the same landscape over time allows erosion and sedimentation rates and their relationship to material types, topography and climate to be determined. The success of remedial works in reducing erosion and sedimentation can also be assessed by the same techniques. Dr Williams has established a number of monitoring sites at mines in Queensland and Western Australia to further develop and prove the technique, and has proposed that the technique be applied to a highly erodable site in New Caledonia.

From 1999 to 2001, Dr Williams led ACARP Project C8039 to develop a ***risk assessment and cost-effectiveness analysis for the rehabilitation of Bowen Basin coal mine spoil***. The results of the project were reported in a Literature Review and Commentary and Project Final Report, plus a spreadsheet-based risk assessment and cost-effectiveness analysis, available at: www.uq.edu.au/civil/. In 2006, Dr Williams undertook a closure study for Xstrata's new Rolleston Coal Project in the Bowen Basin Coalfields.

Dr Williams has since 2000 been involved in the ***closure design for the waste rock dump at Cadia Hill Gold Mine*** in New South Wales, including studies on the use of mixtures of benign trafficked rock and tailings as an alternative cover material, to overcome the shortage of suitable natural materials. In 2002/3, he led an international peer review of the rock dumping operation and closure plan. In 2004, Dr Williams was successful in an ARC Linkage grant application with Cadia totalling over $ 700,000 over 3 years, which has led to the construction of a 15 m high, world-class, demonstration, instrumented rock dump covering 7,000 m^2. The instrumentation includes a full weather station, 24 lysimeters at the base of the dump to monitor seepage, lysimeters on the top surface to monitor rainfall infiltration and three store/release trial covers constructed using natural and mine waste materials. To date it has shown that about 70% of the rainfall incident on the traffic-compacted top of the dump infiltrates, with the majority going into storage within the dump during the first year, and only small amounts percolating to the base of the dump. The behaviour of the cover trials has to date been dominated by the moisture state at which they were constructed. Monitoring of the instrumented rock dump is expected to continue for at least 10 years.

From 2000 to 2003, Dr Williams was a principal researcher into the ***physical and geochemical nature of acid generating waste rock dumps*** in Southern Carolina, USA (Rio Tinto's Ridgeway Mine) and Sudbury, Canada (Inco's Whistle Dump), sampled as they were being excavated and moved to a pit.

From 2001, Dr Williams has researched the ***potential use of waste rock and tailings mixtures as cover materials*** for potentially contaminating mine wastes. The shortage of natural cover materials for potentially contaminating mine wastes is driving the need for alternatives. Mixtures of inert waste rock and tailings have shown high potential as alternative cover materials.

From 2001, Dr Williams has researched ***mined landform evolution and design***, based on natural analogues. It must be recognised that all landforms, whether or not they have been altered by human activities (and most have), evolve over time. Mined landforms should be designed, constructed and rehabilitated in sympathy with their

surroundings, recognising that they too will evolve over time. Natural analogues are key indicators of the landform shape and surface cover that mined landforms should achieve if they are to minimise environmental impact and be sustainable. Research is underway on a number of fronts to further develop mined landform design principles.

From 2001 to 2005, Dr Williams led an ARC Spirt research project with industry partner WMC Resources focussed on an ***assessment of the long-term seepage and runoff from mine tailings storage facilities, to facilitate lease surrender***. This included the monitoring of trial covers on tailings over the duration of the project and large-scale laboratory column testing and numerical analyses. Natural salt pan and rocky slope analogues under the same climatic and similar geochemical conditions were also studied to point to sustainable approaches for rehabilitating the tailings storage facilities.

Dr Williams has been sponsored by mining companies and consultants to visit numerous mining regions and mine sites worldwide, both to impart and extend his knowledge. Since 2000, he has developed a relationship with the International Network for Acid Prevention (INAP), and has contributed to INAP-sponsored research and development projects and workshops involving mine sites in the USA, Canada, Australia and PNG.

Research funding has totalled almost $5 million, including funding from ARC, ARC-SPIRT, ARC Linkage, NERDDC, ACARP-AMIRA, ACARP, MIM CRA-ATD, Kidston Gold Mines, BHP Coal and WMC Resources, Cadia Holdings, and Jubilee Mines N.L. Dr Williams has 193 refereed publications, with about two-thirds of them in the mine waste field.

4.2 Refereed Publication Record

Dr Williams' detailed refereed publication record is given in Appendix A, which lists his 3 invited book chapters, 60 refereed journal publications in journals of high standing, 123 refereed international, regional and national conference papers, and 7 other refereed publications, giving a total of 193 refereed publications over his 24-year tenure at The University of Queensland.

He has published 131 refereed papers over the 12 years since his promotion to Reader in 1994 (an average rate of 11 papers/year). The majority of his refereed publications have come from research that Dr Williams has initiated and supervised, with the authorship shared among his research higher degree students and postdoctoral fellows, whom he has mentored over the years. Also listed in Appendix A are articles promoting Dr Williams' research achievements. His numerous consulting reports are not listed, though a number are discussed elsewhere in this application.

Dr Williams initiated and has been appointed the lead author of a book entitled "Engineered Mine Site Reclamation – Planning, Design & Construction for Cost-Effective Mine Closure" to be published by Kluwer. A synopsis of the book is included as Appendix B.

The journals in which Dr Williams has published are of the highest international standing in the geomechanics field. They include the American Society of Civil

Engineers Journal of Geotechnical and Geoenvironmental Engineering, the American Society for Testing Materials Geotechnical Testing Journal, the Canadian Geotechnical Journal, Earth Surface Processes and Landforms, Engineering Geology, Geotechnique, the International Journal of Environmental Management and Health, the International Journal of Surface Mining and Reclamation, the Transactions of The Institution of Mining and Metallurgy, London, and Soil Science.

The cumulative numbers of refereed publications (book and book chapters, journal publications, conference papers, and other refereed publications) over time are plotted on Figure 1. Figure 1 shows a dramatic increase in the cumulative number of refereed publications over time, and highlights the change in emphasis over the last ten years towards book and journal publication and carefully targeted conference papers at key international conferences, to increase their impact.

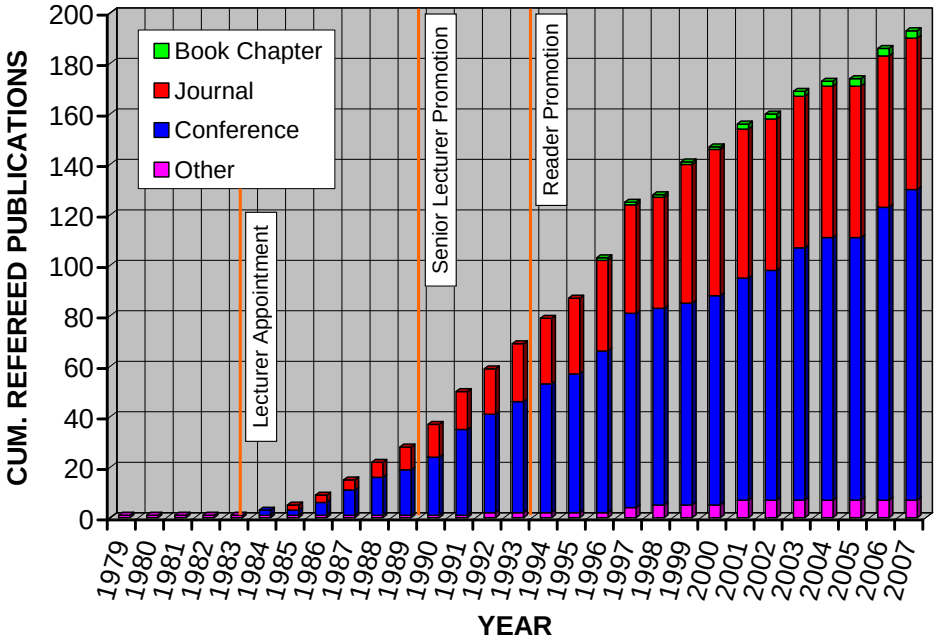

Figure 1 Cumulative numbers of refereed publications over time

4.3 Research Recognition

International recognition of Dr Williams' research achievements has come in the form of invited book chapters and papers, invited lectures, invited Editorial Board Memberships, numerous presentations at universities, conferences and to industry internationally, and in his expertise being widely sought by the minerals industry worldwide, as summarised in the following.

1. ***Three invited book chapters***, one in an Australian publication and the other two in international publications.
2. ***Two invited international journal articles***.
3. ***Two invited national journal articles***.
4. ***Invited Lecture and paper*** on Mined Landform Design at the 2nd Australia-New Zealand Conference on Environmental Geotechnics, Newcastle, 2001.

5. ***Invited Lecture*** on Assessment of Embankment Parameters at the Slope Instability in Surface Mining Symposium, Denver, 2001.
6. ***Invited Keynote Lecture*** on Innovative Tailings Disposal Options at the 3rd International and 21st Annual Minerals Council of Australia Environmental Workshop, Newcastle, 1996.
7. ***Invited Keynote Lecture*** on Tailings Dams at the 3rd International Conference on Environmental Issues and Management of Waste in Energy and Mineral Production, Perth, 1994.
8. ***Session Chair*** at a number international conferences, in the USA, Canada, Australia, Brazil and China.
9. ***Invited Member of the Editorial Board of the prestigious international journal Engineering Geology*** from 1995.
10. ***Invited Member of the Editorial Board of the International Journal of Environmental Issues in Minerals and Energy Industry*** from 1992.
11. ***Chair of Working Group for Tailings Management Handbook (2006)***, Leading Practice Sustainable Development Program for the Mining Industry. Australian Government, Department of Industry Tourism and Resources, 79 pp.
12. ***Member of Working Groups for Mine Rehabilitation and Managing Acid and Metalliferous Drainage Handbooks (2006))***, Leading Practice Sustainable Development Program for the Mining Industry. Australian Government, Department of Industry Tourism and Resources.
13. ***Numerous invited lectures, seminars and workshops to universities internationally***, including The University of Queensland, Cambridge University; Oxford University; City University, London; Danish Geotechnical Institute; Universities of British Columbia, Western Ontario, Manitoba, Alberta, Saskatchewan, and École Polytechnique, Montréal, Canada
14. ***Numerous conference presentations internationally***.
15. ***Numerous invited lectures, seminars and workshops to consultants and companies internationally***, including Golder Associates Inc, Calgary, Canada, September 1992, and at various times in Toronto; Steffen Robertson Kirsten, Johannesburg, South Africa, January 1993 and June 1996; Geo-Eng Australia, Latrobe Valley, Victoria, August 1993 and July 1995, and Beijing, China, November 1993.

