

DR STEVEN PELLIS

BE (Civil) Hons, MEngSc, Ph.D.

Educational Qualifications: Bachelor of Engineering (Civil) (Hons), UNSW Australia, 2000
Master of Engineering Science, UNSW Australia, 2001
Doctor of Philosophy, UNSW Australia, 2016

Professional Associations: Member, IAH - International Association of Hydrogeologists
Member, ANCOLD - Australian National Committee on Large Dams
Member, IAHR – International Association of Hydraulic Research

FIELDS OF SPECIALISATION:

- Assessment and design of hydraulic structures
- Hydraulics of open channels and spillways
- Hydraulic scale physical models
- Scour / erosion in chutes and spillways
- Hydrology and water resources relating to mining and mine effects
- Groundwater modelling and groundwater investigations
- Surface water hydraulics and flood studies
- Dams and dam safety
- Coastal structures
- Reliability of water supply systems
- Specialist GIS analysis

EMPLOYMENT:

2016 – Present: Associate, Pellis Consulting

2011 – 2016: Associate, Pellis Consulting; PhD Candidate, UNSW Australia

2009 – 2011: Senior Project Engineer - WRL, UNSW Australia

2008 – 2009: Senior Water Engineer - Cardno Willing

2006 – 2008: Senior Water Engineer - Ove Arup Partners

2001 – 2006: Project/Senior Project Engineer - WRL, UNSW Australia

1997 – 2001: Graduate Geotechnical Engineer - Pellis Sullivan & Meynink;
Soils Technician (P/T) - Coffey Partners

1994 – 1997: Carpenter/Joiner - LW Hough P/L

PROJECTS RELATED TO DAMS, HYDRAULICS AND HYDRAULIC STRUCTURES

2012-2016

Review of erosion risk, and stability, Somerset dam	Queensland	<p>Technical review and assessment of hydraulics regarding overtopping of abutments at Somerset Dam.</p> <p>Assessment of dam stability in sliding and overturning under extreme flood events.</p>
Review and redesign of a 7.5 GL mine-water dam	Goonyella, Queensland	<p>Technical review of embankment construction in expert witness context. Tasks essentially required complete re-design of the embankment, including material selection and placement, zoning, 3D visualisation and volume calculations, detailed seepage analysis, detailed stability analysis and various supporting hydraulic and geomechanics assessments.</p>
Expert review of embankment failure	Newnes, New South Wales	<p>Expert review of overtopping / piping failure of a tailing facility. Tasks included forensic site inspection, supported by detailed hydraulic, seepage and stability analyses.</p>
Review of embankment seepage / stability	Wilton NSW	<p>Review of potential piping failure, and detailing of solutions for a private embankment dam.</p>
Erosion of unlined spillways	PhD studies	<p>An industry linkage grant was awarded to develop improved design methods for assessment of scour on unlined spillways.</p> <p>Investigations have been based on laboratory testing and field studies.</p> <p>Laboratory testing comprised detailed studies on pressure transients in open channel flows under various conditions, and relating the observed measurement to hydraulic indices such as tractive force and stream power dissipation. The measurements are used to develop kinematic models of stability of unlined rock chutes.</p> <p>Field studies included review of erosion at over 30 dam spillways in Australia, South Africa and the USA. Investigations include geological review and mapping, rock mechanics assessments and detailed hydraulic assessments, typically using HEC-RAS.</p> <p>New methods of assessment of erosion were developed based on these investigations</p>

PROJECTS RELATED TO DAMS, HYDRAULICS AND HYDRAULIC STRUCTURES

Hydraulic analysis of the Balikera tunnel	Hunter region, NSW	Hydraulic analysis of discharge through a stream-diversion tunnel, including assessment of the impacts on hydraulics from rock-falls / tunnel collapse.
Dam safety assessment	Narara, NSW	Undertaking of a dam safety assessment, and preparation of dam safety management plan for the Narara Horticultural Dam, New South Wales.
Dam safety assessment	Hazelwood, VIC	Undertaking of a dam safety assessment of the Hazelwood Cooling Pond, Victoria, in accordance with the Australian National Committee on Large Dams (ANCOLD) guidelines.
Expert Review of Embankment Dam	Dorrigo, NSW	Expert (legal) review of the embankment and hydrology of a 15 m earth embankment dam to advise legal proceedings; witness in court.

