

**REHABILITATION OF MINING LANDS TRUST FUND**  
**Report on Works undertaken ~2000 - 2001 Financial Year**

By Revel Munro  
October 2001



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# **REHABILITATION OF MINING LANDS TRUST FUND**

## **Report on Works undertaken ~2000 – 2001 Financial Year**

### Introduction

This report details rehabilitation of abandoned alluvial tin mining operations in the Gladstone area in the past year. These works are a continuation of sites first targeted in 1998, and could be categorised as:

- A project extending in area of successful rehabilitation ~ Star Hill.
- A project with a blend of innovation and high priority ~ Cat Gully, Endurance Mine.
- Projects in need of ongoing monitoring and maintenance ~ Ruby Creek Deviation & N2 gully, Endurance Mine.
- A project in need of rectification due to failure of engineering works ~ Shallamar Creek Gully, Monarch.

All nominated works were completed within budget and were only marginally affected by delays, such as plant and personal availability. Revel Munro is confident of successful rehabilitation outcomes at all sites, though notes that there are various levels of surety for the range of techniques and conditions. Mining rehabilitation in a variety of forms has been undertaken for over twenty years in the Gladstone area. Most successful has been the medium to low "tech" and moderately high labour input works that have been coupled with low cost local materials and flexible non-prescriptive approach to implementing a general works program.

With the aid of plentiful photographs and summary maps mining rehabilitation procedures and outcomes for five NE projects are detailed below. The Projects are listed in decreasing size of the works undertaken this year.

# **1 Cat Gully area adjacent to Blue Lake, Endurance Mine, South Mt Cameron.**

## **Background**

Features of this Project area are shown on Figure 1 of this report, while figure 2, an aerial photo enlargement depicts the gully erosion present.

A detailed report and plan for remedial work for this period, entitled; *A proposed program to rectify severe gully erosion in the vicinity of Cat Gully, the Endurance Mine, South Mt Cameron, NE Tasmania*, determined the works undertaken at Cat Gully.

Portions of this section are drawn from that report.

An area of three hectares of soft, deeply weathered granite is actively eroding and weathering and if unmanaged will grossly affect a further four hectares of land. The threatened adjacent areas still retain a readily erodible remnant horizon of clays and gravels. This thin mantle of Quaternary sediments represent strata judged to be too low in cassiterite content when the area was subject to scraper mining for Endurance No 1 operation about twenty years ago.

A network of gullies, totaling at least 1500m in length and reaching up to 9m in depth coupled with slumping and runoff erosion are contributing an estimated 3000 tons of suspended solids into the Ringarooma River per year from this relatively small area. Erosion at similar rates could be expected to continue, if uncontrolled, for decades.

This example of intense erosion is essentially a recent event (when compared with over a century of tin mining at South Mt Cameron) and is due to a combination of factors, the main ones being:

- The erodibility, of exposed weathered granite basement rock, with their very soft, kaolinized feldspars.
- Dragline excavation of Cat Gully in 1968, lowering an old drainage line by about 5m.
- Scraper mining operation removing vegetation, soil and subsoil to an impervious clay base.
- Superficial post mining revegetation effort, resulting in only scant vegetation cover.

Trust funds have previously been directed to the Cat Gully site in autumn 1998. On that occasion consultants, SEMF engaged Stornoway Civil Pty. Ltd. to rehabilitate one of the Cat Gully tributary gullies. The work was abandoned due to the onset of May rains, was never completed. It has not been a beneficial activity to the current project.

Figure 1



## Rehabilitation Treatment ~ Planned and undertaken

The period in review did not propose to markedly change the existing landscape morphology. No funding was sought for the substantial modification of the existing landscape where it was intensely dissected. 'Smoothing' and contouring of the gullied landscape would require much machinery expenditure and intensive application of rehabilitation effort that was beyond this initial budget. Planning and execution of these works was cognizant of the need for a second phase of works to address the remaining difficult portions.

The funding sought for this proposal provided for works categorized under six headings:

1. **Task Planned: Creation of access to the sites, including the provision of a suitable holding area for bulk materials brought to the site by large articulated trucks. Provision of signage.**



**Action:** The road (1.1 km) from the Gladstone road was scrubbed by hand with the resulting slash used as gully erosion control material.

Opportunistic use of the Dorset Council grader resulted in access being provided at no cost.

**Signage:** Visitors to the Endurance area are frequent. The tailings area is a noted venue for recreational vehicles; Blue Lake is popular for water-skiing and camping. Many tourists seek out Blue Lake, a high percentage of which become lost, (poor signage) hence the addition to the polite sign pictured – right.



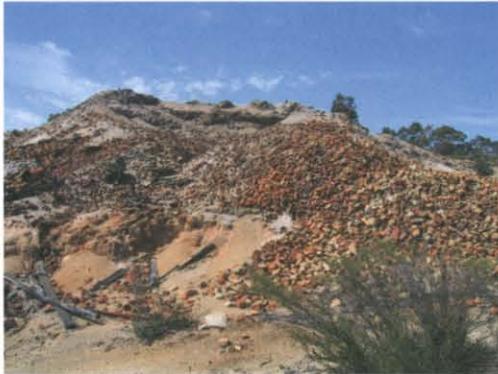
Photograph shows gullies (numbered according to table in report)

Figure 2



100 m. approx

Proposed "cut off" spoon drains  
Existing drainage



**2 Task Planned: Stabilise the heads of many of the active gullies utilizing the following techniques and materials:**

- Mining rock debris and slucebox oversize in heads of gullies

**Action:** The heads of gullies was filled with Endurance Deep Lead mine waste that was primarily slucebox oversize forkings – quartz, cemented grits, and clay balls. Timber, both

Tertiary vegetation remnants and slucebox remains were common. The photo to the left shows the surface rock to be oxidized. The heaps just below the surface are pyritic, and the sulfurous nature of the material is not conducive for plant growth.

- A covering layer of mine tailings from the Endurance Mine.



**Action:** photo shows some of the hundreds of m<sup>3</sup> of mine waste with piles of tailings, (also grey) positioned to cover the mine waste.

A veneer of less pyritic tailings now covers the highly sulfurous mine debris in all the gully heads.