4.4 Research Leadership and Collaboration

Dr Williams is a strong initiator of research and collaboration with academic colleagues and with industry. Internationally, he actively collaborates with the following researchers and industry groups.

1. ***Professor Ward Wilson at the University of British Columbia in Canada***, on research projects, applied research, and expert reviews of waste management at operating mines at Kidston, Queensland; Cadia, NSW; Savage River, Tasmania; and Porgera, PNG.

2. ***Various United States academics***, including Professor Dirk van Zyl at the University of Nevada at Reno; Professor Chuck Shackelford at Colorado State University; and Professor Paul Ziemkiewicz at West Virginia University.
3. ***International Network for Acid Prevention (INAP)***, and industry-sponsored research and technology transfer group.
4. ***Applied research collaboration with industry***, including Rio Tinto, INCO and Placer Dome, located in the USA, Canada and PNG.

Nationally, Dr Williams actively collaborates with the following researchers and industry groups.

1. ***The Australian Centre for Minerals Extension and Research (ACMER)***, Brisbane, as an active participant in research initiatives and the provision of continuing professional education short courses.
2. ***Researchers at the Division of Exploration and Mining, CSIRO, Brisbane***.
3. ***Professor John Carter, then at the University of Sydney***, on early numerical analysis of tailings sedimentation, self-weight consolidation, desiccation, and loading.
4. ***Professor Martin Fahey and Associate Professor Richard Jewell*** at the University of Western Australia; on laboratory testing and field testing of tailings.
5. ***The Australian Nuclear Science and Technology Organisation (ANSTO)***, Acid Mine Drainage Group on various projects.
6. ***Applied research collaboration with industry***, including BHP Billiton Coal, Kidston Gold Mines, WMC Resources, Cadia Hill Gold Mine, and the Savage River Rehabilitation Project.

Within The University of Queensland, Dr Williams actively collaborates with the following academic colleagues, and encourages other academic staff in the pursuit of their own career goals.

1. ***Professor Hal Gurgenci***, CRC Mining, on a joint ACARP Project.
2. ***Dr David Mulligan***, and other members of the Centre for Mined Land Rehabilitation (CMLR), on various mine site rehabilitation research projects, including Kidston Gold Mines, Queensland.
3. ***Associate Professor David Lockington and Dr Bill Clarke***, Environmental Engineering, the former on Dr Williams' ARC-SPIRT Project and both on joint Research Higher Degree supervision.
4. ***Dr Rob Day***, Civil Engineering, on joint Research Higher Degree supervision.
5. ***Associate Professor Sue Golding***, Earth Sciences, on collaborative research at Kidston Gold Mines, Queensland and elsewhere.
6. Informal associations with a range of academics at the ***Sustainable Minerals Institute (SMI), the Julius Kruttschnitt Mineral Research Centre, the Division of Mining Engineering, and the CRC Mining***.

Details of some of the collaborative research projects initiated by Dr Williams are listed in order from the most recent in the following.

1. ***Cadia Hill Gold Mine and the University of British Columbia (UBC), 2003-2006***. This ARC Linkage and Cadia Holdings Pty Ltd-funded project, in association with UBC, aims to develop innovative landform and closure designs for potentially contaminating surface waste rock dumps, including alternative dump slope profiles, covers and surface treatments. A PhD-level Australian Postgraduate Award (Industry, APAI) is attached to the project.
2. ***Queensland Main Roads Department and Golder Associates Pty Ltd, 2002-2005***. This ARC Linkage, QMRD and Golder-funded project aims to develop a risk assessment and cost-effective analysis model applicable to QMRD's geotechnical roadway assets, including fills, cuttings, creek crossings and poor foundation conditions. An MPhil-level APAI is attached to the project.
3. ***Landloch Pty Ltd and Placer Dome Inc, 2002***. This R & D Start Graduate project, also supported financially by Landloch and Placer Dome of Vancouver aims to set criteria for the successful closure of Misima Mine in the wet tropics of PNG. An MPhil-level research student was attached to the project.
4. ***Environmental Geochemistry International Pty Ltd (EGi) and the International Network for Acid Prevention (INAP), 2001-2003***. This R & D Start Graduate project, also supported financially by EGi, and Rio Tinto, INCO and Placer Dome through INAP, aims to hydrologically and geochemically characterise old waste rock dumps that have been excavated at mine sites in the USA and Canada. The information gained will be used to develop improved waste rock dumping design and construction methodologies aimed at preventing acid production. An MPhil research student was attached to the project, and has graduated.
5. ***WMC Resources Limited, 2000 onwards***. This ARC-SPIRT and WMC Resources-funded project aims to facilitate the cost-effective and timely closure and lease surrender of tailings storage facilities in the arid Kalgoorlie mining region of Western Australia. A PhD-level APAI is attached to the project.
6. ***Australian Coal Association Research Program, BHP Coal Pty Ltd, and Golder Associates Pty Ltd, 1996-2001***. This research commenced between Dr Williams and BHP Coal Pty Ltd, who commissioned Dr Williams to access the scope for the engineered rehabilitation of coal mine spoil piles. The completion of this review led to a successful application by Dr Williams, in association with Golder Associates, for funding through ACARP (Project C8039), to develop a risk assessment and cost-effectiveness tool to facilitate the rehabilitation and surrender of Bowen Basin open cut coal mine spoil areas.
7. ***Centre for Mined Land Rehabilitation, 1995 to 2001***. Collaboration with the Unsaturated Soils Group within the Department of Civil Engineering at the University of Saskatchewan and the Department of Agriculture at The University of Queensland on mine closure research at Kidston Gold Mines Limited.

8. ***CRA-Advanced Technology Development, 1995-1997***. A CRA-ATD-funded project, in association with one of their coal mines, investigating the relationship between laboratory-based tests for assessing acid generating potential and measured field performance at a range of scales, to allow the more accurate and reliable prediction of field performance.

9. ***Department of Agriculture, The University of Queensland and MIM Holdings Pty Ltd, 1991-1997***. An MIM-funded project involved collaboration with Associate Professors Clive Bell and Bing So of the Department of Agriculture, and with personnel at Oaky Creek Open-Cut Coal Mine. The project investigated the movement of moisture within rehabilitated overburden spoil piles, and its effect on stability, at Oaky Creek Mine.

10. ***ARCO Coal Australia Inc, Gordonstone Coal Mine, 1991***. Contract Research with ARCO involved the investigation of the geotechnical aspects of the co-disposal of tailings and coarse reject by combined pumping.

11. ***Department of Civil Engineering, The University of Manitoba, Canada, 1990-1994***. A Commonwealth Bilateral Science and Technology Collaborative Research Award enabled collaboration with Professor Jim Graham, of The University of Manitoba in Canada, on analysing the cracking of soils.

12. ***Department of Civil Engineering, Kobe University, Japan, 1990 and 1996***. Funding provided under a Masuda Fellowship enabled collaboration with academic staff in the Department of Civil Engineering at Kobe University, analysing the observed settlement of man-made islands. This was followed by appointment as a Japan Society for the Promotion of Science Fellow at Kobe University in 1996.

13. ***Imperial College of Science and Technology, London, 1989 and 1996 onwards***. A UQ Collaborative Travel Grant allowed collaboration with Dr David Potts, leading to his making his general purpose geotechnical program ICFEP available to The University of Queensland.

14. ***School of Civil and Mining Engineering, The University of Sydney, 1988 onwards***. Collaboration with Professor John Carter and Dr Nigel Balaam, led to the development of the one-dimensional finite element computer program TAIL for analysing the behaviour of coal mine tailings deposited as a slurry. It also led to improvements to the two-dimensional finite element computer program AFENA, and provided impetus for the development of the computer program TSEEP for the analysis of transient, unsaturated flow.

15. ***BHP Engineering Pty Ltd, 1988 to 1990***. Contract Research with BHP Engineering Pty Ltd involved the site investigation for and monitoring of a trial embankment on crusted coal mine tailings at Peak Downs Coal Mine, aimed at assessing the feasibility of upstream raising of the tailings dam on top of tailings.

16. ***New Hope Corporation Pty Ltd, 1986-1993***. New Hope Corporation, operators of New Hope and Jeebropilly Collieries, in the Ipswich Coalfields, provided "field laboratories" for much of the early research on the behaviour of "wet" coal mine tailings deposits, of deposits formed on the co-disposal of tailings and coarse reject by combined pumping, and of open-cut backfilling. The New Hope Colliery site was used in 2001 to successfully trial the application of high resolution digital stereo-photography to monitoring erosion off bare angle of repose spoil slopes.
17. ***CSIRO, Division of Geomechanics, 1986 to 1988***. A CSIRO/UQ Collaborative Research Grant enabled the limited investigation of the strength and deformation parameters of coal mine spoil pile materials.

4.5 Research Funding Sources and Amounts

The majority of Dr Williams' research funding has been at his initiative and with he as the Principal Chief Investigator. Research funding to date totals almost $ 5 million in cash, not including the significant in-kind contributions by The University of Queensland and the various industry partners. In-kind contributions from ARC-SPIRT and ARC Linkage industry partners alone total over $ 1 million. The cash component has been sourced from a wide range of government-based and industry sources.

The cumulative level of research funding (cash contributions) achieved by Dr Williams during his tenure at The University of Queensland is plotted on Figure 2. At Lecturer level, Dr Williams' average annual research funding level was about $ 30,000. At Senior Lecturer level, it averaged about $ 160,000 annually, and at Reader level it has averaged $ 280,000 annually.

