About WRL

The Water Research Laboratory (WRL) is a world-leading research and consulting laboratory that tackles the most challenging and pressing water engineering problems faced by the world today.

Based on Sydney’s Northern Beaches and part of the School of Civil and Environmental Engineering at UNSW Sydney, our globally-esteemed laboratory spans four hectares and is home to state-of-the-art facilities, equipment and personnel comprised of the most experienced and creative problem solvers in their respective areas of research and industry. We are specialists in solving problems related to water and the environment.

Our prestigious record built over more than 50 years has made us what we are today, a leading global think tank. We are a band of pioneers and experts driven by a passion to finding grand breakthroughs for a better tomorrow.

Our areas of expertise include:

- **Coastal, ocean and estuarine engineering and management**
- **River flow, floodplain management & catchment hydrology**
- **Groundwater research and management**
- **Civil engineering hydraulics**
- **Offshore renewable energy**
- **Environmental studies and climate change adaptation**
- **Wetland restoration**

Recent clients:

- ACT Planning and Land Authority
- ACTEW Corporation
- Arup
- Australian National Maritime Museum (ANMM)
- Australian Water Services
- Baulderstone Hornibrook
- Bluescope
- Burnett Water
- Cardno
- Centennial Parklands
- Christchurch City Council
- City of Sydney
- Clarence City Council (Tas)
- Clarence Valley Council (NSW)
- Connell Wagner/Aurecon
- Cotton Catchment Communities CRC
- Ecowise Environmental
- Environmental Resources Management Australia
- GHD
- Gold Coast City Council
- Hunter Water Corporation
- International Atomic Energy Agency
- John Holland
- Kellogg Brown & Root (KBR)
- Leighton
- Macleay Water
- Maunsell Australia
- Midcoast Water
- Moree Cotton Association
- MWH
- Namoi Catchment Management Authority
- NSW Department of Commerce
- NSW Department of Environment & Climate Change
- NSW Department of Lands
- NSW Department of Primary Industries
- NSW Maritime
- NSW National Parks and Wildlife Service
- NT Department of Natural Resources
- Ocealinx Australia
- Outotec (Australasia)
- Parsons Brinckerhoff Australia
- Penrith Lakes Development Corporation
- Pitt & Sherry
- Port Kembla Port Corporation
- PSM
- SKM
- SMEC Australia
- Sydney Ports Corporation
- Sydney Water
- Theiss Contractors
- Tweed River Entrance Sand Bypassing Project
- United Group Infrastructure
- URS
- Veolia Water
- Victorian Department of Sustainability and Environment
- Water Corporation, WA
- Water Solutions
- Water Technology
- WMA Water
- Worley
Expert services overview

Capabilities portfolio

For over 50 years WRL has been providing professional consulting advice.

Coastal engineering
- Ports, harbours, breakwaters & dredging operations
- Offshore and coastal structures
- Coastal and estuarine processes and hazards
- Sea level rise vulnerability and adaptive management
- Foreshore protection and management studies

Environmental engineering
- Climate change adaptation and impacts
- Outfalls, desalination impacts and pollutant releases
- Restoration of wetlands and estuaries
- Boat wake wave impacts and management
- Study design/location in oceans, estuaries, rivers & lakes

Civil engineering hydraulics
- Hydraulics of industrial plants
- Performance of hydraulic structures such as spillways, weirs, culverts and fishways
- Outfall hydraulics
- Pipes, pumps and open channel flow

Groundwater
- Water supply and managed aquifer recharge
- Seepage, flow & contaminant transport
- Aquifer characterisation, 2-3D geophysical imaging & mapping
- Coring, sampling & hydrogeochemical evaluation of sorption & barriers

Hydrology & water resources
- Hydrology & water quality in urban & rural catchments
- Flow, sediment transport & geomorphic behaviour of rivers
- Environmental flows assessment and planning
- Reservoir dynamics, water quality and water budgets
- Flood risk, hazard and emergency planning

Offshore renewable energy
- Ocean current/wave modelling and resource assessment
- Performance of tidal turbines and WECs
- Assessment of extreme load and scour risk
- Marine spatial planning (MSP)

Selected project locations
New South Wales
- Baldry State Forest
- Bondi Beach
- Botany Bay
- Broken Hill
- Brooms Head
- Burwood Beach
- Coffs Harbour
- Forbes
- Gunnedah
- Hat Head
- Hawkesbury River
- Illawarra Coastal Waters
- Iluka
- Jindabyne
- Kogarah Bay
- Lake Macquarie
- Manly
- Narrabeen
- Nepean River
- Newcastle
- Penrith Lakes
- Prospect Reservoir
- Shellharbour
- Shoalhaven
- South West Rocks
- Stuarts Point
- Sydney Deepwater Outfalls
- Sydney Harbour
- Thornleigh Reservoir
- Tweed River
- Wamberal Beach
- Wollongong Outfall

National
- Barrow Island, WA
- Bass Strait
- Burnie Outfall, TAS
- Clarence City Council, TAS
- Dalrymple Bay, QLD
- Darwin Harbour, NT
- Eidsvold Weir, QLD
- Ginninderra Creek, ACT
- Glenelg Harbour, SA
- Gold Coast, QLD
- Hobart, TAS
- Lake Burley Griffin, ACT
- Mooloolah River, QLD
- Moreton Bay, QLD
- Noosa, QLD
- North Esk River, TAS
- Semaphore Park, SA
- Tamar River, TAS
- Wyndham Cove, VIC

International
- Auckland, NZ
- Bounty Bay, Pitcairn Island
- Changi Outfall, Singapore
- Christchurch, NZ
- Eua Island, Tonga
- Hong Kong
- Jakarta Bay, Indonesia
- Koniambo, New Caledonia
- Brunei
- Kuching, Malaysia
- Mangere WWTP, NZ
- Manila Bay, Philippines
- Ok Tedi River, PNG
- Pulau Tekong, Singapore
- Rarotonga, Cook Islands
- Malaysia
- Abu Dhabi
- Tuas, Singapore
- Waimakariri, NZ
Coastal engineering

The Water Research Laboratory has a highly regarded international reputation in coastal and ocean engineering. The 'Lab' is considered the birthplace of coastal engineering in Australia comprising a great history of experience and current knowledge. WRL is the largest coastal hydraulics laboratory in Australia.