2007-2011

Physical Model of Outlet Works, Adelaide Desalination Plant	Adelaide, SA	Design, construction and testing of a physical model of the outlet works (drop structure) from a desalination plant. The model was primarily of clear acrylic piping and, at the scale of 1:6, was over 4 storeys in height.
Lined Storages - Caustic Soda	Gladstone, QLD	Hydraulic modelling and specialist advice on scale modelling of caustic soda storage and distribution networks.
Remediation of Tidal Weir Structures	East Trinity, Qld	Assessment of existing tidal control structures and design of new structures to support tidal flushing of acid sulphate remediation activities.
Testing of Tidal Energy Turbine	Australia	Laboratory testing of power output and efficiency from turbine designs.
Assessment of Hydraulic Forces on Causeway Structures	Queensland	Hydraulic assessments were used as a basis for preparation of guidelines.

2003-2006

Physical testing of large diameter valves	Australia	Physical testing to determine headloss characteristics of large diameter flow valves.
Physical testing of large diameter pipe plug	Australia	Physical testing of the effectiveness of purpose built apparatus to plug and decommission an operating underground pipeline
Physical modelling of a detention basin / weir	Kellyville, NSW	Management, supervision, design and construction of a physical model of instream flood control basin.

PROJECTS RELATED TO DAMS, HYDRAULICS AND HYDRAULIC STRUCTURES

Assessment of dam intake structures for Jindabyne Dam	Jindabyne, NSW	Management, design, construction and testing of a physical model to assess the performance of a proposed dam intake structure.
Design of scour protection for rock chutes	Australia	Large scale physical modelling and analysis to develop specifications for rock scour protection for weir structures.

PROJECTS RELATED TO WATER RESOURCES (HYDROLOGY AND HYDROGEOLOGY)

2011-2016

Prediction of mine inflows	Broadmeadow, Queensland	Review and prediction of groundwater inflows and risks for longwall mining operations
Mining impacts on water resources	Newnes, New South Wales	Detailed review of potential impacts on groundwater and surface water resources (ie endangered swamps) due to of dewatering, subsidence and cracking from longwall mining.
Mining impacts on water resources	Bylong, New South Wales	Review of predicted impacts on groundwater and surface water resources from proposed longwall mining.
Mining impacts on water resources	Williamtown, New South Wales	Review of predicted impacts on groundwater and resources from proposed sand mining.
Mining impacts on water resources	Capertee, New South Wales	Review of predicted impacts on groundwater and resources from proposed longwall mining.
Flood studies	Various	Design flood levels and flood risk, various residential properties in Sydney
Expert review of coastal / seasonal groundwater	Ichthys project, NT	Expert (legal) review of groundwater dynamics and impacts to earthworks planning and progress.
Mine water balance assessments	Gregory / Crinum, QLD	Development of regional surface water models and preliminary groundwater models to examine site-wide water balances to guide a mine closure plan.
Groundwater impacts, Longwall mining	Moss Vale, NSW	Development of regional hydrogeological model and undertaking of 3D transient numerical groundwater modelling (MODFLOW) to assess impacts to groundwater from a proposed longwall mine.
Impacts to groundwater from coal seam gas extraction	Various	Independent review of predicted effects on groundwater from proposed coal seam gas (CSG) projects. Reviews typically supported by 2D and 3D numerical groundwater modelling.
Assessment of basement seepage issues	Maroubra, NSW	Appraisal of major seepage issues for a major development in the Botany Sands. Design of dewatering using 3D numerical groundwater model (MODFLOW). Representation of client at legal mediation.
Groundwater impact assessments	Various	Various minor projects to report on groundwater conditions and risks from proposed developments, including roads and pipelines to assist with EIS document preparation.

