Next SMI Positioning For Growth Workshop
25-26 June
Content - overview

1. **Basics**
   Water balances
   Catchment science

2. **Integration over multiple scales**
   Mine task - catchment approach
   Post-closure

3. **Integration of multiple media**
   Water-product-waste-energy
   Designer tailings

4. **Shared values**
   Quantifying the value of water
   Cost-benefit analysis
   Risk and adaptation
Content – now

• Water balance and efficiency evaluation (seepage, evaporation, entrainment, recovery, etc)

• Water accounting and reporting

• Great Artesian Basin (and other basins) – hydrogeochemical and water use characterisation

• Water and energy: towards water and carbon neutral mining

• Impact assessments (local and cumulative; hydrology; water quality; freshwater ecology; offshore)

• Understanding stakeholder water values, and stakeholder engagement

• Water risk evaluation and mitigation, including climate change impacts
Content - 2 years

• Real-time water, energy and chemistry balances and reporting, and real-time control of water

• Applying new sensor technology including remote sensing

• More emphasis on tropical water positive countries and sediments

• Monitoring impacts of CSG extraction

• Water and energy efficiency benchmarking

• Biomonitoring

• Designer tailings; and integrated mine modelling
Content - 2 years (cont.)

• Mine closure and perpetuity issues (long-term prediction and adaptive planning)

• Mines as contributors to catchment water objectives (economic, social, environment)

• Predicting impacts of unconventional gas/oil production

• Groundwater make-good agreements (technical, community and legal)

• Cost-benefit analysis of further advances in water recovery and treatment, and minerals processing technology

• Modelling and visualisation tools to provide stakeholders confidence in impact mitigation strategies and their operation

• Water footprints and risks through life cycle analysis
Content - 5 years

- Mining innovations, e.g. biomining
- Alternative energy sources (geothermal)
- Deep sea mining impacts
Assumptions about stakeholder needs

• Drive for cost effective water treatment and waste management.

• Mining industry recovery will result in cautious new project development with CAPEX/OPEX constraints driving need for risk consideration in each aspect of project design.

• Government will open Cooper Basin and other basins for coal and gas exploration.

• Advocators for evidence based regulation and community understanding of mining processes and impact management.

• Investment in discovery and innovation (ARC).

• Other SMI centres will require water science support for technological innovation, social and environmental studies.

• Energy sources will change.
Services

- Applied Research (65%)
- Fundamental Research (10%)
- RHD supervision (10%)
- Consultancy (5%)
- Training – external (5%)
- Education – UQ coursework programs (5%)
Services

- **Applied research** to provide better understanding of water risks and opportunities to support policy, planning, design and operational decisions

- **Fundamental research** to develop ideas and discover new facts and that may provide step changes in sustainable use of water

- **RHD supervision** to contribute to applied and fundamental research and train new generation of researchers and water experts

- **Consultancy** to provide independent review of data and impacts assessment, and application of our specialist knowledge and tools

- **Training** to transfer knowledge to our stakeholders about sustainable mine water management

- **Education** to develop knowledge about and interest in water in the UG/PG community, and to provide teaching experience for our staff.
Platforms – tools, data and other assets

- People and projects
- Leading practice guidelines
- Software – HSM
- Water Accounting Framework
- Libraries of training and education material
- Data bases and data visualisation – Water Chemistry Atlas
- Published reports and research papers
- Field equipment
- SMI & UQ laboratories
Cross-SMI collaboration opportunities

CWiMI has active collaborations, project proposals and RHD co-supervisions with CMLR, CSRM, BRC, MISHC

Opportunities include:

• Designer tailings. How can whole of site tailings management reduce water risks, and vice versa?

• Laboratory and field scale experiments on hydrogeochemistry of TSFs and spoil heaps including upscaling to mine site and catchment scales

• Integrating water and water chemistry into minerals processing simulators (IES) and concentrator technology research

• Combined water and energy efficiency benchmarking

• ...

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Cross-SMI collaboration opportunities

• Development of the Social Water Assessment Protocol
• Design, management and/or audits of participatory monitoring
• Mine regions planning and cumulative impacts: quantifying risks arising from interactions between landscape, water, biodiversity and communities, under land use and climate scenarios
• Make-good agreements for groundwater impacts – achieving transparent and scientifically defensible agreements
• New extraction methods (e.g. in-situ metals mining, shale gas, biomining, grade engineering) – understanding the water risks and opportunities
CWiMI now, and in 2 and 5 years time
CWiMI now – goal, vision and strategy

Goal

To be recognised as a leading research centre for supporting sustainable management of water in the minerals and energy industries

Vision

Sustainable use of water through achieving excellence in research, people and practice

Strategy

Diversify funding… develop inter-disciplinary advantage…. revitalised RHD programme… new targeted engagements with industry and research community… and CWiMI’s flagship products need to be capitalised on
CWiMI now - themes and people

Disciplinary base:
- Civil engineering
- Chemical engineering
- Hydrology
- Hydrogeology
- Geochemistry
- Aquatic ecology
- Mathematics/modelling

Research Staff:
- Prof Neil McIntyre
- Dr Sue Vink
- Dr Greg Keir
- Dr Sven Arnold
- Ms Alex Wolhuter
- Ms Vini Nanjappa
- Ms Nena Bulovic
- Mr Ian Callow

± 7 RHDs

UQ partners include:
- SMI-CSRM (communities)
- SMI-CMLR (mine closure design and tailings)
- SMI-BRC (regional planning)
- UQ’s AWMC (water treatment technology)
- UQ’s GPEM (remote sensing)
### CWiMI now – current and recently completed projects

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**RHDs:**
- Drought risk indices
- Floods management
- Hydro-economics
- Soil hydrology
- Salinity in rivers
- ASM & sediments
- Water quality indices
CWiMI now – Business Development Plan

CENTRE FOR WATER IN THE MINERALS INDUSTRY

2015 Engagement and Business Development Plan

Prepared by: Ian Callow
Centre for Water in the Minerals Industry
Sustainable Minerals Institute
The University of Queensland

25 June 2015

THE UNIVERSITY OF QUEENSLAND
SMI CWiMI
Centre for Water in the Minerals Industry

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CWIMI in 2 and 5 years time

• We will revise our current four themes according to our opportunities, interests and skills, and other SMI themes

• We will maintain our existing revenue and research staff levels over next 2 years and then grow

• We will continue to expand our RHD group to 4 RHDs (full supervision equivalent) per post-doctoral research staff member

• We will continue to implement key aspects of our 2014-2019 Strategic Plan, and our new Engagement and Business Development Plan

• We will build on our successful collaborations with CMLR, CSRM and BRC, and develop collaboration with JKMRC; and be substantially involved in their themes and projects

• We will push for paid opportunities to contribute to UG education
CWimi in 2 and 5 years time

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