Investigations utilising state-of-the-art technologies in both numerical (spectral and phase resolving wave) and physical (2D flume and 3D basin) model studies include wave generation and propagation, wave run-up and overtopping, wave forces and stability of coastal structures, littoral sediment transport, tidal hydrodynamics and entrance stability, coastal and estuarine morphology, beach and shoreline erosion and estuarine sedimentation. Automated coastal imaging techniques are applied for both pre- and post-assessment of the full range of coastal engineering and management activities.

Particular areas of expertise include coastal and process understanding, sea level rise effects, coastal hazard definition and inundation studies, foreshore revetment design and testing, coastal zone management, dredging and beach nourishment, design optimisation of coastal structures, harbours, ports and marinas, 'real time' coastal monitoring and measurement utilising leading-edge coastal imaging techniques, impact assessment of nearshore coastal structures on beach planform, peer review and forensic coastal engineering.

Key areas
- Offshore and coastal structures
- Ports, harbours, marinas, breakwaters & dredging operations
- Sea level rise
- Coastal and estuarine processes
- Foreshore protection & management studies
- Coastline monitoring and analysis
- Coastal zone management

Typical projects
Clarence City Council coastal hazard and sea level rise assessment
- Detailed council wide study of local and regional coastal processes and hazards
- Identification of suitable sea level rise scenarios and design storm conditions
- Sea level rise vulnerability assessment
- Coastal hazard mapping
- Recommendations for adaptive management options

Koniambo wharf 2D physical modelling
- Physical modelling in 3 m wide wave flume
- Wave overtopping velocities and depths
- Dynamic uplift and slamming pressures
- Hydrodynamics under wharf deck
- Revetment armour stability

Tweed River sand bypassing coastal monitoring
- Supply and installation of 16 camera monitoring system
- Hourly updated images
- Merged-rectified plan images
- Weekly analysis of shorelines
- Weekly analysis of beach width
- Monthly animations
- Real-time, web-based delivery of monitoring information

Rarotonga wave protection, Cook Islands
- Physical modelling in 1 m wide wave flume
- Hydraulic performance of COPED breakwater units
- Uplift forces on breakwater units
- Wave reduction

A complete list of relevant projects undertaken can be supplied upon request
Environmental engineering combines the resources of groups within the Water Research Laboratory to provide an integrated assessment of environmental impacts. Teams comprising engineers, scientists and technicians are formed to best address the needs of each client, resulting in a unique, tailored solution to the assignment. Emphasis is placed on understanding the processes which dominate the movement and dispersion of pollutants, with each project uniquely designed, managed and executed. Combined with our approach, the result is a coherent product tailored to meet the individual needs of the client.

WRL personnel are highly experienced in providing innovative answers to complex Environmental Engineering questions throughout Australia and overseas. Work centres around three major areas of investigation: Identification and quantification of pollutants discharged to the environment; the movement of pollutants through the domain of interest; and their impacts en-route and at their final resting place. Recent projects have focussed on:

- Minimising the impacts of sewage outfalls on the marine environment
- Complex estuary process studies
- Tidal/wetland restoration projects

WRL places a high emphasis on the measurement and understanding of the physical processes occurring in the environment, so that the interaction with ecological processes can be best understood. WRL understands the importance of quantifying environmental effects so that decision making and planning can be undertaken.

Key areas
Process understanding
- Climate change adaptation/impacts
- Sewage outfalls, desalination impacts and pollutant releases
- Restoration of wetlands and estuaries
- Boat wake wave impacts and management
- Study design and monitoring in oceans, estuaries, rivers & lakes

Environmental data
- Hydrologic, oceanographic and environmental data systems
- ADCP, Seabird 19Plus, Sequoia, ADV, etc
- Decision support systems and databasing (ESDAT, GIS)
- Remote sensing, imaging & GIS

Environmental modelling
- 1D, 2D and 3D hydrodynamic
- Experts in RMA, MIKE, DELFT
- Near-field, far-field, particle tracking & random walk models
- Water quality: Destratification, Aqueous Chemistry, PHREEQC
- Pollutant source identification and real time capabilities

Typical projects
Sydney deepwater outfalls
- Technical management
- Oceanographic processes
- Numerical & physical modelling
- Remote sensing and databasing
- Marine sediment sampling

Yamba-Iluka ebb tide release
- Data analysis and field data programs
- Hydrodynamic modelling
- Near & far field dispersion modelling
- Sediment transport
- Sensitive receiver assessment
- Community consultation

Wetland restoration: Shoalhaven, Newcastle, Yarrapagirri, Anna Bay
- GIS mapping techniques
- Groundwater/surface water connections
- Iod association modelling
- Predictive coupled transport modelling
- Data analysis and monitoring
- ‘Smart’ infrastructure
- Comprehensive project management

Brooklyn Estuary process study
- Interdisciplinary project management
- Water and sediment quality
- Databasing and data collection
- Fish, flora, fauna
- Anthropogenic impact
- Numerical modelling
Civil engineering hydraulics

The Water Research Laboratory has several decades experience in the research, investigation and application of fundamental and applied civil engineering hydraulics. This field of expertise encompasses performance assessment of hydraulic structures such as dam outlet works, energy dissipaters, ocean outfalls, spillways and levees and plants such as pump stations, hydro and thermal power stations, water and wastewater treatment plants. WRL also has a depth of experience and equipment for the accurate measurement of flows and flow patterns.

Studies are undertaken as either desktop studies, field measurement studies, numerical modelling (CFD) or physical model laboratory studies. A strong understanding of the fundamentals of flow, cavitation, flow paths, pressure waves, turbulence, multi-phase flow and sediment transport ensures that effective and appropriate levels of study are undertaken.

When hydraulic behaviour is crucial to the operations of large (or small) infrastructure, WRL can utilise its knowledge and experience, specialist hydraulic laboratories and instrumentation to provide robust and cost saving solutions.