- Additions of a tailings/pyrethrum/lime/gypsum/fertiliser mix and also scrub.

**Action:** This did not occur, as the excavator was unavailable for the mixing process.

- Pipe works, sand bags, sheet metal, rock drop structures in gullies that still carry significant water.

**Action:** Not necessary, all drainage to gullies diverted to cut-off drains. See section 3.

**3. Task Planned: Control drainage into gullies by means of contoured, armored or graded spoon drains and / or diversions** utilizing the following techniques and materials:

- Surveyed routes collecting a number of channels.

**Action: Surveys conducted, control established.**

- Wide spoon drains using geotextile in critical areas, and hay, scrub, sand bags to absorb and hinder runoff.

**Action: Uncontrolled drainage to the heads of gullies has been eliminated. This has been a major component of this project. Contour and cutoff drain locations are shown on figure 3. They total some 600m in length. Such drains vary in their construction method according to resources, catchment area and occurrence of surface indurated horizons.**



Most were lined with straw and hay and covered with jute. The large channel that is part of gully [o] and pictured here with people laying the jute matting has moderate fall and is also underlain by geotextile.

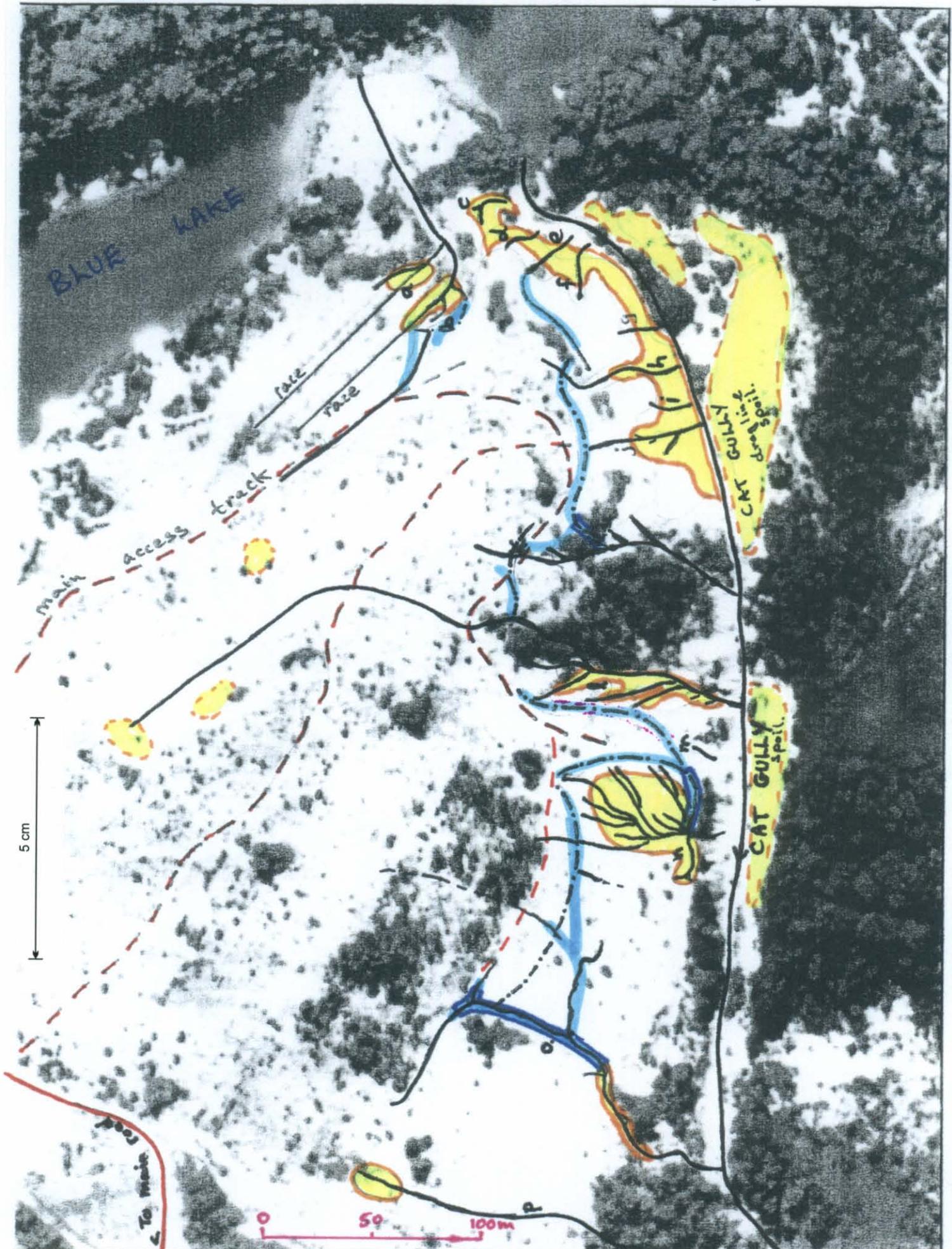
Some channels were excavator dug, (example pictured right), and also fully lined.



Cut-off Drains & Future Rehabilitation

Figure 3

Photograph shows gullies (numbered according to table in report)



 Gully Rehab. ~2001/2002 year.  
 Other possible Rehab ~2001/2002.

 Drains constructed 2001/01.  
 creeks & gullies.

Proposed "cut off" spoon drains & gullies.

Other are essentially shallow depressions, (pictured right), with flow determined by levee banks.



- Steeper rock armoured "drop off" drains with a geotextile underlay.