Figure 2 highlights the dramatic increase in industrial research funding achieved during the 1990s, and the equally dramatic increase in ARC and R & D Start funding, in collaboration with industry partners, since the late 1990s. This is predominantly the result of three successful ARC-SPIRT/Linkage Grant applications since 2000 (a 100% success rate, compared with the national average success rate of about 50%). The research grants awarded during Dr Williams' tenure at The University of Queensland are summarised in Table 1.

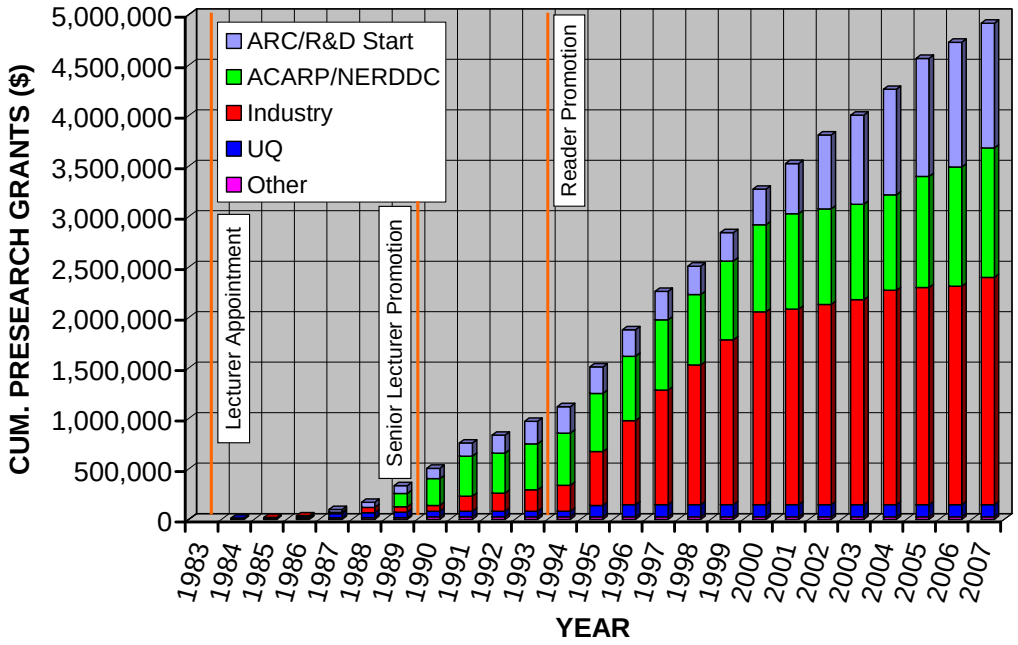

Figure 2 Cumulative research funding (cash) over time

Table 1 Summary of research funding

Year(s)	Research Project	Granting Agency	Cash ($)	Chief Investigators	% Contrib
07-09	Tailings Water Balance	Jubilee Mines N.L.	82,500	D.J. Williams D.A. Williams	70 30
06-07	Product Coal Dewatering	***ACARP***	198,000	D.J. Williams S. Whitton	90 10
2005	Haul Road Watering	***ACARP***	155,000	H. Gurgenci D.J. Williams	60 40
04-06	Development of Innovative Landform and Closure Designs for Potentially Contaminating Surface Waste Rock Dumps	***ARC Linkage*** Cadia Holdings UBC	520,780	D.J. Williams B. Perry G.W. Wilson	80 15 5
02-03	Risk Assessment Applied to Geotechnical Roadway Assets	***ARC Linkage*** QMRD Golder	171,300	D.J. Williams V. Wijey. M.J. Gowan	80 20
01-03	Mine Closure in Wet Tropics	***R&D Start Grad.*** Landloch Placer Dome Inc.	100,000 (Total = 247,000)	D.J. Williams R. Loch	50 50
01-02	Hydrological and Geochemical Characterisation of Mine Waste Rock	***R&D Start Grad.*** EGi INAP	100,000 (Total = 431,480)	D.J. Williams S.D. Miller	50 50
00-02	Long-Term Seepage and Runoff from Tailings Storage Facilities	***ARC-SPIRT*** WMC Resources	290,598	D.J. Williams G.M. Bentel	80 20
99-01	Risk Assessment Applied to Bowen Basin Coal Mine Spoil Rehabilitation	***ACARP*** Golder	248,100	D.J. Williams M.J. Gowan	80 20
1997	Novel Techniques for Evaluating Sustainability of Mine Site Rehabilitation	***ARC (Small)***	20,000	S.D. Golding D.J. Williams	50 50

Table 1 *continued*

Year(s)	Research Project	Granting Agency	Cash ($)	Chief Investigators	% Contrib
96-97	Engineered Rehabilitation of Coal Mine Spoil Piles	BHP Coal	50,000	D.J. Williams	100
95-00	Co-Disposal, Waste Rock Dump Cap, and Tailings Revegetation	Kidston Gold Mines Limited	1.5 m	D.R. Mulligan D.J. Williams	67 33
95-97	Acid Mine Drainage	CRA-ATD	77,000	D.J. Williams	100
93-97	Co-Disposal of Coal Washery Wastes	***ACARP/AMIRA***	300,000	D.J. Williams	100
95-96	Soil covers on waste rock	UQ Quality	15,000	D.J. Williams	100
1995	Development of an environmental modelling laboratory	UQ Quality	50,000	D.J. Williams D.A Mulligan	50 50
1994	Risk analysis applied to transmission tower piers	QEC	15,000	D.J. Williams	100
1994	Vane shear analysis	***ARC (Small)***	20,174	D.J. Williams	100
92-94	Shaking table experiments	***ARC (Small)***	58,500	D.J. Williams	100
1991	Co-disposal of coal washery wastes	Gordonstone Colliery	29,300	D.J. Williams	100
1991	Co-disposal of coal washery wastes	Ensham Coal Project	25,000	D.J. Williams	100
91-94	Hydrology of ponded coal mine spoil piles	MIM Holdings	124,363	D.J. Williams L.C. Bell B. So	34 33 33
90-91	Disposal of coal washery wastes	Ebenezer Coal Mine	11,000	D.J. Williams	100
90-93	Pier load testing	***AESIRB***	106,882	D.J. Williams	100
1990	Application of soil mechanics theory	Bilateral Sci & Tech Coll Res	8,250	D.J. Williams	100
89-91	Integrated disposal of coal mine washery wastes	***NERDDC***	396,760	D.J. Williams D. Haneman	67 33
1988	Bearing capacity of Peak Downs Mine tailings	BHP Eng.	8,900	D.J. Williams	100
1988	Bearing capacity of Moura Mine tailings	BHP-Utah Coal	10,000	D.J. Williams	100
85-86	Fly ash addition to cement treated pavement materials	QMRD	9,100	D.J. Williams	100
1985	Brisbane soils database	IEAust	1,500	D.J. Williams	100
1984	Strength/deformation behaviour of clay rocks	UQ Special Project	14,000	D.J. Williams	100
TOTAL			**$ 4.92 m**		

Government-based sources of research funds have included the Australian Research Council (ARC, and its predecessor the Australian Research Grant Scheme, ARGS), the National Energy Research Development and Demonstration Council (NERDDC), the Australian Cool Association Research Program (ACARP, the successor to NERDDC), the Australian Minerals Industry Research Association (AMIRA), the Australian Electricity Supply Industry Research Board (AESIRB), the R & D Start Graduate Program, the Bilateral Science and Technology Collaborative Research Program, the Commonwealth Department of Science, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and funds distributed by The University of Queensland.

Industry sources of research funds have included Queensland Main Roads Department, Placer Dome Inc of Vancouver, WMC Resources Limited, BHP Coal Pty Ltd, Kidston Gold Mines Limited, CRA-Advanced Technology Development, Jubilee Mines N.L., Queensland Electricity Commission, Gordonstone Colliery, Ensham Coal Project, MIM Holdings Pty Ltd, Ebenezer Coal Mine, BHP Engineering Pty Ltd, and the Institution of Engineers, Australia.

4.6 Future Research and Funding Directions

Dr Williams' major research contributions in the future will be in the areas of improved mine waste disposal and mine site rehabilitation practices to most cost-effectively minimise environmental impacts, mine waste risk assessment and management, the remediation of mine site environmental impacts, mine design for closure, the engineered mitigation of the spontaneous combustion of coal mine rejects and spoil, and the improved dewatering of product coal. To this end, he will continue to identify and pursue opportunities for collaboration with other researchers and industry, and leveraging with government research funding.

Dr Williams has excellent and high level contacts within industry, with whom he works closely on a number of fronts. To satisfy industry's more immediate needs, he is frequently engaged as a specialist consultant. This allows a relationship to be developed, enabling industry's longer term needs to be explored, which can then be addressed on a research basis. An example of the model followed is Dr Williams' long-standing relationship with the international Geotechnical, Mining and Environmental Engineering Consultancy Golder Associates. Flowing from his employment with the company in the early 1980s, Dr Williams has maintained a close working relationship with Golder personnel throughout Australia and North America. This has involved exchange visits, Golder sponsorship of an ARC Industry Fellowship taken up by Dr Williams in 1993, joint research through ACARP Project C8039 and a current ARC-Linkage Project (with Queensland Main Roads Department), internal Golder-sponsored research on tailings paste, and consulting and testing services to Golder.

Over the period from late 2001 to late 2002, Dr Williams has had a very active role assisting Golder, in partnership with the Bechtel-Hatch Project Management Team, in their work on the Goro Nickel Project on New Caledonia. This work has continued sporadically during 2003 and 2004. Given the climatic and geological setting of the site, this project poses many engineering and environmental challenges, and the resources required to investigate these at a sophisticated level are available at The University of Queensland. It is expected that research projects will flow from this involvement during the projected 25-year operating life of the mine. Discussions have been initiated with senior personnel of INCO in Canada, the majority partner in the project, with the aim of pursuing collaborative research and training opportunities with The University of Queensland. Given the University's geographic location close to New Caledonia and its high research and teaching reputation, these have been met very favourably. INCO strongly supports four Canadian Universities through endowed chairs and research funding.