Key areas
- Hydraulics of industrial plants
- Performance of hydraulic structures
- Outfall hydraulics
- Pipes, pumps and open channel flow

Typical projects

**Eidsvold weir**
- Physical modelling
- Weir rating
- Pressure and flow measurements over weir crest
- Flow measurement around fishway entrance

**flowserv valve testing**
- Prototype laboratory testing
- Characteristic flow coefficient
- Valve head losses
- Valves weighing 3500kg

**William Slim Drive retarding basin**
- Physical modelling
- Culvert rating and efficiency measurements
- Velocity measurements and scour potential
- Energy dissipation

**Desalination outfall**
- Desktop study
- Conceptual design options
- Valve/nozzle testing
- Exit velocities and initial dilutions
- Design optimisation
- Physical testing of diffuser cap
- Head loss testing
- CFD modelling

**Suma Park Reservoir spillway**
- Physical modelling
- Hydraulic load and pressure measurement and analysis
- Spillway design optimisation for PMF flows
- Flow and velocity measurement around structure

**Air entrainment in steelworks cooling system**
- Physical modelling
- Flow, velocity and aeration measurement
- Design evaluation and optimisation

A complete list of relevant projects undertaken can be supplied upon request.
The Water Research Laboratory has a team of hydrogeologists and environmental engineers who are highly regarded for groundwater problem solving. This team is recognised in Australia and internationally for project services and applied research in; geophysical imaging and borehole tomography of the subsurface; groundwater chemistry and geochemical indicators of leakage through clay barrier systems.

A pragmatic approach to solving groundwater problems is adopted by project staff, in consultation with industry and government agencies. Studies generally commence with a desktop investigation followed by design and implementation of specific data collection programs.

WRL has extensive borehole, geophysics and logging instrumentation along with numerical models and chemistry laboratory facilities to aid with data interpretation and process understanding.

The application of these expert groundwater services include: effluent reuse and disposal, salinisation, water budgets, groundwater quality, transport and fate of contaminants, acid sulphate soils and leakage through clay barriers.

Key areas
- Effluent re-use and disposal
- Leakage assessment
- Groundwater supply
- Groundwater quality
- Coastal dune aquifers
- Fate of contaminants

Typical projects
ICI Southlands
- Contaminated site investigation
- Sediment coring and analysis
- Multi-port groundwater installations
- Groundwater sampling and analysis
- Geophysical logging and imaging
- Pump testing

Upper Naomi leakage
- Surface geophysics of moisture and clay anomalies
- Drill cores and monitoring bore installation
- Downhole geophysical logging
- Core permeability analysis
- Bore water chemical analysis
- Automated groundwater level and fluid EC monitoring
- Stable isotope flow tracers
- Induced recharge analysis

Nowra REMS
- Desktop study
- Monitoring program design
- Establishment of monitoring bore network
- Implementation of baseline sampling and analysis
- Database development
- Trigger levels for groundwater depth and quality
- Irrigation management contingencies
- Stakeholder consultations

Iluka dune injection
- Monitoring bore installation
- Sediment sampling and analysis
- Slug testing for permeability
- Groundwater quality sampling
- Beneficial use potential
- Water table dynamics
- Flow modelling
- Feasibility analysis

A complete list of relevant projects undertaken can be supplied upon request
The team of engineers at the Water Research Laboratory have specialist expertise to provide solutions for critical water resource issues including catchment hydrology and runoff quality, water budgeting, reservoir operations, environmental flows and the sedimentation, geomorphology and flooding of rivers.

With a strong foundation in the fundamentals, WRL is well placed to make proper use of hydrological and hydraulic models, to understand their strengths and weaknesses and to ensure models are properly calibrated and interpreted. WRL combines these skills with other expert services of groundwater to provide a holistic analysis of catchment hydrology and water resources.

Recent studies have concentrated on the water quality of road runoff, harvesting of catchment runoff in a western reservoir, environmental flow regimes to protect riverine flood plain ecology, design of a sediment trap slot to reduce riverine sediment loads and improvement of water quality in drinking water reservoirs through management and engineering options.

Key areas
- Hydrology and water quality in urban and rural catchments
- Flow, sediment transport and geomorphic behaviour of rivers
- Environmental flows
- Reservoir dynamics and water quality
- Floodplain modelling
- Flood risk & hazard assessment
- Water budgets

Typical projects
- Ok Tedi and Fly Rivers
  - 2D Hydrodynamic modelling
  - Sediment transport modelling
  - Assessment of sediment management options

Launceston flood protection scheme
- Numerical modelling of Tamar, North Esk and South Esk rivers
- Evaluation of performance of existing levee system

Cabramatta Creek
- Unsteady 2D hydrodynamic modelling
- Catchment-wide design flood levels and extents

Mooloolah River
- 2D hydrodynamic modelling
- Evaluation of flow behaviour and velocities
- Assessment of potential for scour and erosion

Stephens Creek, Broken Hill
- Water level and rainfall monitoring
- Water harvesting in Stephens Creek Reservoir

Hawkesbury/Nepean River
- Environmental flows
- Saline dynamics
- Algal dynamics
- Stratification of weir pools

Thornleigh Reservoir
- 3D Stratified flow modelling
- Water age
- Assessment of management options
- Assessment of engineering options

A complete list of relevant projects undertaken can be supplied upon request.
Offshore renewable energy

In the last 20 years, WRL has drawn on its long-standing experience in marine and coastal engineering to provide expert advice to the Australian Offshore Renewable Energy industry. In parallel to its engineering activities, WRL has also been pursuing high-level academic research in the field of wave and tidal energy conversion, with a focus on both physical and numerical modelling.

WRL can help identify the best locations for offshore renewable projects by providing clear assessments of the potential resource but also the risk associated with extreme events. Site selection and resource modelling are typically performed through a combination of field measurements and numerical modelling; providing developers, investors and operators with valuable information for design, installation and operational aspects.

You can rely on our leading coastal engineering team to provide sound and independent advice on highly specialised aspects of offshore renewable projects such as cable routing and anchoring, device foundation and seabed scouring as well as environmental impact assessment.

WRL’s considerable experience in physical modelling combined with our world-class testing facilities, makes it the ideal place for physical trials, from initial verification of the proof of concept, to device optimisation, survivability, and demonstration of project economics with large scale models. Test programs are specifically tailored to developer needs. Our specialist craftsman and fully equipped workshop can assist in the manufacture and calibration of fully instrumented models of marine renewable devices for scale model testing.