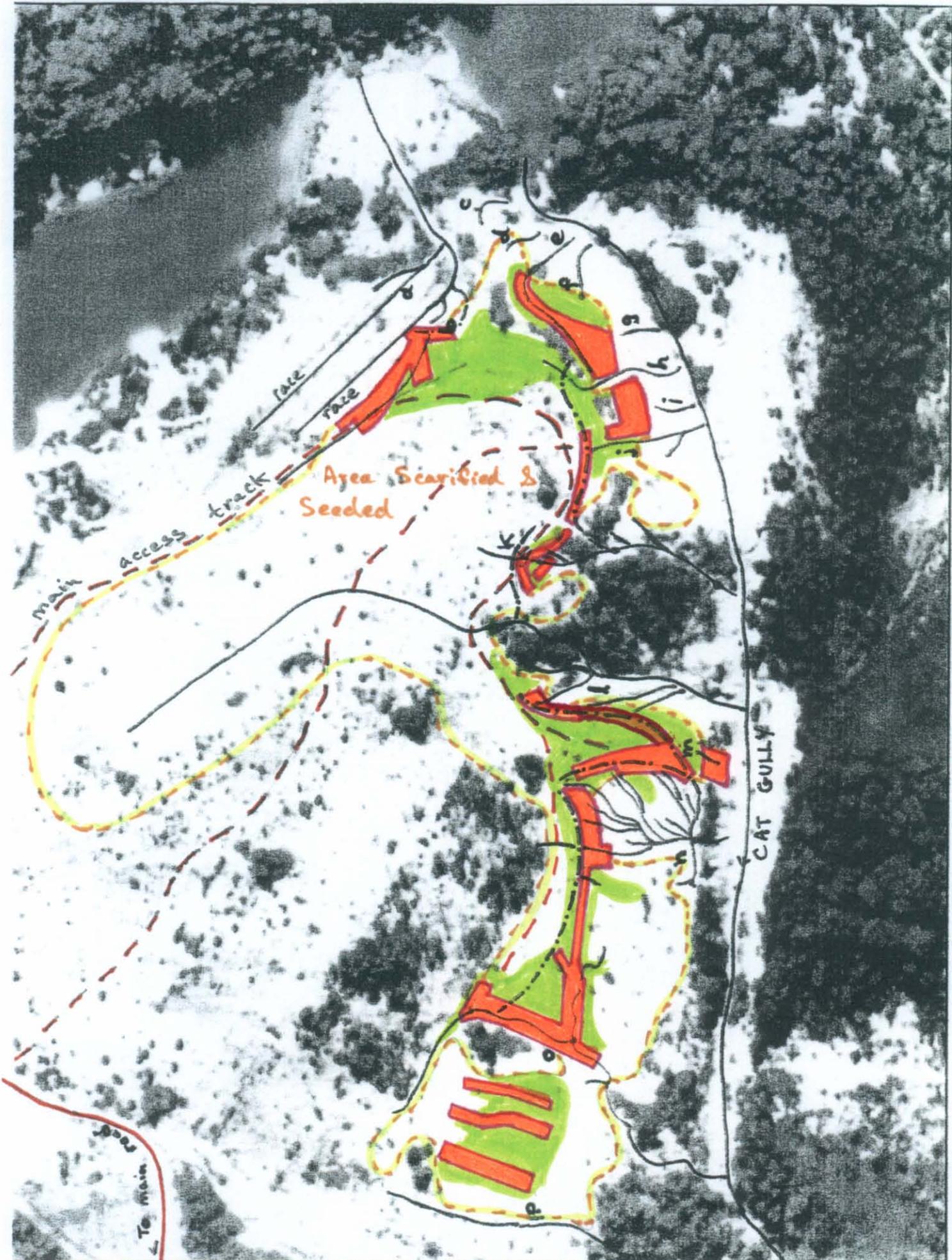


Action: Approximately 60 metres of such drains were constructed where cutoff drains 'dropped' into gullies [k] and [n]. These shallow v shaped, rock over geotextile, 20% slope drains were constructed by excavator, pictured left and below.



# Figure 4 ~ Treatment of Gullies

Photograph shows gullies (numbered according to table in report)



 Jute matting laid.  
 Other intensive treatment.

 Proposed "cut and spray" drains

- Use double layer jute matting to secure materials.

**Action:** Double layer jute matting was not used as the matting was a tighter weave than anticipated. Single layer, as described above was used extensively.

- Sow native seeds and/or short term grasses

**Action:** Sown, see point 4.

- Construct small impoundments if necessary

**Action:** Not necessary.

**4. Task Planned: Decrease sheet runoff adjacent to these gullies** utilizing the following techniques and materials:



- Scarify or rip if necessary and incorporate up to 3cm of tailings/pyrethrum/lime/gypsum/fertiliser mix with native seed +/- grass, maybe in bands.

**Action:** Figure 4 shows the areas so treated in green. Bare areas, were thoroughly scarified with the tractor pictured. Mine tailings were added to improve the structure/permeability of a smaller area adjacent to some gullies. Thick applications of pyrethrum, fertilizer and lime together with native native seed were applied.

- Add hay, scrub and jute matting to the most unstable areas.

**Action:** Figure 4 shows the areas so treated in orange. Large areas were covered with jute matting using about eleven bales (about 6000m<sup>2</sup>) of material. Large quantities of small square and 5x4 foot round bales were used.

The small square bales of cereal straw were applied to the more inaccessible areas by hand. They 'fluffed' up well ~ pictured.

The round bales of triticale straw were difficult to lay evenly by tractor. Some hand laying was also used. Some of the ingredients are pictured below.

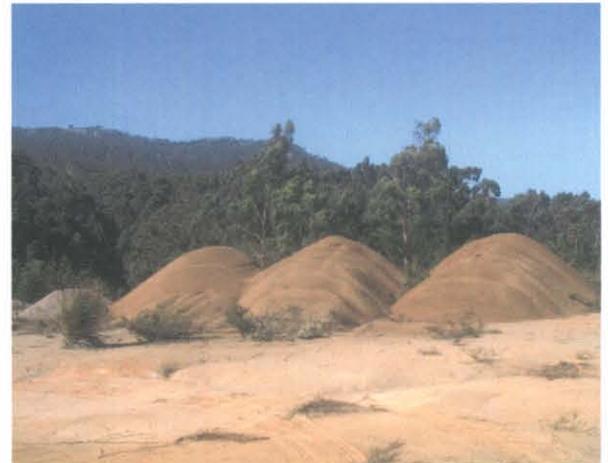
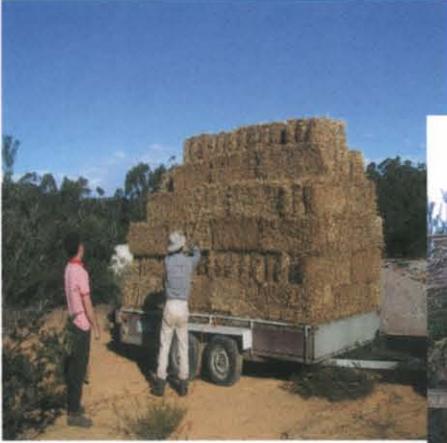


Broad acre treatments Figure 5



100 m. approx  
Broad acre Application of lime  
Fertiliser & Pyrethrum

Proposed "cut of spoon drains"  
Existing drain



PHOTOS OF SOME OF THE MATERIALS USED ~ CEREAL STRAW, SCRUB, ROUND BALES & PYRETHRUM.

