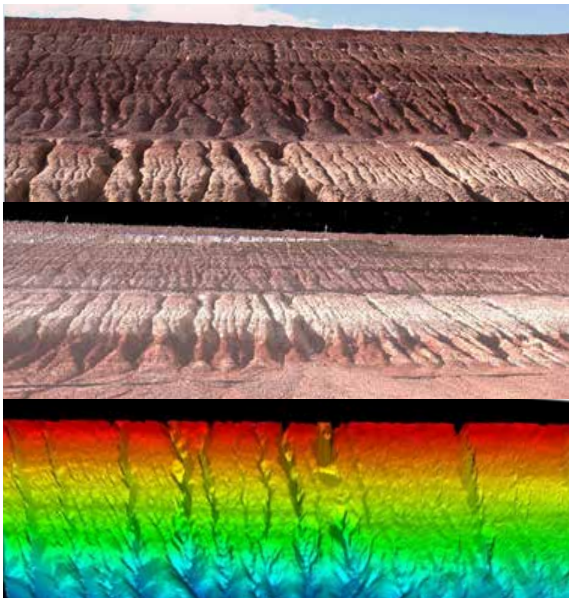
I-Site gains regulatory approval

Maptek™ I-Site™ has provided a solution for monitoring landforms and vegetation that is gaining acceptance from authorities signing off on mine closure plans.



Quantitative assessment of rehabilitation performance is one of the most critical aspects in mine closure and obtaining sign-off and relinquishment from regulatory authorities.

To gain final approvals, post-mine landforms must be safe, stable and sustainable. Current rehabilitation techniques do not provide quantitative monitoring data for stability and landform evolution, making it difficult for regulators to approve mine closure plans.

Soilwater Group, based in Perth, Western Australia, implemented a new rehabilitation monitoring approach using the I-Site™ 8800 laser scanner and I-Site Studio software. Rapidity and ease of use were major considerations in implementing I-Site technology.

The approach involved detailed landform surveys for auditing post-built landforms; identifying problematic and unstable rehabilitation; quantifying erosional features; determining fill rates of surface water management features; and measuring and monitoring floristic parameters over time.

Traditional techniques involve onerous and costly data capture at isolated points or transects across the post-mine surface. In comparison, laser scanning with I-Site allows users to rapidly visualise, measure and process data over larger areas than previously physically possible.

Using I-Site technology, Soilwater was able to pinpoint the erosional and rehabilitation processes occurring within a mine site over time. This improved understanding enables regulators to more rapidly evaluate rehabilitation performance and function so that critical decisions regarding site longevity and closure of a site can be made.