PROJECTS RELATED TO WATER RESOURCES (HYDROLOGY AND HYDROGEOLOGY)

2006-2011

Review of surface and groundwater effects from longwall mining	Springvale Colliery, NSW	Field reconnaissance, data review and surface water modelling tools were used to provide advice on potential impacts to surface water systems from longwall mining effects.
Expert review of groundwater impacts from longwall mining	NRE Gujarat, NSW	Independent review of environmental assessments of impacts of mining subsidence on groundwater and surface water resources.
Review of hydrology of Thirlmere Lakes	Southern Coalfields, NSW	Undertaking of an independent review of the hydrology of Thirlmere Lakes, and on the evidence for impacts from longwall mining
Ranger Uranium Mine – Flow Modelling of Post-Closure Conditions	Ranger, NT	Construction and calibration of a hydrologic and 1D hydraulic flow model of catchments adjacent to the Ranger Uranium Mine.
Groundwater Characterisation and Numerical Modelling for Rainbow Beach Estate	Rainbow Beach, NSW	Specification of a groundwater investigation and monitoring scheme for characterisation of a coastal aquifer near Port Macquarie. A 3D numerical groundwater model was assembled to simulate the aquifer and to assess impacts from a proposed development.
Design of flood detention ponds	Cecil Hills, NSW	Hydrologic analyses for design of flood detention ponds to support large residential subdivisions.
Urban flood hydrology	Stanmore, NSW	Development of 1D stormwater network models to assess flood risk and design flood mitigation options for an urban catchments in Sydney.
Flood modelling and design	Porters Creek, NSW	Supervision of hydrologic and 2D flood models for flood studies of the Porters Creek catchment.
Review of Catchment Processes	Flemington, ACT	Installation and operation of field equipment and development of water balance models for the catchment.
Review of seawater intrusion of coastal aquifers	Christchurch, New Zealand	Literature review on the processes, international experience and management of seawater intrusion of coastal aquifers to guide policy development in the Christchurch region, New Zealand.
Managed aquifer recharge investigations	Borambil Creek, NSW	Scoping studies to evaluate and advise on aquifer management, enhanced recharge and stream restoration, Borambil Creek in the Upper Namoi catchment, New South Wales.
Aquifer Storage and Recovery Feasibility Assessment	Ipswich, Qld	Desktop studies to assess the feasibility and potential yield of a proposed Aquifer and Storage Recovery Scheme near Ipswich, Brisbane.

PROJECTS RELATED TO WATER RESOURCES (HYDROLOGY AND HYDROGEOLOGY)

Perth Airport Drainage Strategy, Review of Groundwater	Perth, WA	Review of surface water-groundwater in the superficial aquifers in the Swan Coastal Plain to assist with flood modelling of the Perth Airport site.
Review of Geothermal Heat Pump Applications, Energy Australia Building	Sydney, NSW	The design of a large ground-source heat pump system was reviewed based on site characterization and the derivation and application of analytical techniques to simulate heat transport.

2002-2005

Design of Stormwater Capture and Treatment Ponds	Eraring, NSW	Desktop analysis of catchment hydraulics to prepare preliminary design of stormwater capture and treatment infrastructure.
Physical Modelling of flooding and evacuation, Penrith Lakes	Penrith, NSW	Management, supervision, design and re-construction of a physical model to examine flood characteristics, floodplain risk planning and evacuation timing for large lakes development scheme in Western Sydney.
Feasibility of flood harvesting	Broken Hill, NSW	Desktop studies and field investigations to assess feasibility of flood capture infrastructure.
Water Resource Assessments, Far North Queensland	Cairns, Qld	Preparation of a water supply strategy for the Far North Queensland region to meet regional forecast demands over 50 years. Technical sub-studies to assess the yield / reliability of supply options, ranging from large dams to residential rainwater tanks and stormwater harvesting.
Assessment of surface – ground water connectivity	Centennial Park, NSW	Field investigations, monitoring and analysis to provide recommendations to irrigators regarding the impacts to groundwater from the abstraction of water from a public lake systems.
Feasibility of Saline Intake Bores for Seawater Desalination	Central Coast, NSW	Detailed field investigations and interpretation to assess feasibility of large intake bores for a planned seawater desalination scheme. Tasks included undertaking resistivity surveys, drilling supervision, supervision and interpretation of aquifer pumping tests, slug tests and groundwater level and quality monitoring.
Assessment of Groundwater Pollution Sources	Confidential	Presentation and interpretation of resistivity survey data to assess location and extent of groundwater pollution from industrial sources. Advice was used to support litigation.