Drawing on The University of Queensland-Thiess Partnership, Dr Williams and Thiess personnel have identified three areas of potential collaboration, given in the following.

1. Handling acid mine drainage and related contaminants at Thiess' mining operations.
2. Adding value to Thiess' mining operations through mined landform design and sustainable future land-use, including training opportunities.
3. Contributing to Thiess' bid for construction and mining contracts at the Goro Nickel Project, and other nickel projects, on New Caledonia.

Dr Williams has initiated contact with Bechtel personnel in Brisbane, with the aim of exploring the potential for collaboration. Bechtel recognise that they recruit more Civil Engineers than any other engineering discipline, engaged in a diverse range of activities, and wish to develop a closer working relationship with Civil Engineering at The University of Queensland. Bechtel's recent involvement in two major projects, the Gladstone QAL expansion and the Goro Nickel Project, stretched their resources, prompting the desire to link up with expertise available at The University of Queensland. Similarly, Consultants Sinclair Knight Merz and Hatch wish to develop further their relationship with Civil Engineering at The University of Queensland. The University of Queensland-Thiess Partnership offers a possible model for collaboration between the University and other industry groups.
Dr Williams will continue to pursue ARC-Linkage and R & D Start funding, in collaboration with industry partners, following on from his successes of recent years (all of his applications for ARC-Linkage and R & D Start Graduate Program funding were very well supported by industry and all were successful).

Dr Williams will pursue more international collaboration through the ARC-Linkage International Scheme, his established links with researchers in North America and Brazil, and through the International Network for Acid Prevention (INAP). INAP was established in the recognition that acid mine drainage is the major threat facing the minerals industry, and the organisation is committed to bringing together the best expertise available worldwide to address this issue. Dr Williams has played a key role as a researcher in response to this commitment, being involved in the INAP-sponsored "Waste Rock Characterisation" Research Project, along with an international team of researchers, and in moves to establish a "Co-Disposal" Research Project.

5 TEACHING EXPERIENCE

On top of his normal undergraduate and postgraduate teaching load, Dr Williams has shown innovation in teaching through resource-based learning, and has an enviable record of success in mentoring higher degree students to successful completion of their theses. He has been a very active participant at International and National Conferences, and in initiating and presenting Continuing Professional Engineering Courses, plus industry seminars and workshops.

Dr Williams has had prime responsibility for the teaching of Soil Mechanics subjects to Civil, Mining and Environmental Engineering students at The University of

Queensland since June 1983. His major Undergraduate involvement has included E2315 (1983-1990, 1992-1999), E2365 (1995-1999), E2235 (2000), CIVL2210 (from 2001), E2431 1984-1986, 1988-1997), E2461 (1996-1999), E2432 (1983-1997), E2445 (intermittently), CIVL4220 (2000), CIVL4240 (2002-2004) and MINE4000 (2005 onwards). In addition, Dr Williams has supervised undergraduate project and thesis students throughout his tenure.

He has also had involvement in the undergraduate teaching of Ag461 (1995-1996), E1450 / 1837 (1994-1995), E2201 (1983), E2202 (1983), E2312 (intermittently), E2411 (1983-1999), E2413 (intermittently), E2419 (intermittently), E2437 / 2438 (1983-1999), E4210 (1983) and ENGG1000 (from 2000).

Dr Williams' major Postgraduate involvement has included E2801 (1984), E2810 (1984), E2812 (1989), E2807 / 2814 (1984, 1988, 1990, 1991, 1993, 1996, 1997), E2815 (1986, 1990, 1992), E2885 (1994), E2896 (1993), E2897 (1985), E2898 (1985, 1989, 1990, 1993), E5849 (1995, Soil Mechanics part), CIVL7290 (2001-2004) and MINE7000 (2005 onwards).

Dr Williams introduced significant new or revised teaching material to undergraduate courses E2315, E2431, E2432 and E2411. The undergraduate course E2437/8 was completely updated and revised. All of the new undergraduate courses E2365, E2445, E2461 CIVL4240/MINE4000 were developed from scratch, as have all of the postgraduate courses.

5.1 Innovation in Teaching

Based on his wide experience of mine sites worldwide, and the mine waste disposal and mine site rehabilitation issues they raise, Dr Williams developed a CD-ROM-based Masters and advanced Undergraduate-level Course on Mine Waste Management and Landform Design (MINE7000/4000, previously CIVL7290/4240), suitable for remote external or internal delivery. The course material was based on 13 modules presented in the form of separate powerpoint presentations. Also developed for this course were a comprehensive Learning Guide and Reader, and comprehensive assessments, some of which are accessed through Blackboard (previously WebCT). The course content was updated for Semester 1, 2005.

The course was first offered in Semester 1, 2001 under the Master of Mineral Resources Program, and has been offered in every year since, attracting a total of 400 students (44 postgraduates and 356 undergraduates). In Semester 1, 2001 it was directed primarily towards postgraduates and attracted 20 students (18 postgraduates and 2 mining exchange undergraduates from Europe). The postgraduates were located at mines across Australia, plus 1 each from Canada and South Africa.
In Semester 2, 2001 it was directed primarily at advanced undergraduates, attracting 71 undergraduates and 3 Queensland-based postgraduates. In Semester 1, 2002 it was

again directed primarily at undergraduates, attracting 42 undergraduates, 2 NSW-based postgraduates and 1 postgraduate from a mine in Peru. In Semester 1, 2003 it attracted 69 undergraduates, and 6 postgraduates. In Semester 1, 2004 it attracted 110 undergraduates and 7 postgraduates, and in Semester 1, 2005 it attracted 63 undergraduates and 7 postgraduates, 6 from around Australia and 1 from the UK. A number of the undergraduate enrolments have been from universities other than The University of Queensland. Opportunities to extend the course to broader markets are being actively pursued.

5.2 Higher Degree Research Supervision

Dr Williams has been the sole or Principal Advisor of 12 successful PhD candidates (plus the Associate Supervisor of 1 successful PhD candidate), 9 successful MEngSc candidates, the Associate Supervisor of 1 successful MEc candidate, the Principal Supervisor of 1 MPhil candidate, and the sole Supervisor of 7 successful MEngSt candidates, giving a total of 31 successful Higher Degree candidates to date. The MEngSt program ceased to be offered after 1994. He currently has 2 full-time PhD candidates and 1 full-time MPhil candidate under his Principal Supervision. Dr Williams' performance in the supervision of higher degrees is demonstrated graphically on Figure 3, which shows his clear focus on PhD supervision since the late 1980s.

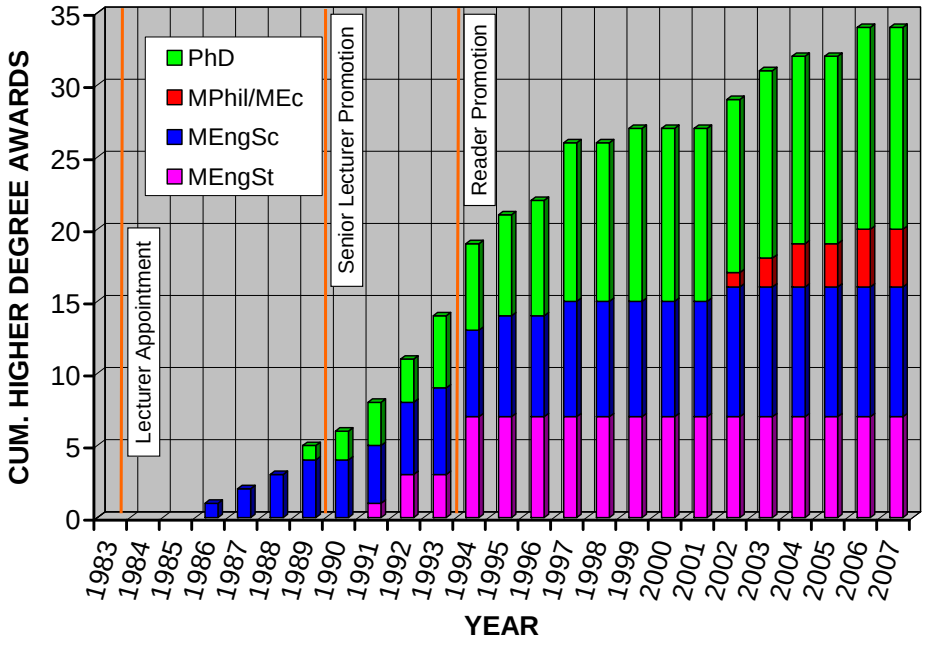

Figure 3 Cumulative higher degree awards successfully supervised

Table 2 summarises Dr Williams' supervision of higher degree research at The University of Queensland. The majority of the Research Postgraduate Students (24), and all of those who commenced since Dr Williams' promotion to Reader, were funded by scholarships from a variety of sources, including the following.

- 9 Commonwealth, ARC, or APAI Scholarships.
- 5 Queensland Main Roads Department Scholarships.
- 9 Industry Scholarships.

- 2 Iranian Government Scholarships.

Dr Williams is currently the Principal Advisor of 1 full-time PhD students (one of whom is due to submit shortly) and 2 MPhil students.

5.3 Contributions to Continuing Professional Education

Dr Williams' extensive involvement in Continuing Professional Education Courses is summarised in Table 3. Original Bound Workshop Notes were produced for courses 2, 4, and 6 to 18. Courses 7 and 11 were successful in attracting grants from the Commonwealth Department of Science under the Bilateral Science and Technology Program, of $ 5,000 and $ 8,250, respectively. The Workshops have generated a substantial surplus for the Department of Civil Engineering at The University of Queensland, including the establishment of a one-off Postgraduate Scholarship for $ 10,000 in 1992. Some of the courses were augmented by assignments and offered for credit towards a higher degree.