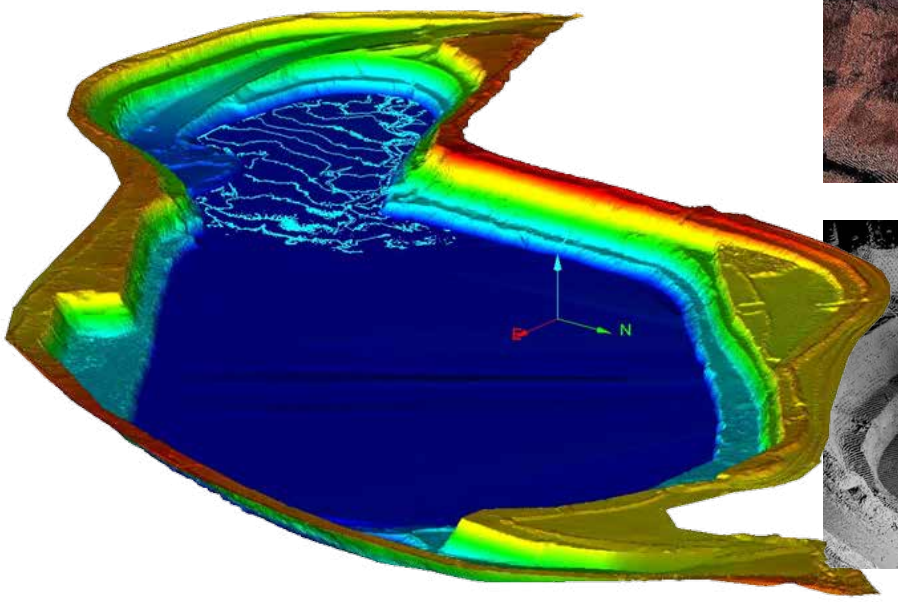
Soil matters

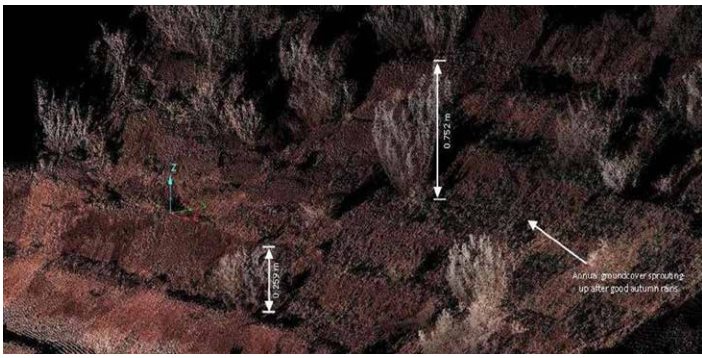
Australia's arid climate means that stability is the most critical aspect influencing rehabilitation success and overall closure of a mine site, as rainfall runoff is exacerbated by dry soils and low vegetation cover.

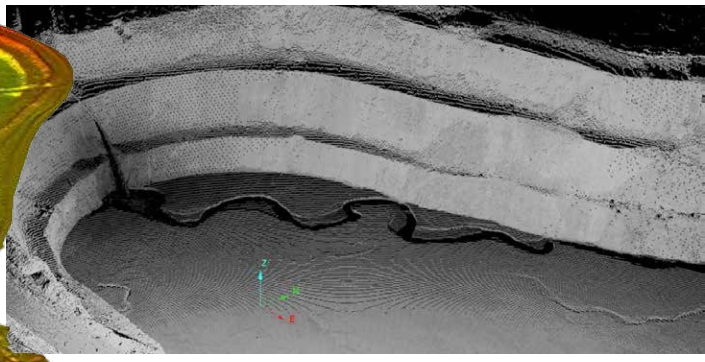
In the early years of rehabilitation accurate, quantitative measurement and monitoring is therefore critical. Surface erosion carries away seed of revegetation species (limiting revegetation potential); fills surface drainage features (decreasing overall structural stability of post-mine landforms); and results in unwanted sediment loss.

I-Site technology makes measuring and monitoring of these surface processes easy and routine.

I-Site technology enabled Soilwater to model a previously unattainable surface for an in-pit tailings dam. By scanning the release point from a remote stand-off, Soilwater was able to create a Digital Elevation Model with 1 cm contours, providing evidence of the size of the beaching effect for monitoring.







I-Site allows slope shape, angle, length and setback to be compared to the rehabilitation design. Surface soil parameters such as the percentile of rock and exposed soil can be quantified, and surface erosion and deposition monitored.

Overlaying photographic imagery on the point cloud proved invaluable for differentiating between ground and vegetation in complex areas.

When filtering unwanted parameters, tiling different windows in I-Site Studio makes it easy to distinguish between soil, rocks and vegetation. High resolution Digital Elevation Models (DEM) can be constructed showing all landform features.

The volume of any or all rills and gullies can be precisely determined to quantify erosion and filling rates of water management structures.

Comparing surfaces year on year using the *Colour by distance* option in I-Site Studio allows the rate of erosion and deposition to be measured to millimetre accuracy.

Measuring erosion depth and volume of soil lost without having to walk the surface is a huge advantage. Scans can be taken year after year without interfering with natural processes. Generating volumes for comparing the current landform to the as-built removes guesswork, and is easy to replicate over a large area.

Plant cover

I-Site point cloud data allows Soilwater to estimate plant height and growth rates, foliage cover and plant density. These parameters are critical for successful rehabilitation of post-mine landforms, particularly in stabilising surface soils, and are often used as completion criteria to assess performance.

Floristic parameters are generally measured and monitored using a quadrant or point/line transect approach, and are expressed per unit area. Given that a high resolution I-Site scan acquires more than 1000 points per square metre, the resulting point cloud can be used to identify the majority of emerging and establishing species.

Accurate data

Large amounts of quantitative data allow Soilwater to more accurately plan rehabilitation and closure activities. This data can also be used to audit all rehabilitation and mine closure earthworks to ensure conformance to design. Scans of general mine site areas can determine volumes of soil materials that can be directly input into cost estimation software to accurately determine mine closure costs.

First pblished, December 2013