Key areas
- Ocean current and wave modelling
- Resource assessment
- Marine spatial planning (MSP)
- Physical modelling of devices
- Wave and ocean current load assessment on structures
- Scour modelling along foundations and subsea cables

Typical projects
- **Muri Lagoon marine current modelling, Cook Islands**
  - Field measurements campaign
  - 3D numerical modelling of currents
  - Resource assessment
  - Turbine placement optimisation
- **MSP along NSW coastline of wave energy projects**
  - State wide marine spatial planning
  - GIS based analysis
  - Multi-criteria assessment
- **Port Fairy wave power assessment**
  - Resource assessment
  - Calibrated numerical wave model
  - Based on multi-year hindcast
- **Tidal turbine testing**
  - 2D Flume testing
  - Power, RPM and load measurements
  - Flows up to 1.1 m/s
- **Oceanlinx Australia OWC testing**
  - Manufacture of 1:30 model of fully instrumented Oscillating Water Column
  - Performance optimisation
  - Irregular wave time series based on site measurements
- **GIS study of ORE location along south-west Victoria**
  - Hi-res wave resource assessment modelling
  - Stakeholder engagement and survey
  - Multi-criteria assessment to minimise conflict with other marine space users
- **Scour protection of offshore wind turbine jacket foundation**
  - 3D wave basin model with mobile bed
  - Design of scour protection system
  - Scour assessment by 3D laser scan
- **2D physical model of Salter’s Duck**
  - Experimental research project
  - 3D mapping of wave pressure distribution on device
  - Assessment of torque, surge and heave loads

A complete list of relevant projects undertaken can be supplied upon request.
The people of WRL

Academics

**Ian Turner, Director and Professor**
Ian is the Director of WRL and is a Professor in the School of Civil and Environmental Engineering. His research interests are in the field of coastal engineering, and he has published extensively in a wide range of engineering and scientific journals; with his research team at WRL funded by competitive national and international grant bodies and Australian government and industry. Ian is a Fellow of the Institution of Engineers Australia, and from 2005-2015 was a member of the EA ‘National Committee on Coastal and Ocean Engineering’.

**Martin Andersen, Associate Professor**
Martin has a MSc in Environmental Engineering Science and a PhD in Hydrogeochemistry. He has been with WRL since 2006 and has been part of the Connected Waters Initiative (CWI) where he has worked on a large research project for the Cotton Catchment Communities CRC, investigating surface water groundwater interactions. Martin’s primary research interest is groundwater geochemistry with practical applications for water resources and water quality problems.

**Stefan Felder, Senior Lecturer**
Stefan is an expert in physical modelling of turbulent free-surface flows. His current research interests include transitional open-channel flows and air-water flows in hydraulic structures. Stefan has gained experience at several hydraulic laboratories in Germany, the UK and Australia. At UNSW Stefan will be teaching undergraduate and postgraduate courses in water engineering with special focus on fluid mechanics and hydraulic engineering.

**William Glamore, Associate Professor**
William has a Bachelor degree in Environmental Science and a PhD in Civil/Environmental Engineering. William has been with WRL since 2003 and has managed and undertaken several large studies during this time. His primary fields of interest are related to estuarine hydrodynamics and water quality including restoration of estuarine environments, acid sulphate soils, coastal wetlands, boat wake waves, outfall hydraulics and field testing, and related physical and numerical models.

**Denis O’Carroll, Professor**
Denis is a Future Fellow and Professor at UNSW. He has ongoing research projects developing nanometals for contaminated site remediation, investigating the environmental fate and ecotoxicity of nanoparticles released from commercial products, improving the understanding of the fate of nonaqueous phase liquids in the subsurface and developing climate change mitigation measures in urban areas.

**Helen Rutlidge, Lecturer**
Helen is a Lecturer within the Connected Waters Initiative, supported by the National Centre for Groundwater Research and Training (NGCRT). Helen specialises in collaborative research on applications of Laser Ablation ICPMS; also including spatially resolved elemental mapping of samples relating to groundwater research.

**Kristen Splinter, Senior Lecturer**
Kristen holds a BSc (Hons) Eng in Civil Engineering, from Queen’s University (Canada), a MEngSc in Coastal and Oceanographic Engineering from the University of Florida (USA) and a PhD in Geological Oceanography with a certificate in Marine Resource Management from Oregon State University (USA). Her research focuses on the development of long term shoreline change models, as well as monitoring beach morphology at 10 sites along the NSW coastline and assessing the capability of surf cams to measure relevant surf zone parameters for coastal monitoring purposes.
Principal Engineers

**Grantley Smith, Manager & Principal Engineer**
Grantley is the Manager of WRL and is responsible for all commercial project activities undertaken both in terms of quality and management. Grantley has a BE (Civil) and a MEngSc majoring in Water Engineering. He has a broad range of experience providing assessment and solutions in water engineering and water resources, developed during his years as a professional engineer. He has a track record of successfully managing complex water projects as well as specific expertise in the selection and application of appropriate models to support design solutions, planning and management across the water spectrum. Most recently Grantley has been lead author and key contributor to reports supporting the revision of Australian Rainfall and Runoff, contributing to guidelines for appropriate use of 2D numerical models to floodplains. He is also a co-contributor to guidelines setting safety criteria for people and vehicles in floods.

**Doug Anderson, Principal Engineer – Groundwater & Modelling**
Doug specialises in water and groundwater resources assessment and management. His interests include the optimal design of engineering systems utilising environmental process and computer modelling studies. To support these interests Doug maintains a strong background in data management, computer programming, geo-spatial data analysis, hydrogeological site characterisation and numerical modelling. Doug is an expert groundwater modeller with several years of FEFLOW modelling experience. His expertise is complemented by a background in groundwater resources assessment, civil engineering hydraulics, automated coastal engineering data collection and management, and the physical and numerical modelling of surface-water flows.

**Matt Blacka, Principal Coastal Engineer**
Matt has completed a MEngSc degree, with specialisation in Coastal Engineering and Management, and a BE (Civil) degree, with first class honours in Coastal Engineering. He manages projects in the fields of coastal processes and hazards, coastal structures, vulnerability assessments, climate change adaptation, physical and numerical modelling, field data collection and coastal monitoring. Matt is one of Australia’s foremost experts in the application of physical models for analysis of coastal and marine structures, having modelled many coastal structure projects, and published multiple papers on coastal structure physical modelling methods and case studies. Matt also regularly undertakes desktop and field investigations for coastal process, hazards and inundation studies. Matt currently manages WRL’s Coastal Imaging programs including analysing shoreline variability, erosion and accretion trends for a range of beaches.

**James Carley, Principal Coastal Engineer**
James specialises in coastal processes, coastal hazards and physical modelling. James holds a Master of Engineering Science degree, majoring in Coastal Engineering and Physical Oceanography. He is one of Australia’s foremost experts in the practical application of coastal process models and has extensive experience with the best currently available numerical and analytical models from around the world. James has undertaken detailed studies of beaches throughout Australia, the South Pacific, South-East Asia and the Middle East involving a review of historical events, prediction of future response to storms, climate change and sea level rise, and beach response to structures.