**5. Task Planned: Increase the fertility, pH and organic matter content of gully flanks, (where accessible) and encourage some stabilisation through revegetation by applying a native seed mix** utilizing the following techniques and materials:

- Spin on with tractor or hired truck a heavy dose of pyrethrum/lime/gypsum/fertiliser mix with seed added.

**Action:** See details in section 6. below.

**6. Task Planned: Increase the infiltration rate, fertility, pH and organic matter content of bare and sparsely covered, adjacent mined land and vegetate with native seed mix** utilizing the following techniques and materials:

- Spin on with hired truck a heavy dose of pyrethrum/lime/gypsum/fertiliser mix with additional seed and fertiliser added.



**Action:** Figure 5 shows an area of about 15 hectares subject to broad acre treatment hatched in orange. Pyrethrum ~ 360 m<sup>3</sup> (6 walking floor truckloads, pictured), 40 m<sup>3</sup> of lime, and 6t of fertilizer were applied by truck and Fast track tractor, both pictured. The fertilizer applied by truck was not the intended high analysis 10.17.8.1. An error by Impact Fertilisers resulted in the cheaper, low grade, 'potato mix' 8.4.10.14 being used. These soil conditioners were

purposely not applied evenly. Heavier applications were spun on the barest and most erodable areas. The trucks were also instructed to back up and spin over the gullies where possible.



Native seed to intensive areas was applied by hand. The flat 'hinterland' was sown with a tractor and spinner. In both cases the seed was heavily bulked with gypsum.



Most native seed was purchased from Forestry Tasmania and or Wildseed. Efforts were made to collect local provenance boobyalla and narrow leaf wattle (*Acacia sophorae* & *A. mucranata*) seed. For rehabilitation at South Mt Cameron, acacias with their prostrate to semi prostrate habits are superior species for erosion control. The seasonal seed set for summer 2001 was not good. A useful but hard won total of some 4kg of predominantly boobyalla was gathered from around the mine site. Its scarcity resulted in the local gathering of seed activity costing about 150% of commercial but non-local seed option.

## Further comments with photographic illustrations ~ Cat Gully



Gully [m] (see) Figure 2. Before treatment took the form of a 9m high face resulting from mass movement. In the wetter months soft decomposed granite continually slumped, forming a receding steep face.

**Action:** Many truckloads of tailings were tipped over the bank covering the area at the angle of rest. With some difficulty, a straw / jute matting / straw covering 'sandwich' was secured over the gravels. Heavy doses of seed and fertilizer were broadcast.

Considering the steepness of the works slumping failure of the works is a possibility. When last inspected in September all treatment was intact.

Gully [j], (pictured right) has been previously battered by Stormoway Constructions in 1998 as part of the incomplete rehabilitation treatment. The works have subsequently continued to erode leaving a large, steep, central gutter and a rilled amphitheatre.

**Action:** Rehabilitation has commenced without the reintroduction of machinery. Scrub, seed, fertiliser and hay have been applied and runoff controlled. Erosion has been minimal this winter.



Flat, but rilled surfaces of bare decomposed granite were in need of rehabilitation. The photo on the left is an example after treatment.

**Action:** Rehabilitation has involved filling gullies and scarifying with the tractor. Straw and covering jute matting was



applied to the worked up surface. Native seed and fertiliser was applied. Triticale from the straw has germinated. Only in inaccessible gullies has cereal growth escaped severe browsing by macropods and rabbits.

Such treated surfaces have been very stable in the five months since treatment.



Pictured left is Gully [b] after treatment. This gully is typical of most that were mainly created by runoff.

Action: Application of mine rubble, tailings, straw and jute matting with seed and fertiliser added, has successfully (to date) stabilized all gullies treated.

Pictured right are markers delineating a monitoring site that was subject to a range of treatments with respect to scarifying, liming, fertiliser application and seeding. Unfortunately the site was partially destroyed by a bogged fertiliser truck and winter rains inundation has flooded other portions.



Some erosion to the flank of a rock chute (pictured left) was caused in August 2001 by a breached levee. The levee was later repaired by hand.



Gullies not yet treated such as this portion of [I] system have continued to slump and erode during the winter wet of winter and spring of 2001.

### Materials used ~ Cat Gully mine rehabilitation 2000 / 2001

Materials to be used	Quantity estimated in Budget	Quantity Used
Rock (silcrete and forkings from Endurance mine)	104 m <sup>3</sup> / 13 loads	200 m <sup>3</sup> / 25 loads
Tailings (from Endurance mine)	640 m <sup>3</sup> / 40 to 80 loads	560 m <sup>3</sup> / 70 loads
Pyrethrum (spent marc)	240 m <sup>3</sup> / 4 loads	360 m <sup>3</sup> / 6 loads
Lime (agricultural)	40 m <sup>3</sup> / 2 loads	40 m <sup>3</sup> / 2 loads
Gypsum (conditioner)	60 x 50kg bags	20 x 50kg bags
Fertiliser (high analysis, maybe with trace elements)	6 tonnes, some in a 2 <sup>nd</sup> application	6 tonnes, (of low analysis)
Jute Matting @ 500m x1.2m + staples	6000m <sup>2</sup>	6600m <sup>2</sup>
Geotextile	1 roll	1 roll
Grass seed –e.g. cheap tamma ryegrass	4 bags – 100kg?	nil
Scrub	50 trailer loads	15 trailer loads
Hay / straw	20 round bales	50 round bales
Hay / straw	300 bales	100 bales
Sandbags	100	nil
Cement	12	0
Native Seed	Balance of stock	Balance of stock
Native Seed ( <i>Acacia sophore</i> of local providence)	8 kg	4 kg
Pipe & elbows –probably 100mm sewer	?	Nil – no pipe work needed
Misc.- Materials		Extra steel skewers

# **1 Star Hill (Garfield, Lawrys) Mine, Gladstone.**

## **Background**

The location of the Star Hill Project is shown on Figure 6. This elevated and geologically distinctive area several kilometres east of Gladstone has a long history of tin mining exploitation, dominated by medium sized operators.