Table 2 Summary of higher degree research supervision

Degree	P/T or F/T	Student	Date of Enrolment	Date Awarded	P or A & % Supervision
MEngSc	P/T	G Fahey		06/86	P; 100%
MEngSc	P/T	A Litwinowicz *		03/87	P; 100%
MEngSc	F&P/T	R E Rawlings *		09/88	P; 80%
PhD	P&F/T	R W Seedsman		10/88	P; 80%
MEngSc	P/T	R C Morgan		01/89	P; 50%
PhD	F/T	P H Morris #		12/90	P; 100%
PhD	P/T	F Bullen		02/91	P; 100%
MEngSt	P/T	R L Mann		07/91	P; 100%
MEngSc	F&P/T	G Strohfeldt		07/92	P; 100%
MEngSt	P/T	P Glover		07/92	P; 100%
PhD	F/T	J-Z Zou #		03/93	P; 100%
MEngSt	F/T	G Ravitraj		12/92	P; 100%
MEngSc	F&P/T	G J Hobbs *		04/93	P; 50%
PhD	F&P/T	J W Sibley #		08/93	P; 80%
MEngSt	P/T	B Poulsen		04/94	P; 100%
MEngSt	P/T	M Stawski		07/94	P; 100%
PhD	F/T	H-Y Li #		06/94	P; 100%
MEngSt	P/T	T MacBeth		07/94	P; 100%
MEngSt	P/T	A Watson		07/94	P; 100%
PhD	F&P/T	V Kuganathan #		06/95	P; 100%
PhD	P/T	U M Iyer		10/97	P; 100%
PhD	P&F/T	B Look *		09/96	P; 100%
PhD	P/T	H R Asche		03/03	A; 50%
MEngSc	F/T	D J Stirling ^		12/95	P; 100%
MEngSc	P/T	K Berry ^		10/97	P; 50%
PhD	F/T	M Ghazavi **		09/97	P; 100%
PhD	F/T	A Naderian **		04/97	P; 90%
PhD	P/T	D Allen ^ ?	02/94		P; 100%
MEngSc	F&P/T	D O'Toole ^		03/02	P; 100%
PhD	F/T	D Rassam ^		06/99	P; 100%
PhD	F/T	K Bethune # ?	04/95		P; 80%
MEc	F/T	B Golding ^		06/02	A; 50%
MPhil	P/T	A-B Tran ^		03/04	P: 50%
PhD	F/T	D J Stolberg #	06/01	01/06	P; 90%
MPhil	P/T	C Voucher ^ ?	06/01		P; 50%
MPhil	F/T	M Creagh # *	05/02	07/06	P; 50%
PhD	F/T	T Rohde #	12/03		P; 90%
MPhil	P/T	P Chapman ^	01/06		P; 90
MPhil	P/T	J Holub	01/06		P; 90

* Queensland Main Roads Department Scholarship Holder (5 in total).
\# Commonwealth / ARC / APAI Scholarship Holder (9 in total).
^ Industry Scholarship Holder (9 in total).
** Iranian Government Scholarship Holder (2 in total).
? Darren Allen withdrew due to illness, Kirsty Bethune to care for her new-born baby, and Cameron Voucher to take up full-time employment.

Table 3 Involvement in Continuing Professional Education Courses

DATE		TOPIC	DAYS	ATTENDANCE	INVOLVEMENT
09	83	1. Soft Soil Problems (to Indonesian Engineers)	2.5	20 each	Lecturer, Demonstrator
06	84				
01	85				
07	85				
09	86				
11	84	2. Introduction to Earthquake Engineering	2	33	Co-Convenor, Lecturer
04	85	3. Piling	0.5	95	Convenor, Introducer, Discussion Leader
09	85	4. Investigation, Analysis and Treatment of Soft Clay Sites	2	60	Co-Convenor, Lecturer
03	86	5. Critical State Soil Mechanics	1	30	Convenor, Lecturer
08	86	6. Mine Tailings Disposal	2	60	Co-Convenor, Lecturer
08	87	7. Soil Mechanics Theory, Computation and Laboratory Practice	4	70	Convenor, Lecturer
11	87	8. Second Earthquake Engineering Workshop	3	45	Co-Convenor, Lecturer
08	88	9. Basement Excavations - Theory, Design and Litigation	3	52	Convenor, Lecturer
07	89	10. Piling	2	70	Convenor, Lecturer
07	90	11. Application of Soil Mechanics Theory	2	35	Convenor, Lecturer
07	91	12. Design of Transmission Line Structures	5	40	Lecturer
08	92	13. In-Situ Testing and its Application to Geotechnical Engineering	2	34	Convenor, Lecturer
08	92	14. Mine Wastes - Disposal, Rehabilitation and Legislation	3	46	Convenor, Lecturer
06	93	15. Use and Interpretation of Cone Penetration Testing for Foundation and Groundwater Studies	3	26	Convenor, Introducer
07	93	16. Design of Transmission Line Structures - Foundations	5	34	Lecturer
07	93	17. Drilled Shaft Foundations	2	40	Convenor, Introducer
07	97	18. Using *SoilCover* to Cap Wastes	2.5	34	Convenor, Introducer
TOTALS			**56.5**	**904**	

Dr Williams has been engaged to contribute to the following Continuing Professional Education Courses, run by others on a commercial basis.

1. *Australian Centre for Minerals Extension and Research (ACMER) Short Course on Environmental Management in Mining for the Queensland EPA, 23-25 May 2005, Rockhampton.*
2. *ACMER Short Course on Designing Sustainable Covers for Mine Wastes, 28 August 2004, Perth.*

3. *ACMER Workshop on Tailings, 26-27 August 2004, Perth.*
4. *ACMER Short Course on Environmental Management for the Minerals Industry, 21-22 April 2004, Brisbane.*
5. *ACMER Short Course on Improved Landform Design for Mine Site Operation and Closure, 18-19 February 2004, Brisbane.*
6. *ACMER Workshop on Sustainable Mine Closure, 23-24 October 2003, Adelaide*.
7. *International Conference on Acid Rock Drainage (ICARD) Short Course by D.J. Williams, G. W. Wilson and M. Rykaart on Management of Acid Rock Drainage Potential to Achieve Cost-Effective Mine Site Rehabilitation and Closure, 13 July 2003, Cairns*.
8. *University of British Columbia (UBC) Short Course by D. J. Williams and G.W. Wilson.*
9. *ACMER Short Course on Design of Covers for Saline, Sodic and Sulphidic Wastes, 10 November 2002, Newcastle*.
10. *ACMER Workshop on Mined Landform Design, led by Dr David Williams, 26 July 2001 in Perth and 23 May 2002 in Melbourne*.
11. *IIR Tailings Workshop # 2, led by David Williams, 4 July 2001, Perth*. "Preventing Tailings Accidents Through Sustainable Tailings Management".
12. *IIR Tailings Summit, 2-3 July 2001, Perth*. "Optimising the Rehabilitation of Tailings - Latest Developments".
13. *ACMER Seminar on Erosion and Sediment Control, 28-29 August 2000, Adelaide*. "Geotechnical Stability, Pits and Risk Assessment".
14. *ACMER Workshop on Rehabilitation Issues for the Coal Industry in Queensland, 19-20 July 1999, Emerald*. "Progress Report on ACARP Project C8039 - Risk Analysis Applied to Spoil Rehabilitation".
15. *ACMER Workshop on Future Directions in Tailings Environmental Management, 14-15 September 1998, Perth*. "Physical Processes and Capping of Sub-Aerially Deposited Tailings Slurry".
16. *ACMER Workshop on Environmental Issues in decommissioning Mine Sites, 9-10 March 1998, Brisbane*. "Waste Rock and Waste Material Stockpiles.
17. *IIR Tailings Summit, 15-16 October 1996, Sydney*. "Innovative Tailings Disposal Concepts and Practices.
18. *ACMER Workshop on Post-Mining Landform Stability and Design, 18-20 September 1996, Brisbane*. "Industry Practice in Post-Mining Waste Rock Dump Design - Overseas Trends".

5.4 Conference, University and Industry Presentations

Dr Williams has made well over 120 oral presentations, relating his research activities and the application of his research findings, at International and National Conferences, universities worldwide and to industry worldwide. These have included over 40 conference presentations internationally, over 40 seminars to universities internationally, and over 40 seminars to industry internationally. His seminars to universities internationally have included the following.

1. Over 15 at The University of Queensland, including one at the Julius Kruttschnitt Mineral Research Centre.
2. Three at Cambridge University, one at Oxford University, and one at City University, London, in the UK.
3. One at the Danish Geotechnical Institute, Copenhagen.
4. Two at the University of British Columbia, one at the University of Western Ontario, two at the University of Manitoba, one at the University of Alberta, one at the University of Saskatchewan, and two at École Polytechnique, Montréal, in Canada.
5. Eight to various universities in Brazil.
6. Two at the University of Nevada at Reno, USA.

His seminars to industry have included the following.

1. Eight to Consulting Engineers Golder Associates in Brisbane and Melbourne, in Calgary and Toronto, Canada and in Denver, USA.
2. Three to Consulting Engineers Steffen Robertson Kirsten in Vancouver, Canada, and in Johannesburg, South Africa (two).
3. One to Consulting Engineers Klohn Crippen in Vancouver, Canada.
4. Three to Consulting Engineers Geo-Eng Australia in the Latrobe Valley (two) and in Beijing, China.
5. Several to industry groups in Brazil.
6. Two to BHP Coal Pty Ltd in Brisbane.
7. Three to INAP in Vancouver, Denver and Cairns.
8. Numerous seminars at mine sites and to mining companies worldwide.

