

ELLENDALE DIAMOND MINE

Managing an abandoned mine as a future resource



E9 Noise Bund indicating significant landform erosion

The management objective for the Ellendale abandoned mine site is to ensure Ellendale remains viable for future responsible resource development as the remaining diamond resource is of significant value to the State.

Landforms and infrastructure at Ellendale have continued to be exposed to the natural weather extremes typical of the West Kimberley since the site was abandoned in 2015.

Recent inspections of constructed landforms have highlighted areas of significant erosion (as shown) with potential to lead to wall instability and downstream sedimentation.



E4 Lights Stockpile erosion blowout and sediment fan



E4 TSF 2A northwestern wall showing significant surface erosion, gully and tunnelling



E9 TSF 1D significant gully erosion on the western wall of Cell 3

Waste rock characterization informing landform remediation

Ellendale is located on the Lennard Shelf in the northeastern portion of the Canning Basin. The geology is dominated by the Devonian marine sediments (siltstones, shales, limestones) of the Fairfield Group which are unconformably overlain by Permian-age fluvial sandstones (Grant Group). During the Tertiary Period, the Canning Basin was intruded by lamproitic plugs and subsequent eruptions have filled the volcanic vent with lamproite pyroclastic tuffs.

Main waste rock types include:

- Magmatics (variety of tuffs and lamproite)
- Fairfield Group siltstones
- Grant Group sandstone

These waste materials have been used to construct landforms and tailings storage facilities (TSF). The significant level of erosion on some of these features has the potential to lead to wall instability if no remedial action is taken.

Factors contributing to significant erosion:

- Waste rock types are prone to chemical and mechanical weathering
- Weathered materials becoming highly erosive, likely exacerbated by the current landform design
- Landforms with inadequate constructed surface water control features including poorly constructed or absent crest and berm bunds, and berms inadequate to contain surface run-off



Fresh magmatics



Large magmatic rocks weathering to dust



Five-year-old weathered magmatics

Landform remediation will incorporate appropriate rock armoring and modifications to the current batter design to enable long-term surface stability.



Fresh siltstone



Weathered siltstone



Weathered siltstone (top), weathered sandstone (bottom)

Waste rock photographs from 2011 have been reproduced courtesy of Landloch Pty Ltd