Ron Lawry was the most notable recent miner. His operations in the 1970's to 1982 are characterized by:

- the use of mobile (sledge mounted) treatment plants, usually connected to the HEC grid;
- extensive use of bulldozers to supplement hydraulic monitors, break up cement layers, strip ground, move plant and construct innumerable earth structures;
- Ron constructed a complex network of tailings dams, dams and races to recycle water and thus limit the quantity of purchased Mt Cameron Water Race Board water;
- frequent relocation of operations within his leases. Thus extensions to areas previously mined, reworked ground, and part obliteration of previously worked ground has lead to a varied, 'pocketed' and difficult to interpret landscape;
- relics of past set-ups, e.g. workshop sheds (with relic bolts, flanges, and steel scraps), sluice box races ( use of old drill steel stakes common), expired vehicles (especially Peugeots), dozer parts, and treatment plant/sledge remains are common.

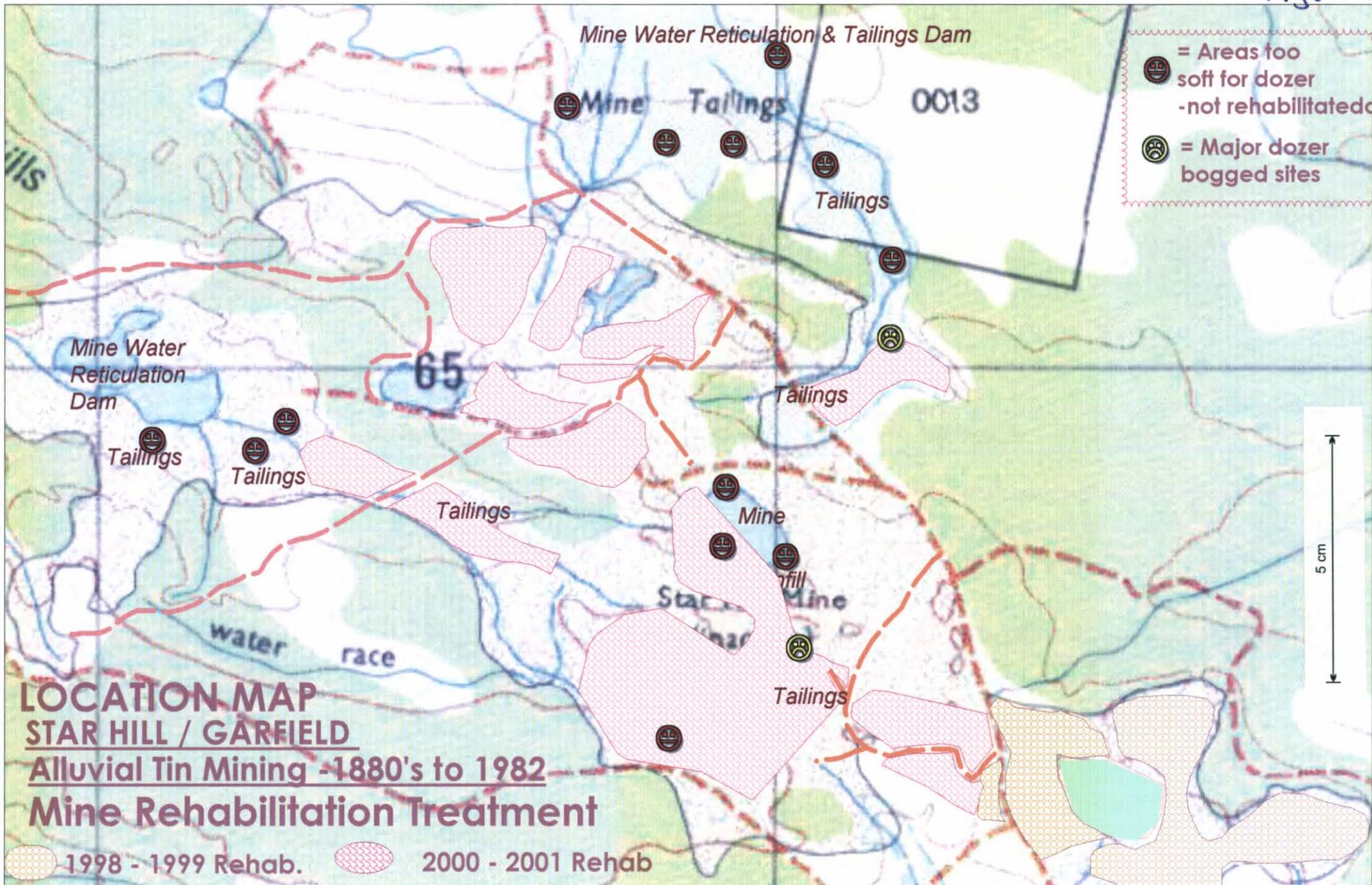
The area long exploited and known as Hardins Ravine (to the west of Star Hill Mine and Figure 6) was not part of Ron Lawry's leased ground. Other operators last worked it over the same period. The Mines Rehabilitation Trust through SEMF / Brambles constructed a gabion/rock lined outfall in 1999 at the downstream end of Hardins

Ravine.

