A novel and practical approach to identify durable rock for landform rehabilitation at the Mt Arthur coal mine

S Mackenzie1, A Sampaklis2, G Wesley3, T Trickey4 and N Stackman5

1. Founder, Mine Earth, O’Connor WA 6163. Email: shannon@mineearth.com.au

2. Specialist Closure Planning, BHP NSW Energy Coal, Muswellbrook NSW 2333. Email: andrew.sampaklis@bhp.com

3. Principal Environmental Geologist, Mine Earth, O’Connor WA 6163. Email: glendon@mineearth.com.au

4. Senior Geologist, BHP NSW Energy Coal, Muswellbrook NSW 2333. Email: teresa.trickey1@bhp.com

5. Project Manager Engineering Projects, BHP NSW Energy Coal, Muswellbrook NSW 2333. Email: nigel.stackman@bhp.com

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# ABSTRACT

The Mt Arthur Coal Mine is scheduled for closure by 2030. Disturbed land at Mt Arthur will be rehabilitated using innovative geomorphological designs specifically developed for mining landforms.

A large volume of durable rock will be required for the construction of the drainage channels that will be incorporated into the final slopes of the rehabilitated landforms. Mt Arthur was considering importing durable rock from offsite sources or have concrete matting fabricated offsite until a collaborative geological assessment of onsite waste rock resources was undertaken. The assessment identified a suitable source of durable rock that met the requirements for drain construction.

A practical field procedure was developed for use by operational staff to identify suitable durable rock and distinguish this from non-durable rock. The focus of the field procedure was on the novel application of a ‘Schmidt hammer’ to measure rock strength by conducting a non-destructive rebound test to derive an ‘R-value'. A threshold R-value was developed for operational staff to distinguish suitable durable rock from non-durable rock.

The threshold R-value was developed from an extensive sitewide test work program to establish a baseline dataset, and from collaborative verification by geological, engineering and landform design representatives. To complement the use of the R-value threshold in the field, rock strength and durability were also assessed from a range of other key parameters including uniaxial compressive strength, point load strength, mineralogical composition, density and water absorption.

This novel, practical and cost-effective approach has resulted in better environmental outcomes through the beneficial reuse of onsite resources, improved integration of operational and closure activities, and optimised closure outcomes compared with the used of fabricated concrete matting or importing rock.

The collaborative approach to identify durable rock sources and the development of the field procedure will be described in detail along with working examples from Mt Arthur.