During his 22-year career at The University of Queensland, Dr Williams has initiated and organised visits to The University of Queensland by over 30 eminent worldwide Geomechanics practitioners, including a 1985 University of Queensland Visiting Professor, Dr Dick Parry then of Cambridge University, England. Other eminent visitors have included Professor John Atkinson of the City University London, Dr Gernot Beer then of CSIRO Brisbane, Professor Dick Campanella of the University of British Columbia Canada, Professor John Carter of the University of Sydney, Professor Ian Donald then of Monash University, Professor Jim Graham of the University of Manitoba Canada, Professor Fred Kulhawy of Cornell University USA, Dr Marcis Kurzeme of Golder Associates in Melbourne, Dr Jack Morgan of Golder Associates in Melbourne, Professors David Potts and Richard Jardine of Imperial

College London, Professor Harry Poulos of Sydney University, Professor Mark Randolph of the University of Western Australia, Professor Peter Robertson of the University of Alberta Canada, Don Welch of Golder Associates in Toronto Canada, Professor Ward Wilson then of the University of Saskatchewan Canada, and the late Professor Peter Wroth of Oxford University England.

Dr Williams' very active engagement with industry enables training needs to be identified, which have been served through informal seminars, targeted short courses, and study tours.

5.5 Student Evaluation of Teaching

The University of Queensland Teval Student Assessments have been carried out for most undergraduate and postgraduate subjects taught. The results for Dr Williams' undergraduate teaching and course material are summarised in Tables 4(a) and (b), respectively. The ratings are on a scale from 1 (very poor) through 4 (satisfactory) to 7 (outstanding), with the later 5-point ratings converted to the previous 7-point ratings scale. Dr Williams' average undergraduate ratings have generally been at or above the Teval averages across The University of Queensland. Third year ratings have been at about the University averages, while the fourth year ratings have typically been above the University averages, particularly for elective courses (E2437/8 and E2461 and CIVL4240/MINE4000). The teacher ratings have typically been a little higher than the course material ratings, as is common across the University.

The results for Dr Williams' postgraduate teaching and course material are summarised in Tables 5(a) and (b), respectively. Dr Williams' postgraduate ratings have generally been well above the University Teval averages and dependent on the material covered. The teacher ratings have typically been a little higher than the course material ratings. Copies of the detailed Teval printouts are available on request.

Table 4(a) Summary of undergraduate Teval teacher ratings

YEAR	COURSE					
	E2315/65	**E2431**	**E2432**	**E2437/8**	**E2461**	**E2445**
1984	4.6					
1985	5.1	5.0	5.1			
1986	5.5	5.0	4.7	5.4		
1987	5.3		5.1	5.2		
1988	4.9	4.1	4.5	4.8		
1989	4.4	4.5				
1990	4.9	4.9	5.3			
1991		5.1				
1992	5.4	4.7	4.7			
1993						
1994	5.2	5.8		5.8		5.8
1995	4.0	5.5	5.4			
1996	4.9			5.6		
1997		5.1				
1998	4.6	4.6				
1999	5.1	4.4			5.5	
2000		4.1				
Averages	**4.9**	**4.8**	**5.0**	**5.4**	**5.5**	**5.8**
Code change	**CIVL2210**				**CIVL4240/ MINE4000**	
2001						
2002	5.6					
2003						
2004						
2005						
2006						
2007						
Averages	**5.6**					

Table 4(b) Summary of undergraduate Teval course material ratings

YEAR	COURSE					
	E2315/65	**E2431**	**E2432**	**E2437/8**	**E2461**	**E2445**
1984	4.6					
1985	4.7	4.7	4.7			
1986	5.1	4.7	4.2	5.3		
1987	4.7		4.6	5.2		
1988	4.2	4.5	4.4	4.8		
1989	3.8	4.3				
1990	4.6	4.4	4.7			
1991		4.6				
1992	5.1	4.5	4.5			
1993						
1994	4.5	5.2		5.8		5.8
1995	4.2	4.8	4.9			
1996	4.6			5.5		
1997		4.7				
1998	4.5	4.5				
1999	4.9	4.7			5.4	
2000		4.1				
Averages	**4.9**	**4.6**	**4.6**	**5.3**	**5.4**	**5.8**
Code change	**CIVL2210**				**CIVL4240/ MINE4000**	
2001						
2002	5.3					
2003					5.9	
2004						
2005						
2006						
2007					4.8	
Averages	**5.3**				**5.3**	

Table 5(a) Summary of postgraduate Teval teacher ratings

YEAR	COURSES					
	E2801	**E2812**	**E2814**	**E2815**	**E5849**	
1984	5.8		5.8			
1985						
1986				5.5		
1987						
1988			5.6			
1989			5.6			
1990		5.4				
1991			5.8			
1992				5.8		
1993						
1994						
1995					6.1	
1996						
1997						
1998						
1999						
2000						
Averages	**5.8**	**5.4**	**5.7**	**5.7**	**6.1**	
Code change	**CIVL7210**		**CIVL7220**			**CIVL7290/ MINE7000**

Table 5(b) Summary of postgraduate Teval course material ratings

YEAR	COURSES					
	E2801	**E2812**	**E2814**	**E2815**	**E5849**	
1984	6.0		5.7			
1985						
1986				5.3		
1987						
1988			5.0			
1989			5.0			
1990		4.7				
1991			5.6			
1992				5.8		
1993						
1994						
1995					6.1	
1996						
1997						
1998						
1999						
2000						
Averages	**5.8**	**5.4**	**5.7**	**5.7**	**6.1**	
Code change	**CIVL7210**		**CIVL7220**			**CIVL7290/ MINE7000**
2001						5.7
2002						
2003						5.6
2004						
2005						
2006						
2007						5.2
Average						**5.5**

6 SERVICE

Dr Williams' service profile covers contributions at The University of Queensland, to his academic discipline, to his profession and to those under his academic supervision.

6.1 At The University of Queensland

Among the many administrative roles that Dr Williams has assumed during his tenure at The University of Queensland, the following are highlighted.

1. Deputising for the Head of Civil Engineering since 2001.
2. Deputy Director of the Centre for Mined Land Rehabilitation from 1997 to 1999.
3. Elected member of the Engineering Faculty Executive for three years from 1994 to 1996.
4. Invited member of the School of Engineering Executive Planning and Research Committee during 2001.
5. Serving on the University Promotions and Reappointments Reader Sub-Committee for Physical Sciences, Engineering and Architecture from 2000 to 2002, a year longer than the normal 2-year term.
6. Serving on University Appointments Committees both to Civil Engineering and to cognate Departments.
7. Civil Engineering Postgraduate and 4th Year Advisor for various terms from 1991.
8. Civil Engineering Co-Ordinator of Graduate Employment and Convenor of Courses and Careers, from 1999.
9. Civil Engineering Co-Ordinator and a keen promoter of the Undergraduate Site Learning Program since its inception.
10. Member of the Women in Engineering Faculty Committee from 1993 to 1996.
11. Establishment of an Exchange Agreement between The University of Queensland and the University of Saskatchewan, Canada in 1996.
12. Academic Fellow of St John's College, UQ, from 2005, following an association with the College spanning over 10 years.

6.2 Contributions to Academic Discipline

Dr Williams has made extensive and continuing contributions to his academic discipline, as highlighted in the following.

1. Member of the Editorial Boards of the international Journals:
    (a) *Engineering Geology* from 1995.
    (b) *International Journal of Environmental Issues in Minerals and Energy Industry* from 1992.

2. Member of the Organising Committees for:
    (a) Water in Mining Conference 2003, held in Brisbane 2003.
    (b) 6th International Conference on Acid Rock Drainage held in Cairns, 2003.
    (c) 3rd International Conference on Environmental Issues and Management of Waste in Energy and Mineral Production held in Perth, 1994.
    (d) Conference on Probabilistic Methods in Geotechnical Engineering, held in Canberra, 1993.
3. Session Chair at a number international conferences, in the USA, Canada, Australia, Brazil and China.
4. Regular Reviewer for the International Journals:
    (a) *Engineering Geology*.
    (b) *Canadian Geotechnical Journal*.
    (c) *Computers in Geotechnics*.
    (d) *International Journal of Environmental Issues in Minerals and Energy Industry*.
5. Reviewer of a range of International Journals, including:
    (a) *Geotechnique*.
    (b) *ASCE Journal of Geotechnical and Geoenvironmental Engineering*.
    (c) *Transactions of The Institution of Mining and Metallurgy*.
    (d) *Journal of Geotechnical and Geological Engineering*.
    (e) *Advances in Environmental Research*.
6. Regular Reviewer for International, Regional and National Conference papers.
7. Regular reviewer of ARC research grant applications.
8. Occasional reviewer of Canadian National Science and Engineering Research Council grant applications.
9. Higher degree thesis examination for numerous Australian universities (including James Cook, Monash, Melbourne, Queensland, Sydney, Western Australia and Wollongong) and Canadian universities (Saskatchewan and British Columbia).

6.3 Service to Profession

Dr Williams has maintained very active service to the Profession, as highlighted in the following.

1. Member of the Institution of Engineers, Australia, Queensland Division Committee for 1985.

2. Member of the Australian Geomechanics Society Queensland Branch Committee almost continuously from 1983, including Queensland Vice-Chairman in 1984 and Chairman in 1985, and the Queensland Representative on the National Committee of the Australian Geomechanics Society from 1984 to 1986 and from 2007.
3. Mechanical Testing Laboratory Assessor for the National Association of Testing Authorities from 1983 to 1999.
4. Convenor of and lecturer to over 20 Professional Continuing Education short courses.

Through his administrative and academic roles, Dr Williams has taken a keen interest in the mentoring of graduates, postgraduates, and postdoctoral fellows, assisting them academically and in their career choices. He is regularly contacted by former graduates and postgraduates for career advice.

Dr Williams also offers career and academic advice to Secondary School students, and makes technical presentations to service organisations such as Rotary and Lions.

7 PROFESSIONAL EXPERIENCE

Dr Williams has undertaken an extensive and broad range of high level consulting commissions since joining The University of Queensland, initially focussing on building foundation and slope failures, and more recently focussing on mine waste disposal and mine site rehabilitation projects throughout Australasia and overseas.