The old Cybele Working dominates the other end of the low east –west ridge that characterizes the Star Hill deposit (see orange stippled area on Figure 6). Extensive (some 7.5ha of works) and successful Mines Rehabilitation Trust mine rehabilitation through SEMF / RG & SD Gerke was undertaken over the sandy Cybele Workings in 1998. An excavator was used reshape a dissected, within-basin landscape for follow-up native seed direct drilling. Although the SEMF designed, 'within basin' wetland system of linked mine holes with anticipated aquatic vegetative regrowth has not occurred, the establishment of vigorous, healthy cover from direct seeding on the well drained, smoothed surfaces is most apparent. The success of the direct seeding component forms the basis of the current Star Hill program. The picture to the left shows typical regrowth from the April 1998 program.



Figure 6



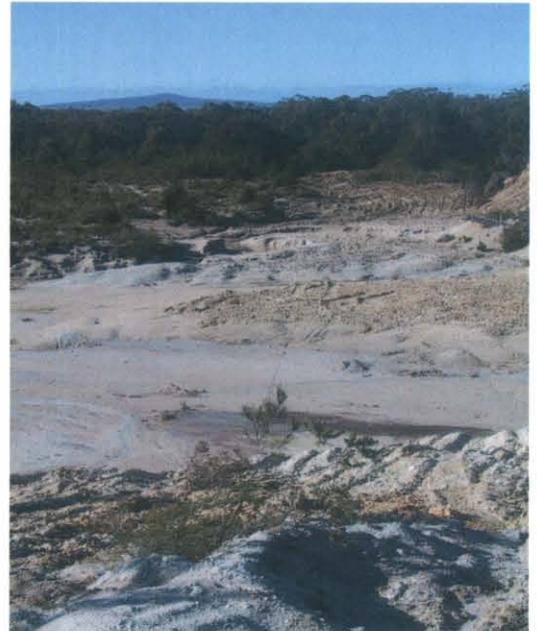
## **Rehabilitation Treatment ~ Planned and undertaken**

- **The location:** The area rehabilitated in 2000/2001 at Star Hill is shown in Figure 6. Many discontinuous areas totaling 19.5 ha have been treated this year. They consist of the balance of mined ground and tailings available for treatment by this equipment. The ground treated was variable. The range included; gullied bedrock (soft sandstone), sandy and clayey sluice sites, higher gravel/yellow clay banks, silt flats and sand/gravel tailings.

Examples are pictured below.



Ripped and sown ~Gravel and clay banks (above)



Ripped and sown ~ sandy sluiced area (above)



Ripped and sown ~ tailings (above)



Untreated, sand/clay sluiced area (right)

- **Equipment:** The same equipment proven by the 1998 project undertook works at Star Hill between April 25th and May 31st 2001. The unit consisted of a Caterpillar D6 bulldozer with a specially constructed three run seed drill integrated with three rippers. The bin section featured a separate fertiliser and seed units for each run. Capacities for each bin exceeded 100kg. Early in the current program the drive to the drill was changed to an operator



controlled electric system (pictured left). Previously a weighted, toothed, trailed drive wheel provided ground drive. That system had shortcomings in respect to slippage and obstruction / proneness to damage when in reversing mode. A picture below of the bogged unit shows the original drive system.

Drop tubes on the unit were positioned to place the seed/fertiliser mix to the margin of the furrow. No seed-covering feature was fitted to the drill.

**Treatment:** Native seed was sown over rip lines one meter apart, together with high analysis fertiliser 10.17.8.1. This spacing resulted in ten kilometers of rip lines per hectare. The seed mix initially consisted of the following species left over from the previous project.

<i>Acacia mucranata</i>	<i>Allocasurina littoralis</i>	<i>Eucalyptus Amygdalina</i>
<i>Acacia sophorae</i>	<i>Kunzia ambigua</i>	<i>Eucalyptus Pauciflora</i>
<i>Acacia terminalis</i>	<i>Callistemon linearis</i>	<i>Eucalyptus Siberi</i>
<i>Acacia delbata</i>	<i>Leptospermum scoparium</i>	<i>Eucalyptus Viminalis</i>
<i>Acacia verticillata</i>	<i>Leptospermum scoparium</i>	<i>Lomandra longifolia</i>
<i>Allocasurina vericillata</i>	<i>horizontalis</i>	<i>Melaleuca squarrosa</i>
		<i>Poa lab.</i>

Once old stock was exhausted the simpler mixes were used. Use of casurina species and sags was discontinued due to poor germination. The seed mix weighting of eucalypts was lessened with *E. siberi*, a non-local, no longer used. Woolly tea tree was introduced to colonize the wetter areas. The last used mix is listed below.

<i>Acacia mucranata</i>	<i>Kunzia ambigua</i>	<i>Eucalyptus Viminalis</i>
<i>Acacia sophorae</i>	<i>Leptospermum lanigerum</i>	<i>Melaleuca squarrosa</i>
<i>Acacia terminalis</i>	<i>Leptospermum scoparium</i>	<i>Poa lab.</i>

*Acacia delbata*

*Eucalyptus Amygdalina*

The seed was weighed into amounts suitable for adding to 50kg bags of the bulking agent, gypsum. Seed requiring boiling treatment was kept separate. The drill was calibrated to apply 400g of seed mix per rip line kilometer.

Some initial problems were encountered with seed flowage due to damp gypsum.

**The ground conditions:** The types of sites are described in the location section above. During the first hundred meters of drill calibration tests it became apparent that bogging of the dozer would become an ever-present hazard. This was not anticipated as ground conditions varied from the previous project in respect of:

- The autumn wet break had arrived.
- The previous project at Star Hill had involved the simultaneous use of an excavator and this bulldozer. Help was at hand when the dozer became stuck.
- Mining methods and subsequent ground conditions differed between the two sites. For numerous mined areas subject to the current work tailings and their fans of



slimes had often filled earlier workings. In places a thin crust masked thick accumulations of slimes. Pictured are photos of major bogged event No.1 where an excavator was eventually required to dig the machine out on day three of lost time. Much time and energy was earlier expended on placing large quantities of materials under the tracks in an effort to keep the machine from

sinking into oozing silt. (Years ago an excavator meet a similar fate, being essentially ruined by the seepage of silts into the engine etc.)

The large tractor pictured below only narrowly avoided being seriously bogged.

Following this early experience large areas of ground was excluded from the works program. Margins of tailings dams, such as pictured below were definite 'no go areas'.





