

## *Llanberris Rehabilitation Plan*

### **Setting**

The Llanberris site is in the suburb of Golden Point, Ballarat, and is within the Ballarat Mine Lease MIN5392. Figure 1 shows the lease boundary and the location of this site.

The site covers an area of approx. 1.9 Ha and is bounded by the Llanberris Athletics reserve to the west, Canadian Creek to the north-east, residential properties to the east and York Street to the south. The site slopes from the western boundary down to Canadian Creek, an elevation change of approx. 7m over 70-100m.

A trapezoidal shaped cutting into the southern, high side, of the site is the location of the original Llanberris shaft and more recently the dewatering point for the historic mine workings that enabled the current mine to commence mining deeper ore. All buildings apart from one have been removed from earlier operation of a plant that treated mine water before discharge to Canadian Creek. Several concrete pads and structures remain, along with some pumping headworks and piping.

A pile of sandy-grit residue approx. 25 m x 5 m x 1m in size is located north of the shaft. Samples from April 2021 show that it has elevated concentrations of arsenic.

A shallow oblong pond approx. 95 m length and ranging from 5 m to 15 m wide is in the north-west portion of the site. This was used as a polishing pond for the original water treatment plant. The overflow from the pond discharges to Canadian Creek.

All services to the site have been removed or disconnected.

### **History**

This is the location of the original Llanberris No.1 shaft constructed in the late 1800s. An aerial photograph from 1934 shows most of the site covered with what appears to be large mullock piles from the historic operations. Aerial images show that, by 1958, the piles have been reshaped or removed and an oval created in what is now the Llanberris Athletics Reserve. The site was devoid of trees and appears to have limited vegetation apart from in the far eastern portion. The aerial images of 1934 and 1990 provide a snapshot of the changes from the significant impacts of historic mining through to 1990 when the water treatment plant was operating.

Following approval of Ballarat Goldfields Limited November 1987 Environmental Effects Statement (1987 EES) the shaft was reopened for dewatering the historic mine workings above the proposed new mining areas. As the new mine has been developed, dewatering has been achieved through the new drives and dewatering bores installed from the new operations so that this site is no longer required.

A water treatment plant operated at the Llanberris site between 1989 and 1995 discharging to Canadian Creek under EPA licence (EX258/7). However, due to the lack of efficiency and inability to meet the licence requirements the plant was decommissioned and removed in 1995, with the intention of constructing a more sophisticated plant at a later stage. That plant was not constructed with treatment occurring at the main minesite, and the site is no longer used as an active part of the mining operations.

## Proposed Rehabilitation Plan

The rehabilitation for Llanberris is part of the overall Rehabilitation Plan, however as this site is no longer used in the routine mining functions it is to be rehabilitated and returned to the Crown Land Manager.

The rehabilitation project addresses:

- Knowledge gaps in:
  - community engagement with an emphasis on understanding potential post-mining landforms.
  - geochemical status of the soils, grit residue and polishing pond.
  - groundwater quality and connections Canadian Creek.
  - Updated site survey to re-establish boundaries, map contours and locate key features for detailed planning purposes.
- Making the site safe for general access by removing remnant structures and recontouring steep slopes to safe, stable forms.
  - Remnant infrastructure includes concrete pads, the disused substation, power poles, well head and pipework, scrap pipe and steelwork.
- Permanently backfilling and sealing Llanberris shaft, including placement of a monument to mark the location.
  - The redundant shaft will be closed and made safe following geotechnical guidance.
- Characterising, removing, or remediating remnant mining related materials (e.g. polishing pond and grit pile) that are potential sources of contamination to soil, surface water or groundwater.
  - A pile of coarse grit/sand (approx. 25 m x 5 m x 1 m) is present and was sampled in April 2021 with elevated Arsenic concentrations measured. 13 soil samples were taken with those in the grit pile ranging from 5540 mg/kg to 9980 mg/kg. Two samples 20 m downslope of the pile returned results of 121 mg/kg and 272 mg/kg.
- Characterising any contamination of soil and waters and developing a risk profile for the site against regulatory criteria.
  - A detailed site investigation commenced on 2 September 2021 with a screening survey using XRF conducted to inform a detailed soil survey and subsequent groundwater investigations. Soil sampling was conducted on 16 September 2021.
- Rip compacted areas to 0.5 m and topsoil to 0.3 m.
- Reshape steeper slopes to approx. 1 in 5 to match topography of the site.
  - The material balance indicates that there is insufficient material onsite to fill the cutting around the Llanberris shaft and backfill the shaft. A material import plan is required along with necessary permits.
- Developing and implementing remediation plans to meet land use objectives agreed with the Land Manager and following regulatory requirements.
- Developing and implementing a vegetation management plan focused on weed management and matching vegetation to intended land use, currently assumed to be PPRZ and likely tying in with the adjacent athletics facility.

- The fencing around the site will be maintained until the site is handed back to Crown Land. This is a safety and security measure to control access until the site is handed back, minimise uncontrolled dumping of rubbish and ensure the rehabilitation activities are protected.
- Establishing monitoring plans to assess the effectiveness of the rehabilitation activities and address any aspects that do not meet criteria.



Figure 1 Llanberris Site Layout



Figure 2 Image 1934



Figure 3 Image 1990

