

Northparkes Mines
A century of mining together

Geotechnical Considerations for Exploration

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Overview

- Isn't geotechnical engineering an operational issue?
- When do we start geotechnical investigations?
- What do we do?
- Why should we care?
- The Northparkes approach

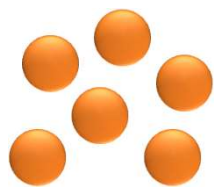
Geotechnical Engineering – short or long term focus?

- Applies across all project stages:
 - Early stage – data and model focused
 - Late stage – optimising designs and adapting to changing environment
- High level, long-term perspective to short-term, event focused perspective.
- Maintain holistic view across all project stages
- Operational feedback
- Multi-disciplinary approach

Timeline – when do we start?

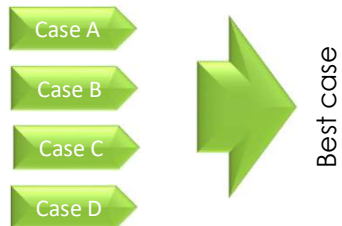
Project
Timeline

Scoping



What could it be?

Pre-feasibility



What should it be?

Feasibility



What will it be?

Commitment and Execution



Investment in the decision and project delivery

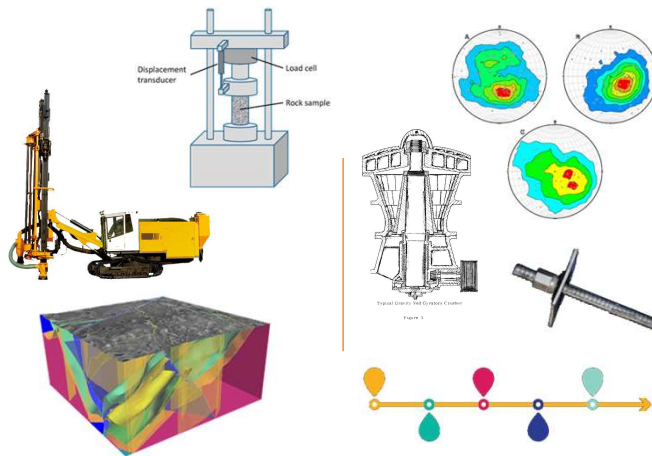


Operations

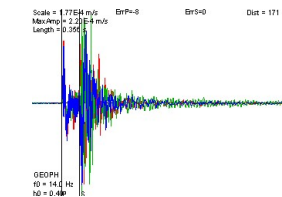
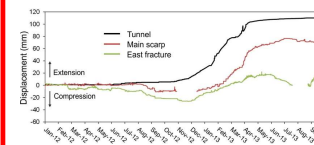


Extract value

Geotechnical
Timeline



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Source: Divergent thinking – the value-add proposition in mining consulting. AusIMM Bulletin, April 2016
<https://www.ausimmbulletin.com/feature/divergent-thinking/>



Data acquisition – what do we do?

- Drilling
 - Logging of core
 - Interval data – weathering, alteration, lithology, RQD
 - Point data - structural
 - Downhole geophysics (ATV/OTV/FWS)
- Sampling
 - Geotechnical index testing (UCS, DS, triaxial etc.)
 - Abrasivity, toughness, mill work index
- Interpretation
 - Structural model
 - Weathering/alteration model
 - Fracture density
 - Fragmentation assessments
 - Support requirements
 - Etc.

Impacts of geotechnical data – why do we care?

- Safety
 - Zero Harm to people, equipment and environment
 - Legislative and regulatory requirements
- Cost
 - Optimise the cost for mining whilst maintaining commitment to safety
 - Ground support designs
 - Material handling options
- Productivity
 - Cycle times for development headings (cable installation, support requirements, seismic re-entry)

Geotechnical Exploration at Northparkes



Site Overview
Northparkes Mines - 2017

■ Tenure
● Prospects

0 0.6 1.2 1.8 2.4 Km

Data Source: 10/10/2017 10:22:52 PM
Coordinate System: GDA 1984 UTM Zone 56

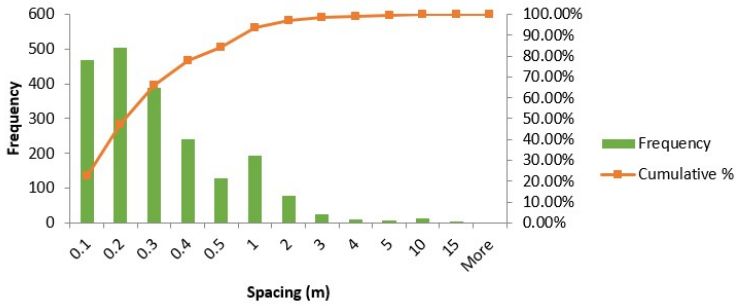
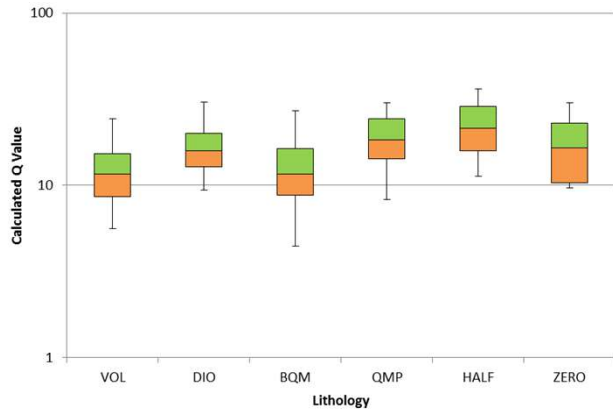