PROJECTS RELATED TO WATER RESOURCES (HYDROLOGY AND HYDROGEOLOGY)

Groundwater System Characterisation	Blue Mountains, NSW	Supervision of field investigations to characterise groundwater hydraulics and quality in sandstone aquifers in the Blue Mountains, NSW for a proposed quarry. Tasks included supervision of drilling, bore logging, groundwater sampling, and undertaking packer and slug tests and associated analysis to estimate hydraulic properties.
Impacts of Effluent Disposal on Groundwater in Coastal Aquifers	Various	Detailed field investigations into groundwater hydraulics and quality in coastal aquifers to support effluent disposal schemes at various sites in New South Wales, including Hat Head, South West Rocks, Iluka, Hastings Point and Sussex Inlet.
Assessment of Groundwater Seepage for Tunnel Design	Sydney, NSW	Undertaking of permeability testing of sandstone bores in the CBD of Sydney. Results were interpreted to provide parameters to support design of tunnelling works.
Design of a Groundwater Effluent Disposal Scheme	Iluka, NSW	Detailed field investigations and associated interpretation to assess feasibility and support design of an effluent disposal scheme. Tasks included supervision and interpretation of aquifer pumping tests, and assessment of planned infrastructure development locations with respect to coastal processes.

PROJECTS RELATED TO COASTAL ENGINEERING

2009-2016

Coastal stability assessment	Central Coast, New South Wales	Assessment of coastal damage / risk to public infrastructure after extreme coastal event
Seawall design	Central Coast, New South Wales	Site inspection, site characterisation and stability analysis supporting design of public beach stair access and coastal revetment.
Review of dredging and excavability	Darwin, NT	Expert (legal) analysis of field data to support legal proceedings related to dredging.
Design of geobag seawalls	Byron Bay, NSW	Numerical finite-element and kinematic stability assessment of geo-bag seawall designs
Risk assessment of seawalls	Manly, NSW	Review and risk assessment of geotechnical stability of 18 seawalls in accordance with statutory procedures.

2005-2009

Physical Modelling of Desalination Brine Outlet	Perth, WA	Design, construction and application of a physical model to examine diffusion processes of brine discharge from a large scale desalination plant.
Foreshore Embankment Stabilisation	Penrith, NSW	Provision of specialist advice on options for stabilisation of foreshore regions against erosion around a series of inland lakes.
Appraisal and Design of Coastal Protection Structures	Green Island, Qld	Project manager for the review of the function and condition of a sediment control groyne on Green Island (Great Barrier Reef).
Assessment of Greenwater Overtopping of Offshore Structures	Browse, WA	Technical studies to investigate the extent and impacts of green water overtopping of a number of large scale offshore structures.
Burwood Beach Ocean Outfall Modelling	Newcastle, NSW	Detailed analyses of meteorological conditions were undertaken to predict the statistical frequency of pollution events at beaches adjacent to an ocean outfall.
Review of Sub-Aerial Landslide Tsunami Generation and Propagation, Lihir Gold Mine	Papua New Guinea	A tsunami event, caused by a sub-aerial landslide, was recorded at a local tidal monitoring station. Analyses of the characteristics of the tsunami event were undertaken and used to postulate on the extent, velocity and timing of the landslide.