**Francois Flocard, Principal Engineer – Water & Energy**
Dr Francois Flocard holds a Master of Engineering Science degree, majoring in hydraulics, and was awarded his PhD on the subject of Physical Modelling of Wave Energy Conversion Processes. Francois is an expert in the field of renewable ocean wave energy; he has managed the installation of a 250 kW pilot device in Victoria and led several large studies related to wave dynamics and wave energy conversion processes. Francois is an expert in 2D and 3D physical modelling with expertise in the application of physical models for assessing coastal, marine structures and wave energy devices; and lead the development of wave maker control interfaces and wave signal analysis software at UNSW Sydney.
Brett Miller, Principal Engineer – Hydraulics & Modelling
Brett is an expert in the field of Civil Engineering Hydraulics using both physical modelling and numerical modelling techniques. His key focus is directing pure and applied research focused on industry's requirements. He has undertaken numerous investigations using complex 1D, 2D and 3D hydrodynamic and water quality models. With advanced mathematical and programming skills, Brett also directs the development of open source modelling tools for specific applications, teaching and research. Brett is an international expert in all aspects of ocean outfalls; in recent years, he has been involved with most of the large desalination outfalls in Australia.

Ben Modra, Principal Coastal Engineer
Ben holds a Bachelor of Engineering/Arts and a Masters of Engineering Science (Coastal Engineering), and has ten years experience providing specialist expertise to the coastal and engineering community in NSW and Australia. He specialises in studies relating to coastal and hydraulic engineering, and is a leader in physical modelling for these fields. He is experienced in the inspection, design and testing of coastal structures, particularly rubble mound breakwaters. Ben is experienced in the deployment of instrumentation for both laboratory and field investigations, and has a strong reputation for the analysis of environmental data. He has pioneered new approaches to tidal and wave data and is an expert of the application of timeseries and statistical analysis to coastal management.

Duncan Rayner, Principal Engineer - Environmental
Duncan specialises in coastal wetlands and estuaries. Duncan’s field expertise supports his significant experience in numerical modelling and laboratory investigations, with a strong background in hydraulics. An expert in data collection in challenging environments, he has led numerous investigations of wetlands, both fresh and tidal, rivers and estuaries, and coastal shelf environments. Duncan also has significant experience in catchment hydrology and groundwater processes. Both his Bachelor and Master’s theses focused on estuarine water quality and hydrodynamics. Previously he has also worked as an engineer in contaminated site remediation encompassing investigation and monitoring.

Senior Project Engineers
Ian Coghlan, Senior Project Engineer
Ian has completed a MEngSc degree with specialisation in the field of Coastal Engineering and Management, a BE (Mechanical) degree, with first class honours and a Diploma in Engineering Practice. He has ten years experience working at WRL and has undertaken and managed a range of projects primarily in the fields of coastal structures, coastal processes and hydraulic structures. These studies include physical modelling, numerical modelling, desktop analysis, field investigations and data analysis. Ian is an Australian expert in two-dimensional and quasi three-dimensional flume physical modelling with expertise in the application of physical models for assessing coastal and marine structures, and is also an expert in numerical modelling of rivers, estuaries and oceans and analysing large datasets.
Project Engineers

Mathieu Deiber, Project Engineer
Since graduating from one of France’s leading engineering schools in 2010 with a MEngSc degree specialising in Marine Engineering, Mathieu has provided technical advisory services to clients on a range of coastal and maritime projects, with professional experience in the United States, Australia and Middle-East. His experience includes modelling and assessment of coastal processes including water levels, hydrodynamics, water quality, sediment transport, thermal effluent recirculation, wave transformation and wave penetration.

Chris Drummond, Project Engineer & Certified Drone Pilot
Chris is a certified RPA/drone pilot with extensive experience including aerial surveying of the Yamba-Iluka breakwater for asset management, monitoring of the Ettalong Geobag seawall and assessment of beach erosion for the entire Wyong LGA coastline. He has also completed various desktop investigations for coastal hazard analysis along the NSW coast. While working at WRL, Chris has completed physical model investigations for a range of coastal structures including breakwaters, groynes and marinas, as well as hydraulic structures such as stormwater assets and drainage systems. Recent physical modelling investigations include 3D modelling using mobile sediment at Mission Beach and 2D modelling of Flexmat stability at Roy Hill. Chris also has expertise in hydraulic physical models assessing gutter intake capacity for Sydney Water and head loss through chambers for the Green Square Alliance.

Alice Harrison, Project Engineer
Alice completed her Bachelor of Civil Engineering in 2015, focusing on aspects of hydrology and water engineering; and completed an honours thesis in coastal engineering. She concurrently completed a Bachelor of Commerce in 2015, majoring in finance, minoring in economics and received top results in subjects concerning financial derivatives and managerial economics. Alice has strong critical thinking and problem solving abilities that gives her a unique approach to projects. Her experience includes 2D wave flume modelling and economic analysis of the impact of climate change on coastal structures along the NSW coast.

Dan Howe, Project Engineer
Dr Dan Howe holds a Bachelor of Engineering (Civil & Environmental), and was awarded a PhD from UNSW, investigating wave runup on steep slopes. He is experienced in physical modelling of coastal processes and structures (including rubble mound and concrete breakwaters), and has performed experimental work at large-scale facilities, including the 300 m long GWK wave flume in Germany. Dan has also worked as a consulting engineer in the water and wastewater industry, focusing on the design and analysis of pump stations, pipelines, and treatment plants.

Gabriela Lumiatti, Project Engineer
Gabriela completed her Bachelor of Environmental Engineering at Unesp - Rio Claro (Brazil) in 2015 with First Class Honours and a Diploma in Marketing in 2017. Her honours thesis focused on investigating hazardous debris flow processes, including detailed watershed susceptibility analysis and numerical modelling of debris flow. She has experience in underwater inspections of urban infrastructure assets.

Priom Rahman, Project Engineer
Priom completed a Combined BE (Civil), with First Class Honours, and Bachelor of Commerce (with Distinction). Her honours thesis looked at fine scale downscaling of GCM rainfall for use in flood modelling of urban coastal catchments for which she was awarded the 2010 National Honours Research Grant from the National Climate Change and Adaptation Facility. Priom undertakes a range of projects in the fields of hydrological and hydrodynamics modelling, coastal processes, climate change impact analysis and groundwater aquitard assessments.
Jamie Ruprecht, Project Engineer

Jamie is a Project Engineer at WRL, and is currently undertaking a PhD on biophysical linkages in estuaries. He holds a Bachelor of Engineering degree in Civil Engineering (First Class Honours) and a Masters in Engineering Science on the stability of tidal inlets in restored coastal wetlands. He was the lead project engineer working on the Big Swamp Restoration Project and the Lower Manning River Drainage Remediation Action Plan, and is currently undertaking a water quality monitoring program at the Big Swamp site.

