

Newcastle Courthouse, NSW

CLIENT AAP Corporation

YEAR 2012 - 2014

SCOPE OF WORK

- Geotechnical investigation
- Sonar assessment of mine workings
- Numerical modelling of subsidence
- Design of remedial grouting
- Preparation of technical specification
- Verification of grouting works



Accurate sonar mapping showing actual layout of workings

The Newcastle Courthouse is built over abandoned mine workings in two coal seams. Douglas Partners used Sonar technology to accurately map the workings and used numerical modelling to design a robust grouting strategy to protect the important structure.

The Newcastle Courthouse is a state-of-the-art seven storey, 12,000 m² building constructed over two sets of potentially unstable abandoned mine workings at about 25 m and 75 m depth. Douglas Partners (DP) were selected to provide advice to APP Corporation and the NSW Department of Justice based on their extensive knowledge of the mine workings and their team who have a solid track record of design and verification of mine remediation works.

Information held by DP indicated that the site was likely to be underlain by unmapped workings in the Yard/Dudley Seam extending past the known extent of workings as well as deeper workings in the Borehole Sea. The first step was to investigate the condition and extent of the workings in both seams using a combination of drilling and using DP's specialist sonar equipment to map the workings.

Due to the high importance of the structure and following consultation with the Department of Justice and the Mine Subsidence Board it was agreed that a robust grouting strategy

be employed to ensure stability of the mine workings. Computer modelling was undertaken by in-house specialists using LAModel to assess potential subsidence for various grouting options. A third party peer review of our modelling confirmed the suitability of design options.

The adopted scheme involved bulk grouting of the Dudley/Yard Seam below the site and targeted grouting in the Borehole Seam. The Borehole Seam grouting comprised full encapsulation of key pillars below the site to limit subsidence to that which could be tolerated by structural design and taking into account surface access constraints. The resulting grouting layout was considerably less extensive than preliminary designs by others and allowed grouting to be undertaken within the site extents;

A detailed grouting specification was prepared by DP for tendering and a risk workshop between APP, DP and preferred grouting contractor to identify key risks to the grouting program and appropriate management strategies. Verification of grouting works by DP

to the satisfaction of the MSB allowed final MSB approval of the development.

The use of ongoing sonar mapping of the workings in both seams during the works allowed variations in the layout, as compared to the the historical mine plan, to be identified early and reduced drilling requirements as well as verified that all areas of workings had been satisfactorily remediated. Careful monitoring of the grouting works allowed a refined understanding of the behaviour of grout and how it permeates through the workings.

"Douglas Partners have a detailed understanding of the mine rectification process which was of great benefit to the Newcastle Courthouse project team."

*Ethan Clarke
APP Senior Project Manager*