7.1 Range of Consulting Services

Dr Williams has been involved in peer reviews for the following major projects:

- Led International Peer Reviews for the Savage River Rehabilitation Project in Tasmania in 2002 and 2005 – the next review is planned for 2008
- Led International Peer Review on handling acid generating waste rock dumping and dump closure strategies at Cadia Hill Gold Mine in New South Wales in 2002/3
- Member of the peer review team for Stage 2 of the Stuart Oil Shale Project at Gladstone in Queensland in 2004
- Peer reviewer of the rehabilitation of the San Manuel Copper Mine tailings facility in Arizona, USA in 2004
- Member of the 2005 peer review team that reviewed future red mud disposal, containment and rehabilitation at QAL at Gladstone in Queensland in 2005
- Geotechnical reviewer of the breach of the co-disposal dam at Burton Coal in Queensland in 2005
- Peer reviewer of the conceptual closure plan for Worsley Alumina red mud storage in Western Australia in 2005

- Peer reviewer for waste rock dump covers for Century mine in Queensland in 2007.
- During 2006 and 2007, Dr Williams has been an advisor to the EIS team for the Olympic Dam Expansion Project in South Australia, providing expert input on disposal, hydrology and closure issues for both waste rock and tailings.

Dr Williams has undertaken the following expert witness projects:

- Expert witness through Corrs Chambers Westgarth Lawyers, in relation to coal washery rejects used as filling for residential sub-division purposes
- Expert witness through McCullough Robertson Lawyers, in relation to the failure of a concrete arch reclaim tunnel beneath a coal stockpile
- Expert witness in relation to professional misconduct cases brought by the Queensland Professional Engineers Registration Board
- Numerous expert witness commissions related to residential and commercial building footing failures and slope instability

Dr Williams is also widely sought for his expert input, in particular to mine waste disposal and mine site rehabilitation and remediation at operating mines throughout Australia and overseas. In Australia, he has consulted on numerous coal mines throughout Queensland and New South Wales; on Red Dome Gold Mine closure, Kidston closure, Osborne waste disposal, Ivanhoe Cloncurry mine closure, Phosphate Hill gypsum disposal, QERL processed waste storage facility closure, and Century Zinc Mine waste rock dumping in Queensland; Cadia Hill Gold Mine waste rock dumping and dump closure in New South Wales; Mt Morgans Gold Mine co-disposal, and WMC Resources' nickel operations tailings closure in Western Australia; waste disposal issues at the Ballarat East and Heathcote gold mines in Victoria; and a review of ARD treatments at Savage River Mine in Tasmania. Overseas he has consulted on tailings depositional design and water balance for the Kori Kollo Mine in Bolivia, a review of co-disposal of tailings and waste rock at Porgera Gold Mine and the closure of Misima Gold Mine in PNG, waste disposal design for the Goro Nickel project in New Caledonia, and advice on co-disposal for the Martabe Project in Indonesia.

Dr Williams has been involved in material characterisation testing and the design of numerous mine waste covers throughout Australia, and the design, installation and monitoring of lysimeters and mine waste covers at Kidston Gold Mines, WMC Resources' Mt Keith Nickel Operations, QERL's Stuart Oil Shale Project, a large-scale trial waste rock dump at Cadia Hill Gold Mine, and a large-scale trial tailings cell at Jubilee Nickel Mine.

Dr Williams has been invited to visit numerous mining regions and individual mines throughout Australia, and in Canada, the USA, Brazil, South Africa, UK, China, Chile, PNG, New Caledonia, and Spain.

APPENDIX A - BIBLIOGRAPHY

Dr Williams' bibliographic record, detailed below in order from the most recent in the following, comprises ***193 refereed publications***, including 3 book chapters, 60 refereed journal articles, 123 refereed conference publications, and seven other refereed publications. Dr Williams' percentage contribution to each publication is indicated in brackets. Those authors attached to The University of Queensland at the time of paper preparation are highlighted in upper case. In addition, he has had published 26 unrefereed research reports and Workshop Notes, 17 promotional articles, and numerous consulting reports (not listed).

Book Chapters

1. WILLIAMS, D.J. Chapter 17: Placing covers on soft tailings. In: *Ground Improvement-Case Histories*, 491-512. Eds B. Indraratna and Chu Jian. Elsevier, 2005. ***(Invited)***. (100%)
2. WILLIAMS, D.J. Chapter 30: Assessment of Embankment Parameters. In: *Slope Stability in Surface Mining*, 275-284. Eds W.A. Hustrulid, M.J. McCarter and D.J.A Van Zyl. Society for Mining, Metallurgy, and Exploration, Inc., Littleton, Colorado, USA. 2001. ***(Invited)***. (100%)
3. WILLIAMS, D.J. Chapter 7: Minimisation and Management of Solid Wastes. In: *Environmental Management in the Australian Minerals and Energy Industry*, 157-188. Ed D.R. Mulligan. Sydney, UNSW Press in association with Australian Minerals and Energy Environment Foundation, 1996. ***(Invited)***. (100%)

Refereed Journal Articles

1. WILLIAMS, D.J. Engineering closure of an open pit gold operation in a semi-arid climate. *International Journal of Surface Mining and Reclamation, Special Edition on Mining and the Environment*, **16**, **4**, 270-288. 2002. ***(Invited)***. (100%)
2. WILLIAMS, D.J. Prediction of erosion from steep mine slopes. *International Journal of Environmental Management and Health*, **12**, **1**, 35-50. 2001. ***(Invited)***. (100%)
3. MORRIS, P.H. and WILLIAMS, D.J. The porosity of co-disposed coalmine wastes. *International Journal of Surface Mining, Reclamation and Environment*, **14**, 63-73. 2000. (33%)
4. MORRIS, P.H. and WILLIAMS, D.J. A revision of Blight's model of field vane testing. *Canadian Geotechnical Journal*, **37**, 1089-1098. 2000. (33%)
5. RASSAM, D.W. and WILLIAMS, D.J. A dynamic method for determining the soil water characteristic curve for coarse-grained soils. *ASTM Geotechnical Testing Journal*, **23**, **1**, 67-71. 2000. (40%)
6. MORRIS, P.H. and WILLIAMS, D.J. A worldwide correlation for exponential bed particle size variation in sub-aerial aqueous flows. *Earth Surface Processes and Landforms*, **24**, 835-847. 1999. (33%)
7. MORRIS, P.H. and WILLIAMS, D.J. Segregation of co-disposed coal mine washery wastes. *Canadian Institute of Mining Bulletin*, **92**, 72-76. 1999. (33%)
8. MORRIS, P.H. and WILLIAMS, D.J. Some comments on the prediction of mine waste beach slopes. *International Journal of Surface Mining, Reclamation and Environment*, **13**, 31-36. 1999. (33%)
9. MORRIS, P.H. and WILLIAMS, D.J. Worldwide correlations for sub-aerial aqueous flows with exponential longitudinal profiles. *Earth Surface Processes and Landforms*, **24**, 867-879. 1999. (33%)
10. RASSAM, D.W. and WILLIAMS, D.J. A dynamic method for determining the soil water characteristic curve. *ASTM Geotechnical Testing Journal*, **2**, **2**, 138-146. 1999. (40%)

11. RASSAM, D.W. and WILLIAMS, D.J. A numerical study of steady state evaporative conditions applied to mine tailings. *Canadian Geotechnical Journal*, **36**, 640-650. 1999. (40%)
12. RASSAM, D.W. and WILLIAMS, D.J. A relationship describing the shear strength of unsaturated soils. *Canadian Geotechnical Journal*, **36**, 363-368. 1999. (40%)
13. RASSAM, D.W. and WILLIAMS, D.J. Bearing capacity of desiccated tailings. *ASCE Journal of Geotechnical and Geoenvironmental Engineering*, **125**, **7**, 600-610. 1999. (40%)
14. RASSAM, D.W. and WILLIAMS, D.J. Engineering properties of gold tailings. *International Journal of Surface Mining, Reclamation and Environment*, **13**, 91-96. 1999. (40%)
15. RASSAM, D.W. and WILLIAMS, D.J. Three-dimensional effects on slope stability of high waste rock dumps. *International Journal of Surface Mining, Reclamation and Environment*, **13**, 19-24. 1999. (40%)
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19. MORRIS, P.H. and WILLIAMS, D.J. Co-disposal of washery wastes at Jeebropilly Colliery, Queensland, Australia. *Transactions IMM, A : Mining Industry*, **106**, A25-A29. 1997. (33%)
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26. MORRIS, P.H. and WILLIAMS, D.J. Prediction of mine tailings delta profiles. *Transactions IMM, A : Mining Industry*, **105**, A63-A68. 1996. (33%)
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31. WILLIAMS, D.J. Lateral thinking on mine site rehabilitation. *Australian Geomechanics*, **29**, 71-80. 1995. (100%)
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55. WILLIAMS, D.J. Potential engineering risks in the earthquake hazard to the east coast of Queensland. *IEAust, Civil Engineering Transactions*, **CE30/5**, 307-317. 1988. (100%)

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59. WILLIAMS, D.J. and Parry, R.H.G. Experimentally determined distribution of stress around a horizontally loaded model pile in dense sand. *IEAust, Civil Engineering Transactions*, **CE27/3**, 263-268. 1985. ***(Invited)***. (90%)

60. WILLIAMS, D.J. and Walker, L.K. Laboratory and field strength of mine waste rock. *IEAust, Civil Engineering Transactions*, **CE27/3**, 299-305. 1985. ***(Invited)***. (90%)

Refereed Conference Publications

1. CREAGH, M.S., WILLIAMS, D.J. and Wijeyakulasuriya, V. Fault tree analysis and risk assessment for the performance of unbound granular paving materials. *Proceedings of Twenty-second Australian Road Research Board Conference, Canberra, Australia, 29 October - 2 November 2006*, 1-19. ARRB, 2006. (20%)

2. WILLIAMS, D.J. Application of unsaturated soil mechanics to product coal dewatering. *Proceedings of 2006 Australian Mining Technology Conference, Hunter Valley, Australia, 26-27 September 2006*, 223-235. AusIMM, 2006 (100%)