James Simpson, Project Engineer

James completed his Bachelor of Civil Engineering with First Class Honours in 2016, focusing on aspects of water resources engineering and hydraulics. His thesis investigated developing a hydraulic structure to assist tidal flushing in estuaries. He has experience as an environmental consultant and a water resources engineer. His expertise includes numerical and physical modeling, environmental monitoring and assessments.

Toby Tucker, Project Engineer

Toby completed his Bachelor of Civil Engineering in 2015 and has part-time project experience on water infrastructure projects. His studies focused on aspects of water engineering including catchment modeling, hydraulics and coastal engineering. He graduated with first class honours for his thesis where he used the Argus camera network in conjunction with various numerical models to study different aspects of sand bar recovery on beaches after storm erosion events.

Consulting Specialist

Ian King, Consulting Specialist

Professor Ian King is an internationally recognised expert in the application of state-of-the-art computer simulation techniques to practical engineering problems and has pioneered the application of the Finite Element Methods to water resource problems. He is the principal author of the RMA suite of finite element models that are in worldwide use by governmental agencies and the consulting profession.

Adjunct & Visiting Academics

Ian Acworth, Emeritus Professor

Ian was the Gary Johnston Professor of Water Management, a joint Chair between the School of Civil and Environmental Engineering in the Faculty of Engineering and the School of Biology, Earth and Environmental Sciences in the Faculty of Science. He is the past Director of the Connected Waters Initiative Research Centre at UNSW and the Project Director for the DIISRTE Groundwater EIF project.

Bruce Cathers, Adjunct Lecturer

Dr Bruce Cathers has a Master of Engineering Science; and a PhD from the University of Manchester. Bruce has been associated with WRL since 1996 and is a specialist in the fields of water quality modelling, ocean outfalls; coastal, estuarine and river engineering; physical and numerical modelling, and stormwater structures. His teaching areas are: hydraulics, air and water quality; and river, estuarine and coastal engineering.

Ron Cox, Associate Professor

Ron has extensive research experience in water, coastal and environmental engineering and management, working with industry and government within Australia and overseas. In 2008 Ron was awarded Engineers Australia's prestigious Sir John Holland Award for Civil Engineer of the Year, in recognition for his long standing and continuing contribution to the profession and community, particularly in the field of coastal engineering.
Bill Peirson, Adjunct Associate Professor
Bill is the former Director of the Water Research Laboratory and a former co-Director of the UNSW Water Research Centre. He has many years of professional engineering expertise and research experience in large-scale water engineering. This includes the fields of engineering hydraulics and fluid mechanics, coastal and ocean engineering, river engineering, estuarine and port engineering and engineering hydrology.

Research Associates & Senior Researchers

Chris Chen, Research Associate
Chris began working as a Research Associate at WRL in February 2018, also undertaking teaching within the School of Civil and Environmental Engineering. He is currently working on the Thirlmere Lakes project, which aims to identify the sensitivity of the wetland systems to external influences, including the potential effects of mining activity, groundwater extraction, and climate change. Chris is particularly interested in modelling and field sampling of lakes and reservoirs.

Mitchell Harley, Senior Research Associate
Mitchell specialises in the field of coastal morphodynamics, wave climatology, coastal modelling and early warning systems for coastal hazards. His research has led to a number of seminal publications in distinguished journals such as the Journal of Geophysical Research, the International Journal of Climatology, Coastal Engineering, Geomorphology and Natural Hazards Earth System Sciences, and is cited in the latest IPCC report on impacts, adaption and vulnerability to climate change.

Valentin Heimhuber, Research Associate
Valentin specialises in the application of advanced computational methods, geospatial analysis and statistics for water resources management. His research is focused on using large spatio-temporal datasets and statistics to develop knowledge and tools for addressing key challenges related to the global freshwater and biodiversity crisis. He is currently using climate model projections and hydrodynamic modelling to study the likely impacts of climate change on estuaries in Australia and around the world.

Mahmood Sadat-Noori, Research Associate
Mahmood joined WRL in 2017 and works on a coastal wetland restoration research project, investigating how tidal manipulation in tidal wetlands will influence surface and groundwater dynamics within the wetland. In particular, how the subsurface hydrology controls nutrient exchange, salt marsh plant zonation and carbon cycling in wetland surface waters. His research operates at the interface between two fields; hydrology and biogeochemistry.

Josh Simmons, Research Associate
Josh began his role as a Research Associate at WRL in October 2017, after completing his PhD in the field of Coastal Engineering at UNSW Sydney. During his PhD, he examined the tools available for modelling sediment transport during erosive coastal storm events. Specifically, his research explored the various numerical modelling approaches employed by commonly-used coastal erosion models, presented improved methods for calibrating these models, and quantified data-requirements for effective model calibration. As part of a NSW Environmental Trust grant, ‘Delivering a beach erosion forecasting system’, Josh will continue to pursue these research interests, exploring a number of numerical and data-driven modelling approaches.
Technical Support

Fang Bian, Technical Officer
Fang has a BSc majoring in chemistry, specialising in laser-related devices as well as analytical instruments; and an MSc majoring in applied geology, focussing on fire, groundwater and cave science. Fang’s primary role at WRL is to manage the groundwater records for the National Centre for Groundwater Research and Training across NSW, and to assist in other in-lab and in-field planning.

Anna Blacka, Graphic Designer
Anna has worked as a Graphic Designer at WRL since 2008 and is responsible for all technical drafting, with particular expertise in 3D graphical illustrations. Anna has gained extensive experience working in a range of graphic design fields including advertising, branding, and publications, with specialist skills in web design, social media and digital image manipulation. Anna has a Bachelor of Design (Visual Communication), majoring in Photomedia, and is experienced in use of a wide range of graphics software including Photoshop, InDesign, Illustrator, Wordpress, Drupal and MailChimp.