2001-2004

Breakwater / Revetment Design, Sydney Airport	Sydney, NSW	Undertaking physical model studies for optimisation of toe scour protection requirements for a breakwater / revetment structure at Sydney Airport.
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PROJECTS RELATED TO COASTAL ENGINEERING

Estuarine Numerical Modelling	Auckland, New Zealand	Set up and calibration of 2D numerical hydrodynamic model for examination of tidal currents and estuarine processes in a region of Auckland Harbour to allow examination of impacts of proposed developments.
Numerical and Physical Modelling of Mooring Structure	Darwin, NT	Numerical and physical modelling studies to assess amplification or modification of currents adjacent to a large wharf structure during the mooring of large sea vessels.
Ocean Outfall Assessment	Wollongong, NSW	Undertaking physical modelling of a section of proposed outfall design for examination of saline intrusion.
Wind-Wave Growth and Dissipation Studies and Research	Australia	Physical testing and research to investigate the physics of wind – wave interactions and the processes of wave growth and dissipation. Studies resulted in the publication of new research into the growth and dissipation of wind waves.
Seawall Assessment and Design	Manly, NSW	Detailed assessment of the stability and long term performance of a public seawall in Manly, Sydney.
Coastal Erosion Assessment	Glenelg, SA	Numerical assessment of coastal longshore sediment transport to support expert advice for litigation following coastal erosion issues at Glenelg, Adelaide.
Design of Wave Paddle System	Australia	Design, construction and calibration of a wave generation system for undertaking wave basin modelling studies.
Assessment of Sediment Response to Offshore Reef Structures	Australia	Research into the shoreline response to offshore reef structures. Tasks included design, supervision and testing of a movable bed physical model.

PROJECTS RELATED TO CIVIL AND GEOTECHNICAL DESIGN

2001-2016

Geotechnical risk assessment	Narara, New South Wales	Assessment of general geotechnical risks and constraints for site subdivision
Review of longwall mining design	Mandalong	Assistance with expert review of legal claim pertaining to planning and design of longwall mining excavations.
Review of tunnel design	Wynyard Walk	Assistance with expert review of design of pedestrian tunnel.
Jet grouting / excavation	Cowper Wharf, NSW	Expert (legal) review of claim regarding jet-grouting and excavability and disposal of material.
Tunnel construction supervision	Point Piper, NSW	Routine inspection of construction of private pedestrian tunnel
Forensic investigation of piping failure	Yalourn, VIC	Support for expert review of piping-failure of embankment at Yalourn. Tasks included: compilation and management of detailed GIS database of all data relevant to the claim; development of 3D conceptual models; finite element stability assessments, and; numerical seepage modelling.
Review of site development options	Hornsby, NSW	3D GIS mapping of geology and earthworks and detailed analysis to assess excavation design and quantities for a legal claim at Hornsby Quarry.
Mine effect monitoring	Wollongong, NSW	Member of technical committee panel for monitoring and protection of public infrastructure (roads) for impacts from longwall mining.
Review of major pit failure	Mulia, Indonesia	3D GIS mapping of geology and earthworks and undertaking finite element analysis to examine options for responding to major earth slip at a mine site
Review of excavation designs	Sydney Opera House, NSW	3D GIS mapping of geology and earthworks and detailed analysis to assess excavation design and quantities for a legal claim at the Opera House carpark.
Review of basement design	Dee Why, NSW	Review of basement piling and waterproofing to support legal claim.
Excavation stability appraisal	Sydney CBD	Review of potential settlement from planned deep excavation in Sydney CBD.
Tunnel lining investigations	M2 tunnel, NSW	Forensic investigations of existing tunnel lining through undertaking of specialist coring and fourier analysis of drumminess testing.
Pond design	Kenny, ACT	Design of pond lining options for proposed in-stream basin.
Residential access tunnel	Point Piper, NSW	Routine monitoring of a residential tunneling project

PROJECTS RELATED TO CIVIL AND GEOTECHNICAL DESIGN

Yamba Hill Groundwater and Slope Stability Monitoring	Yamba, NSW	Supervision of drilling and installation of groundwater monitoring bores and inclinometers to assess slope stability at Yamba.
Tunnel excavation monitoring	NSW	Routing review of tunnelling monitoring apparatus during construction of the Eastern Distributor Tunnel, Sydney.