**The methodology:** Selection of target areas for direct seeding was a cooperative exercise between John Pemberton and David Gatehouse of MRT, Revel Munro and the bulldozer driver. The driver determined the intensity of treatment in respect of leveling and avoiding self-regenerating portions and soft conditions.



On one tailings heap he was instructed not to avoid rehabilitation *pinus radiata* trees. This instruction is on the basis that pines have been observed to be a growing weed threat in bushland surrounding their mine site plantings (see photo, left).

### **3. Shallamar Creek gully restoration, Old Monarch Mine, northern flank of Mt Cameron.**

#### **Background**

Shallamar Creek is a drainage line originating on Mt Cameron that, at the break of slope passes through the Old Monarch Tin Mining Co. flooded mine hole. The users of the MT Cameron Field Study Centre use this picturesque lake for water sports. A campsite is nearby. The Creek then drops into a channel within the dragline excavated operations of the BMI Mining tin mining workings. In the period since 1974 when the dragline last worked the creek has back cut as a gully up to four meters deep. Progressive back cutting would result in the mine hole being drained.

In 1998 the Trust acted to stabilize the gully. Consultants, SEMF designed and supervised tenderers, Stornoway Constructions with gully stabilization structures. The location of these gully works is shown on Figure 7, with Figure 8 showing more detail. These works consisted of seven, one metre high gabion basket structures some twenty metres apart within the gully. The gabions were placed in a tiered manner upon fill from an adjacent tailings source.

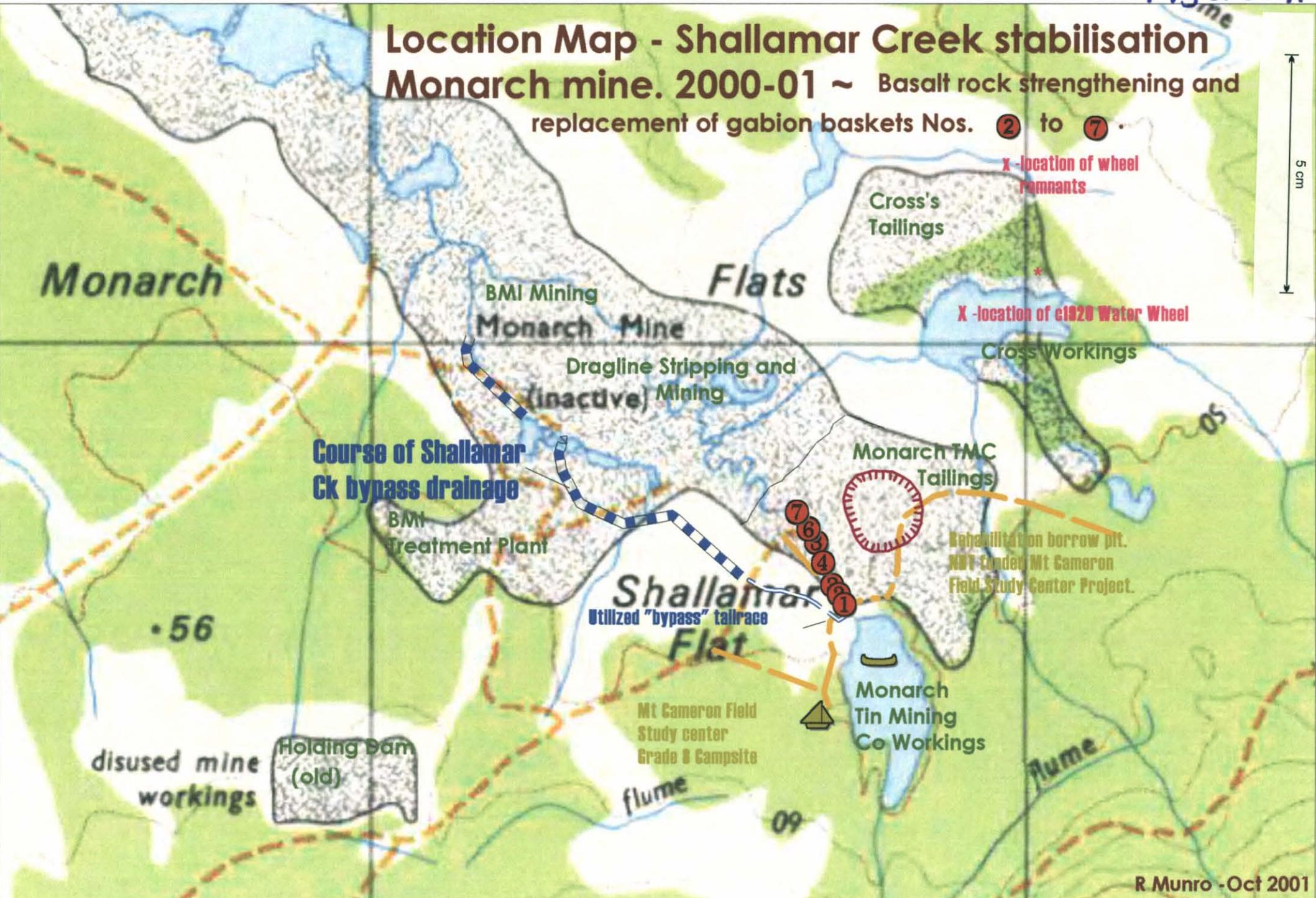
Inadequacies of the gabion structures were apparent from the onset of the first winter rains. The western margins Gabions 4 and 6 were breached, temporarily repaired and subsequently repaired and strengthened with rock armor. During a flash flood on January 4<sup>th</sup> 2000 the other margin of gabion 6 was breached. Possibly in domino fashion, Gabions 5, 4, 3, & 2 slumped and were subsequently breached as their supporting reno mattresses also slumped. Large volumes of the supporting tailings were rapidly eroded by the flash flood. The photos below show the resultant damage.



Figure 7.

# Location Map - Shallamar Creek stabilisation Monarch mine. 2000-01 ~ Basalt rock strengthening and replacement of gabion baskets Nos. ② to ⑦

5 cm



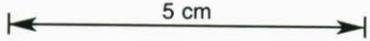
# Figure 8 Survey plan of Monarch Rehabilitation Gully

Shallimar Creek, vicinity of Mt. Cameron  
North East Tasmania.