- Near mine vs. far field
- Project requirements & timeline
- Collaboration with exploration geo's on hole design and sampling
- Geotechnical logging
 - RQD
 - Structural
 - GSI
 - Infill characteristics
 - Fault characterisation
- Data management – Acquire
- Model generation
 - Structural
 - Geotechnical block model

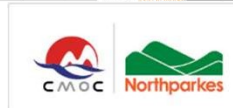
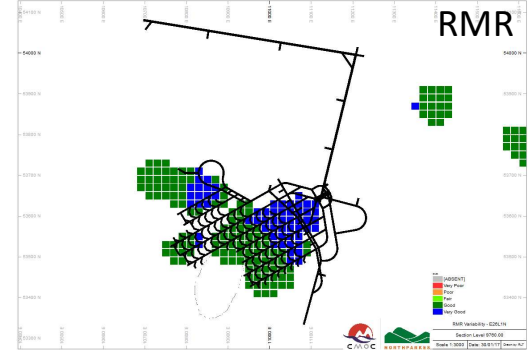
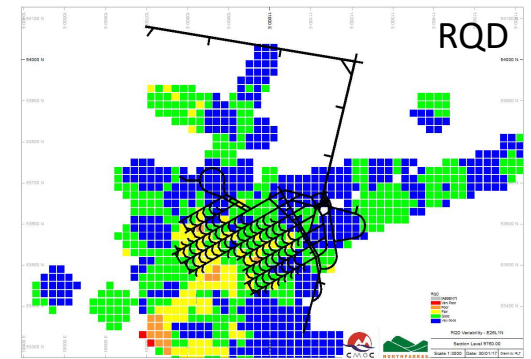
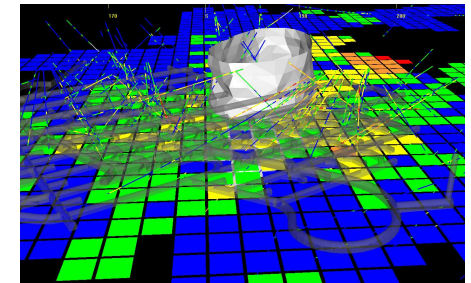
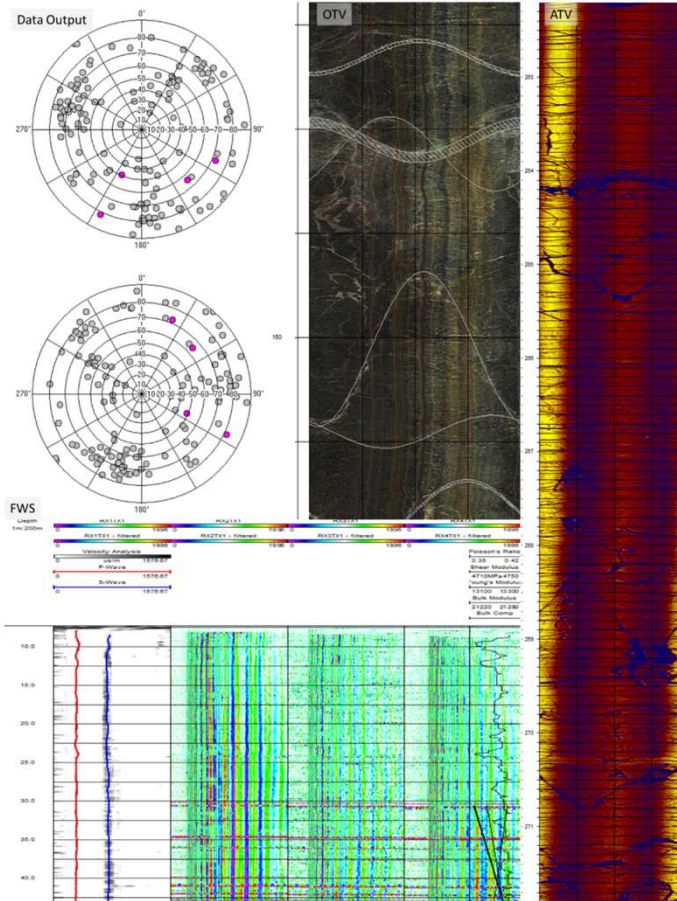
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Geotechnical Exploration at Northparkes – L1N



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***Thank you for
listening***

Any questions?