PUBLICATIONS

JOURNAL PAPERS / RESEARCH REPORTS

1. **PELLS, S., DOUGLAS, K., PELL, P.J.N., FELL, R., PEIRSON, W.L. (2016)** Rock mass erodibility. Accepted, subject to revision J.Hyd.Eng. ASCE. HYENG-9857
2. **PELLS, P.J.N., BIENIAWSKI, Z.T., HENCHER, S., PELL, S.E.**, 2015. RQD - Time to rest in peace submitted in November 2015.
3. **PELLS, S.E., 2016.** Erosion of Rock in Spillways (Doctoral Thesis). UNSW Australia, Kensington, N.S.W. <http://handle.unsw.edu.au/1959.4/56008>
4. **PELLS, S.E. and PELL, P.J.N, 2015** Application of Dupuit's Equation in SWMM to simulate baseflow. Technical note, ASCE Journal of Hydrologic Engineering,
5. **PELLS, S.E. and PEIRSON, W.L. 2014** DISCUSSION: "Evaluation of Overtopping Riprap Design Relationships" by Steven R. Abt, Christopher I. Thornton, Bryan A. Scholl, and Theodore R. Bender *Journal of the American Water Resources Association (JAWRA)* 11 Nov 2014.
6. **PELLS, S.E. and PELL, P.J.N, 2012-** Impacts of longwall mining and coal seam gas extraction on groundwater regimes in the Sydney basin Part 1 – Theory. *Australian Geomechanics Journal* Volume 47, No. 3, p.35, September 2012
7. **PELLS, S.E. and PELL, P.J.N, 2012-** Impacts of longwall mining and coal seam gas extraction on groundwater regimes in the Sydney basin. Part 2 – Practical applications. *Australian Geomechanics Journal* Volume 47, No. 3, p.51, September 2012
8. **PEIRSON, W L, FIGLUS, J, PELL, S E and COX, R J 2008** - Placed Rock as Protection against Erosion by Flow down Steep Slopes *Journal of Hydraulic Engineering*. Volume 134, Issue 9, pp. 1370-1375, 2008.
9. **PEIRSON, W L and PELL, S E 2004** - A Laboratory Study Of Wave Growth And Air Flow Behaviour Over Waves Strongly Forced By Wind. WRL Research Report 219 on behalf of the United States Army, European Research Office Funding under contract number N62558-04-M-0002, 2004.
10. **PEIRSON, W L, GARCIA, A W and PELL, S E 2003** - Water Wave Attenuation Due to Opposing Wind *Journal of Fluid Mechanics* 2003 Vol 487, pp 345 -365, 2003.
11. **PELL, S E & FELL, R, 2003** - Damage and Cracking of Embankment Dams by Earthquake and the Implications for Internal Erosion and Piping 21st ICOLD Congress 2003 Montreal Q83 83/R18 18.
12. **PELL, S.E & FELL, R, 2002** - Damage and Cracking of Embankment Dams by Earthquake and the Implications for Internal Erosion and Piping. UNICIV Report Vol 408, 220 pages. UNSW 2002.