Rob Jenkins, Technical Officer - Toolmaker
Rob joined the WRL team in 2012 as a Technical Officer (Toolmaker), assisting both the WRL project staff and academic staff with the construction of physical models and specialist instrumentation. He is also responsible for assisting students with the setup and operation of experiments. Rob is a highly skilled professional toolmaker with over 20 years of experience in high-end surgical instrument manufacture.

Larry Paice, Workshop Supervisor
Larry joined the WRL team in 2010 as a specialist craftsperson and workshop supervisor, assisting both WRL project staff and academic staff with the design and construction of physical models. He is also responsible for assisting students with test structures and the set-up of their instrumentation. Larry comes as a highly experienced carpenter offering background in high-end residential carpentry and joinery. Larry currently holds a carpenter and builders licence.

Rob Thompson, IT Technical Officer
Rob has worked as WRL’s in-house IT Technical Officer since 2006, and is responsible for maintaining all of WRL’s software and hardware systems. Since 2010 Rob has also worked on the design and operation of WRL’s camera based wetland environmental monitoring program at Tomago. Rob is experienced in the design and operation of remote and wireless image collection systems.

Administration Support

Grace Carlino, Administration Assistant
Grace joined the WRL administration team in 2016, having worked in all areas of accounting for both sole traders and large businesses; including administration, client relations, bookkeeping, payroll, income tax, BAS and superannuation. Her responsibilities include accounts payable and receivable, credit card reconciliations, expense reimbursements, stock ordering and control, travel bookings and daily support for the other administrative staff.

Coral Johnson, Publications Officer
Coral joined WRL in 2012 as a Publications Officer. Located in the Reception Office, Coral welcomes WRL’s visitors and students. In the role of Publications Officer, she is responsible for the proof reading, editing, production and distribution of the WRL Technical Report series. Coral began her career in secretarial studies and achieved a Bachelor of Social Work. Her career has been diverse as it includes working in the corporate, University, public health and community development sectors.

Ross Mathews, Administration Assistant
Ross has been an Administrative Assistant at WRL since 1990. He has extensive experience in administrative procedures at UNSW, with his responsibilities including; accounts payable and receivable, credit card reconciliations, petty cash, orders, asset management, motor vehicle maintenance and keys.
Consulting services agreement
Terms

1. Definitions & interpretation

1.1 Definitions

In this Agreement, unless the context otherwise requires:

**Background IP** means Intellectual Property Rights owned or licensed by a party prior to the date of commencement of this Agreement, or subsequent to that date but unrelated to this Agreement;

**Client Materials** includes, without limitation, any equipment, materials, data or information supplied to UNSW or its contractors by or on behalf of the Client;

**Confidential Information** means all information of a party or its clients or other suppliers, which would reasonably be regarded as confidential, disclosed to the other party before or after the date of this Agreement, including without limitation information relating to:

(a) Background IP; and
(b) the business, operations products, customers and suppliers of the disclosing party,

whether disclosed verbally, in writing, in electronic form or by any other means, but excluding information which:

(c) the recipient can prove by its own written records that it knew or possessed before the Confidential Information was disclosed or made available to it by the disclosing party;

(d) is or becomes available to the public otherwise than by a breach by the recipient of this Agreement;

(e) is lawfully acquired by the recipient from a third party without restrictions as to its use or disclosure; or

(f) is disclosed as required by law;

**Deliverables** means the deliverables to be supplied to the Client under this Agreement as specified in the Details;

**Details** means the matters set out in the table on the front page(s) of this Agreement;

**GST** means the tax imposed by A New Tax System (Goods and Services Tax) Act 1999 (Cth) and related tax imposition Acts of the Commonwealth of Australia;

**Intellectual Property Rights** means all rights resulting from intellectual activity whether capable of protection by statute, common law or in equity, including copyright, discoveries, inventions, innovations, technical information and data, prototypes, processes, specifications, know-how, plant varieties, the right to have confidential information kept confidential and all rights and interests of a like nature, together with any and all documentation and other material relating to such rights and interests;

**Key Personnel** means the person(s) named in the Details;

**Services** means the services, including any Deliverables UNSW is providing under this Agreement as described in the Details; and

**Special Conditions** means any conditions noted in Annexure B.

1.2 Interpretation

(a) The Details, these terms, the Special Conditions and any annexures together constitute the Agreement.

(b) If any Special Conditions have been identified, those Special Conditions override the provisions of these terms to the extent of any inconsistency.

2. Term

(a) This Agreement commences on the Commencement Date specified in the Details and continues in force until completion of the Services or until the Agreement is terminated in accordance with its terms.

3. Services

(a) UNSW agrees to provide the Services to a standard being that which is reasonably to be expected of a qualified professional person providing the Services and otherwise in accordance with the Agreement.

(b) UNSW will ensure that the Services are carried out by the Key Personnel or such other person(s) as may be agreed in writing from time to time.

(c) If, due to circumstances beyond UNSW’s control, the Key Personnel become unavailable to perform the Services, UNSW will use reasonable endeavours to provide a suitably qualified replacement, subject to the Client’s approval which will not be unreasonably withheld. If UNSW is unable to provide a suitably qualified replacement, UNSW will refund fees paid less any fees payable for services already rendered or expenses or liabilities reasonably incurred by UNSW.

(d) UNSW will use best efforts to complete the Services by the Completion Date and any milestone dates (if any) specified in the Details.

(e) If ethics and/or biosafety committee approval (or similar) is required in relation to the Services, UNSW must use reasonable endeavours to obtain such approval. Before such approvals are obtained, UNSW is not required to commence the Services.

(f) The Client acknowledges that where the Services involve research, development, expert opinion or testing, UNSW may produce no results or conclusions, or opinions or results that are unpredictable or which do not favour the Client. UNSW makes no promise, prediction or warranty concerning these conclusions, opinions or results.

4. Client’s obligations

4.1 Client to perform Client’s duties

The Client will comply with or perform the Client Duties (if any) specified in the Details and, at UNSW’s request, will promptly provide:

(a) the Client Materials required to be incorporated into, or used to perform, the Services;

(b) instructions and responses to UNSW’s reasonable requests on all matters relating to the Services; and

(c) any other information, ideas or suggestions which UNSW is to consider in performing the Services.