3. WILLIAMS, D.J. Mine closure as a driver for waste rock dump construction. *Proceedings of First International Seminar on Mine Closure, Perth, Australia, 13-15 September 2006*, 697-706. ACG, 2006. (100%)

4. WILLIAMS, D.J. and Kline, J.T. Innovative mine closure design based on observations of mine and natural analogues. *Proceedings of First International Seminar on Mine Closure, Perth, Australia, 13-15 September 2006*, 559-568. ACG, 2006. (90%)

5. WILLIAMS, D.J., MULLIGAN, D.M. and Currey, N.A. A Reflection and analysis of the waste rock dump closure strategies at Kidston Gold Mine. *Proceedings of First International Seminar on Mine Closure, Perth, Australia, 13-15 September 2006*, 463-472. ACG, 2006. (60%)

6. STOLBERG, D.J and WILLIAMS, D.J. Large-scale column testing of hypersaline tailings. *Proceedings of 5th International Congress on Environmental Geotechnics, Cardiff, Wales, 26-30 June 2006*, **II**, 976-983. Thomas Telford, 2006. (40%)

7. WILLIAMS, D.J. and STOLBERG, D.J. Erosional stability of tailings storage facilities in an arid climate. *Proceedings of 5th International Congress on Environmental Geotechnics, Cardiff, Wales, 26-30 June 2006*, **II**, 999-1006. Thomas Telford, 2006. (60%)

8. WILLIAMS, D.J., ROHDE, T.K, STOLBERG, D.J. and Pope, G. Alternative design and instrumentation of covers over potentially acid forming mine wastes. *Proceedings of 5th International Congress on Environmental Geotechnics, Cardiff, Wales, 26-30 June 2006*, **II**, 1007-1014. Thomas Telford, 2006. (60%)

9. WILLIAMS, D.J. and STOLBERG, D.J. Field performance of capillary break covers over hypersaline tailings in an arid climate. *Proceedings of 4th International Conference on Unsaturated Soils, Carefree, Arizona, 2-6 April 2006*, **1**, 777-788. ASCE, Geo Institute, 2006. (60%)

10. WILLIAMS, D.J., STOLBERG, D.J. and Currey, N.A. Long-term performance of a "store/release" cover over potentially acid forming waste rock in a semi-arid climate. *Proceedings of 4th International Conference on Unsaturated Soils, Carefree, Arizona, 2-6 April 2006*, **1**, 756-776. ASCE, Geo Institute, 2006. (80%)

11. WILLIAMS, D.J., STOLBERG, D.J. and Currey, N.A. Long-term performance of Kidston's "store/release" cover system over potentially acid forming waste rock dumps. *Proceedings of Seventh International Conference on Acid Rock Drainage, St Louis, Missouri, USA, 26-30 March 2006*, 2385-2396, 2006. (80%)

12. WILLIAMS, D.J. The case for revolutionary change to mine waste disposal and rehabilitation. *Proceedings of Second International Seminar on Strategic versus Tactical Approaches to Mining, Perth, Australia, 8-10 March 2006*, 19 pp. ACG, 2006. (100%)

13. WILLIAMS, D.J. and STOLBERG, D.J. Erosional stability of tailings storage facilities in and arid climate. *Proceedings 11th International Conference on Tailings and Mine Waste '04, Vail, Colorado, 10-13 October 2004*, 55-61. Leiden, A.A. Balkema, 2004. (70%)

14. STOLBERG, D.J. and WILLIAMS, D.J. Cover systems for tailings storage facilities in an arid climate. *Proceedings 11th International Conference on Tailings and Mine Waste '04, Vail, Colorado, 10-13 October 2004*, 153-159. Leiden, A.A. Balkema, 2004. (50%)

15. WILLIAMS, D.J., Loch, R.J. and Vacher, C. Risk assessment applied to tunnel erosion of mine spoils. *Proceedings 11th International Conference on Tailings and Mine Waste '04, Vail, Colorado, 10-13 October 2004*, 63-70. Leiden, A.A. Balkema, 2004. (80%)

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17. WILLIAMS, D.J., Currey, N.A. and Ritchie, P.J. Successful tailings dam design, construction, operation and closure - a case study. *Proceedings of International Symposium on Major Challenges in Tailings Dams (ICOLD 2003), Montréal, Canada, 15 June 2003*, 320-330. 2003. (80%)

18. Fines, P., Wilson, G.W., WILLIAMS, D.J., TRAN, A.B. and Miller, S. Field characterisation of two full-scale waste rock piles. *Proceedings of 6th International Conference on Acid Rock Drainage, Cairns, Australia, 14-17 July 2003*, 903-909. 2003. (15%)

19. TRAN, A.B., Miller, S., WILLIAMS, D.J., Fines, P. and Wilson, G.W. Geochemical and mineralogical characterisation of two contrasting waste rock dumps - the INAP waste rock dump characterisation project. *Proceedings of 6th International Conference on Acid Rock Drainage, Cairns, Australia, 14-17 July 2003*, 939-947. 2003.
(15%)WILLIAMS, D.J., Currey, N.A. and Ritchie, P.J. Kidston waste rock dump design and "store and release" cover system seven years on. *Proceedings of 6th International Conference on Acid Rock Drainage, Cairns, Australia, 14-17 July 2003*, 419-426. 2003.
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25. WILLIAMS, D.J., Currey, N.A. and Ritchie, P.J. and Briese, E.H. A case study of water management on closure of an open pit mining operation in North Queensland, Australia. *Proceedings of Water in Mining 2003, 13-15 October 2003, Brisbane, Australia*, 323-330. 2003. (80%)

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28. WILLIAMS, D.J., STOLBERG, D.J., Soole, P. and Poropat, G. Monitoring erosion off unvegetated mine tailings facilities and natural slopes using high-resolution, digital stereo-photography. *Proceedings of 4th International Congress on Environmental Geotechnics, 11-15 August 2002, Rio de Janeiro, Brazil*, 291-295. 2002. (67%)

29. WILLIAMS, D.J. Mined landform design. *Proceedings of 2nd Australia-New Zealand Conference on Environmental Geotechnics, 28-30 November 2001, Newcastle,* Australia, 18 pp. 2001. ***(Invited)***. (100%)

30. WILLIAMS, D.J., Wilson, G.W., Currey, N.A. and Ritchie, P.J. Engineering aspects of the rehabilitation of an open pit gold operation in a semi-arid climate. *Proceedings of 26th Annual Minerals Council of Australia Environmental Workshop, 14-19 October 2001, Adelaide*, 19 pp. 2001. ***(Invited)***. (80%)

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40. BETHUNE, K.J., WILLIAMS, D.J. and LOCKINGTON, D.A. Acid mine drainage: Comparison of laboratory testing to mine site conditions. *Proceedings of 4th International Conference on Acid Mine Drainage, Vancouver, Canada, 31 May to 6 June 1997*, 305-318. 1997. (33%)

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42. GHAZAVI, M., WILLIAMS, D.J. and MORRIS, P.H. Analysis of piles subjected to uplift loads. *Proceedings of 2nd International Symposium on Structures and Foundations in Civil Engineering, Hong Kong, 7-10 January 1997*, 7 pp. Hong Kong University of Science and Technology, 1997. (33%)

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55. LI, H. and WILLIAMS, D.J. Physical and numerical modelling of combined sedimentation/ consolidation of coal tailings. *Proceedings of 7th Australia - New Zealand Conference on Geomechanics, Adelaide, Australia, 1-5 July 1996*, 808-813. Eds M.B. Jaksa, W.S. Kaggwa and D.A. Cameron. Canberra, IEAust National Conference Publication 96/07, 1996. (33%)

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70. WILLIAMS, D.J. and Gowan, M.J. Operation of co-disposal of coal mine washery wastes. *Proceedings of 2nd International Conference on Tailings & Mine Waste '94, Fort Collins, USA, 19-21 January 1994*, 225-233. Rotterdam, A.A. Balkema, 1994. (80%)

71. WILLIAMS, D.J., Van Zyl, D. and Gowan, M.J. ***Invited*** *Keynote Lecture, Stream C: Waste Management, Tailings Dams*. 3rd International Conference on Environmental Issues and Management of Waste in Energy and Mineral Production, Perth, 30 August - 1 September 1994, 15 pp. 1994. (80%)

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81. WILLIAMS, D.J. and KUGANATHAN, V. Co-Disposal of coal mine tailings and coarse reject. *Proceedings of 3rd Large Open Pit Mining Conference, Mackay, Australia, 30 August - 3 September 1992*, 429-432. Melbourne, AusIMM, 1992. (80%)

82. WILLIAMS, D.J. and ZOU, J.-Z. Location of critical slip surfaces in coal mine spoil piles. *Proceedings of 6th Australia - New Zealand Conference on Geomechanics, Christchurch, New Zealand, 3-7 February 1992*, 468-473. Christchurch, New Zealand Geomechanics Society, 1992. (50%)

83. MORRIS, P.H. and WILLIAMS, D.J. Factors influencing calibration of nuclear moisture gauges. *Proceedings of 3rd International Symposium Field Measurements in Geomechanics, Oslo, Norway, 9-11 September 1991*, 3-12. Ed G. Sorum. Rotterdam, A.A. Balkema, 1991. (40%)

84. WILLIAMS, D.J. Developments in coal mine tailings disposal and rehabilitation. *Proceedings of Queensland Coal Symposium, Brisbane, Australia, 29-30 August 1991*, 169-175. Melbourne, AusIMM, 1991. (100%)

85. WILLIAMS, D.J. and LI, H.-Y. Effect of solute suction on behaviour of swelling clays. *Proceedings of 9th Asian Regional Conference on Soil Mechanics and Foundation Engineering, Bangkok, Thailand, December 1991*, 4 pp. 1991. (50%)

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93. YAN, S.-W. and WILLIAMS, D.J. Deformation of reconstituted clay under cyclic loading. *Proceedings of 2nd International Conference on Recent Advances in Geotechnical Engineering and Soil Dynamics, Rolla, USA, 11-15 March 1991*, I, 307-310. 1991. (40%)

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