PUBLICATIONS

SELECTED CONFERENCE PAPERS

1. **PELLS, S.E. 2016** - Assessment and surveillance of erosion risk in unlined spillways. Proceedings, 84th ICOLD Annual Meeting, International Committee on Large Dams 15 - 20 May 2016, Johannesburg, South Africa
2. **PELLS, P.J.N., PELLs, S.E. and VAN SCHALKWYK, M. 2016** A tale of two spillways. Proceedings, 84th ICOLD Annual Meeting, International Committee on Large Dams 15 - 20 May 2016, Johannesburg, South Africa
3. **PELLS, S., FELL, R., DOUGLAS, K., PEIRSON, W. 2016** Erosion Of Unlined Spillways In Rock. Proc. 20th Cong. Asia Pac. Div. Int. Assoc. Hydro Env. Eng. & Res. IAHR APD 2016, August – 28 to 31 2016. Colombo, Sri Lanka\
4. **PELLS, P.J.N and PELLs, S.E. 2016** The water levels of the Thirlmere Lakes. Proc. 20th Cong. Asia Pac. Div. Int. Assoc. Hydro Env. Eng. & Res. IAHR APD 2016, August – 28 to 31 2016. Colombo, Sri Lanka
5. **PELLS, S.E, PELLs, P.J.N., PEIRSON, W.L., DOUGLAS, K. and FELL, R. 2015** Erosion of unlined spillways in rock – does a ‘scour threshold’ exist? Proceedings, ANCOLD annual conference, Brisbane, 5-6 November 2015
6. **PELLS, P.J.N and PELLs, S.E. 2015** Hydrogeologists and Geotechnical engineers – lost without translation AGS / IAH Symposium, Sydney 13 November 2015
7. **CARLEY, J. T., MARIANI, A., COX, R., SHAND, T., & PELLs, S. 2013.** History and Future of Seawalls in the Manly Local Government Area. In I. L. Turner (Ed.), Coasts and Ports 2013: 21st Australasian Coastal and Ocean Engineering Conference and the 14th Australasian Port and Harbour Conference. Manly NSW Australia.
8. **PELLS, S.E 2010-** Potential impact of sea-level rise on coastal aquifers. Groundwater 2010 Conference, 31 Oct – 4 Nov 2010, Canberra.
9. **PEIRSON, W L; FIGLUS, J; PELLs, S E and COX, R J. 2008** - Large Rock Protection against Erosion by Flow Down Steep Slopes. In: 9th National Conference on Hydraulics in Water Engineering: Hydraulics 2008. Barton, A.C.T.: Engineers Australia, 2008: [142]-[148].
10. **PELLS, S.E 2008** - Desktop Estimation of Yield For Aquifer Storage Recovery Schemes. In: Lambert, Martin (Editor); Daniell, TM (Editor); Leonard, Michael (Editor). Proceedings of Water Down Under 2008. Modbury, SA: Engineers Australia ; Causal Productions, 2008: 1037-1048.
11. **TIMMS, W., GLAMORE, W & PELLs, S.E. 2005** - Groundwater Quality Impacts Of On-Site Effluent Disposal On-Site '05 Conference Proceedings 2005.
12. **PELLS, S.E., TIMMS, W and TURNER, I.L. 2004** - Managing Groundwater in Coastal Sand Aquifers NSW Coastal Conference Proceedings, 2004.

NUMERICAL MODELLING EXPERIENCE / CAPABILITY

Steven has capability in applying the following analytical tools:

Hydrogeology	3D Flow	GMS
		FEFLOW
		Groundwater VISTAS
		Visual MODFLOW
		MODFLOW-SURFACT
	2D Flow	SEEP/W
Pump Test Analysis	WTAQ	
	USGS Models	
Hydrology	WSUD	AQUALM
		MUSIC
	Flood hydrology	XP-RAFTS
		WBNM
	Characterisation	Basejumper, HAART
Continuous	RRL (Simhyd, AWBM)	
Hydraulics	1D Hydraulics	XP-SWMM
		Mike 11
		SWMM
		HEC-RAS
		DRAINS
	2D Hydraulics	XP-SWMM2D
		TUFLOW
		SOBEK
RMA2		
Pipelines	Network Analysis	EPANET
		WaterGEMS
Geomechanics	Slope stability	Roscience SLIDE
		SLOPE/W
	deformation	Phase2
Spatial Analysis and Presentation	GIS	MapINFO
		ArcGIS
		QGIS
	Drafting	AutoCAD
		Sketchup
		Grapher
		Surfer
General Analysis	Excel	
	Matlab	