4.2 Use of Client Materials

In respect of the Client Materials, the Client will ensure, that, to the extent applicable:

(a) the Client Materials are accurate, complete and current;

(b) the Client is entitled to supply the Client Materials to UNSW and its contractors for the purposes of the Services;

(c) the use of the Client Materials in connection with the Services is lawful and does not require the consent, permit or authorisation of any party, including any consent from third parties to use their intellectual property in the performance of the Services;

(d) if the Services include the use, reproduction or adaptation of Client Materials, the Client will obtain all necessary authority for that use, reproduction and adaptation;

(e) unless specified by written notice to UNSW, the Client Materials are not reasonably capable of constituting a threat to safety, health, life, property or the environment; and

(f) the Client will give written notice to UNSW of any matters affecting the safe, secure and appropriate transportation, use, storage and disposal of the Client Materials.

4.3 No liability if Client duties not fulfilled

UNSW will not be responsible for any deficiency or alleged deficiency (including delay) in the performance of the Services attributable to:

(a) a breach by the Client of a material term this Agreement; or

(b) a failure by the Client to provide relevant, accurate or timely information or decisions.

4.4 Occupational health and safety

The Client will ensure that any UNSW personnel attending a site inspection or any premises of, or known to, the Client in connection
with the provision of the Services is provided a safe place of work in compliance with relevant occupational health and safety legislation or requirements.

5. Payment
5.1 Fees
The Client will pay UNSW the fees at the rate or amount and in the manner specified in the Details.

5.2 Expenses
(a) The Client must pay all reasonable travel, accommodation, courier and administrative expenses which UNSW incurs in performing the Services including those specified in the Details.
(b) Where practicable, UNSW will not incur any additional expenses without first notifying the Client and obtaining approval for the relevant expenditure.

5.3 Invoices
(a) UNSW will submit a tax invoice to the Client monthly or otherwise in accordance with the Details.
(b) The Client must pay those tax invoices within 30 days of the date of issue of each tax invoice.

5.4 Overdue payments
UNSW may suspend performance of the Services or its other obligations under this Agreement until all overdue amounts are paid.

6. Taxes
(a) Unless otherwise stated in the Details, all charges and expenses payable by the Client under this Agreement are exclusive of GST but inclusive of any other applicable taxes, duties, imposts and other similar charges payable in respect of the Services.
(b) If GST is payable on any supply made by UNSW under this Agreement, the Client will pay to UNSW, an additional amount equivalent to the GST at the time payment to UNSW is due.

7. Intellectual Property Rights
(a) Each party retains its rights in any Background IP and those rights will not be transferred or changed by the use of Background IP in connection with the Services or its disclosure by one party to this Agreement to the other.
(b) Intellectual Property Rights created in the course of performing the Services will be owned by UNSW.
(c) On full payment by the Client of all fees and expenses due under clause 5 UNSW grants to the Client a non-exclusive, non-transferable, royalty free, perpetual licence to use the Intellectual Property Rights in the Deliverables for the Client's internal business purposes.

8. Confidential Information, privacy and publications
8.1 Obligation of confidentiality
Both parties must (except as may be required by law or with the other party's prior written consent):
(a) maintain the secrecy and confidentiality of any Confidential Information of the other party; and
(b) refrain from copying, transmitting, retaining or removing any Confidential Information of the other party, or attempting to do so, except to the extent necessary to perform the Services.

8.2 Privacy
Each party must comply with the Privacy Act 1988 (Cth) and the reasonable directions of the other party in relation to the handling of any personal information that that party holds or has held and used in connection with this Agreement.

8.3 Publications
(a) UNSW may publish information relating to the Services, including the Deliverables, in academic, scientific and technical publications provided no Confidential Information owned by the Client is disclosed.
(b) The Client must not use the names ‘UNSW’, ‘University of New South Wales’ or the names of the Key Personnel, or any department, unit, employee or contractor of UNSW in any publication or promotional material without UNSW’s prior written approval.

9. Liability & warranties
9.1 Non-excludable liability
(a) Nothing in this Agreement is to be read as excluding, restricting or modifying the application of any legislation which by law cannot be excluded, restricted or modified.
(b) Subject to (a), any representation, warranty, condition or undertaking which, but for this clause, would be implied in this Agreement by law is excluded.

9.2 Exclusion of certain losses
Neither party will be liable for any loss of profits, loss of data, loss of business opportunity and liabilities in respect of third parties, or special, incidental, indirect or consequential loss or damages, which may be suffered or incurred or which may arise directly or indirectly in connection with any material or services supplied under this Agreement or in connection with any act or omission (negligent or otherwise) on the part of a party, or otherwise out of the relationship created by this Agreement.

9.3 Remedies for terms implied by law
To the extent permitted by law, the liability of UNSW for any claim arising directly or indirectly from a breach of any non-excludable term or condition implied by statute is limited, at the option of UNSW, to one or more of the following: the supplying of the Services again; or the payment of the cost of having the Services supplied again.

9.4 Liability cap
Subject to clauses 9.1-9.3 inclusive:
(a) the total liability of UNSW to the Client for loss or damage of any kind whether arising in tort (including negligence), contract, statute, law, equity or under an indemnity is limited to the fees paid by the Client under this Agreement;
(b) each party’s liability under this Agreement is reduced to the extent that any damage, liability, loss or cost arises from or is attributable to any act or omission of the other party, their employees, agents, contractors or students.

9.5 Representations and effect of clause
(a) The Client acknowledges that it has not relied on any representations made by UNSW which are not set out in this Agreement.
(b) References to UNSW in this clause 9 include UNSW's officers, employees, agents, students and contractors.
(c) This clause 9 applies regardless of anything else in this Agreement, to the extent permitted by law.

10. Termination
(a) Either party may terminate this Agreement immediately by written notice if the other commits a material breach of this Agreement which it fails to correct within 30 days of being notified of the breach, or if the other party becomes the subject of any insolvency administration.
(b) The Client may terminate the Agreement or reduce the scope of Services by no less than 7 days written notice to UNSW but the Client must pay all fees and expenses incurred by UNSW in connection with the Services up to the date of receipt by UNSW of notice from the Client and all future unavoidable costs and expenses UNSW incurs in relation to the Agreement.
(c) Clauses 3(1), 4.3, and 7–9 inclusive survive the expiration or earlier termination of this Agreement.

11. General
(a) This Agreement contains the entire understanding between the parties concerning its subject matter and supersedes all prior oral and written representations and agreements.
(b) This Agreement is governed by and must be construed in accordance with the laws of New South Wales. The parties submit to the non-exclusive jurisdiction of the courts of that State and the Commonwealth of Australia.
(c) This Agreement may only be varied in writing by the parties.
(d) The relationship established by this Agreement between UNSW and the Client is one of principal and independent contractor and not one of employment, partnership or joint venture.