Plan showing location of gabion structures  
and spot heights (arbitrary datum) post  
January 2000 flash flood event(s)

1 : 500

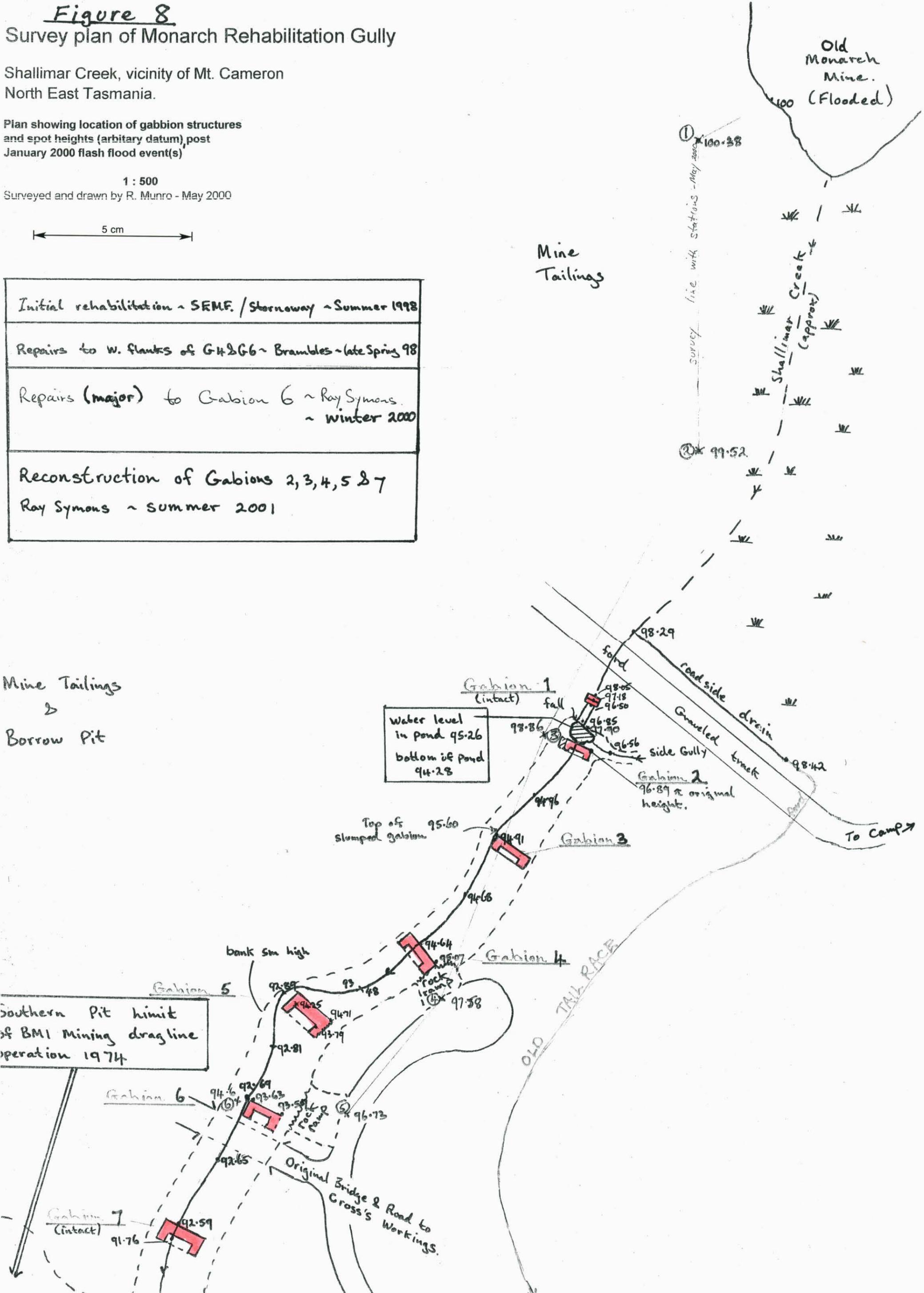
Surveyed and drawn by R. Munro - May 2000



Initial rehabilitation - SEMF. / Stornoway - Summer 1998
Repairs to W. flanks of G4 & G6 - Brambles - late Spring 98
Repairs (major) to Gabion 6 - Roy Symons. ~ Winter 2000
Reconstruction of Gabions 2, 3, 4, 5 & 7 Roy Symons - Summer 2001

Mine Tailings  
↳  
Borrow Pit

Southern Pit limit  
of BMI Mining dragline  
operation 1974



**Repairs to failed gabions. 1999/2000**

Following consultation with engineers a rock fill solution to repair task was chosen. In May of 2000, local contractor Ray Symons carted some 1000 tones of basalt mine overburden from the Brisies Mine (pictured).



A portion of the stockpile was immediately used to repair Gabion 6 (pictured after repairs with rock and geotextile, left).

To allow for easy repairs to Gabion 6, Shallimar Creek was diverted with a short drain (pictured right) into an adjacent old tailrace. This diversion was left in place for almost a year. Indeed it could have been a very cheap solution to the total gully problem! The course of the diverted water is shown on Figure 7. Thick *gahnia radula* regrowth on sedgeland flats together with a long and very gentle gradient ensured that the bypass outlet did not erode.



### **Repairs to failed gabions. 2000/2001**

Ray Symons of Gladstone was again hired this summer to complete repairs to the gully affected by the collapsed gabion structures utilizing the rock stockpile and geotextile. Rock chute structures were constructed to either encompass or replace Gabions 2, 3, 4 and 5. Gabion 1 above the gully remained intact and in no need of maintenance. Gabion 6 was adequately repaired the previous year. The lowest structure, Gabion 7 has been substantially strengthened and armored as its stability is most crucial to the integrity of the whole project.

Access to the structures was a difficulty. A track had to be cleared between the gully and the bypass tailrace and ramps constructed to each gabion site. The excavator, due to the fluid nature of the underlying tailings could not access the gully floor. This precaution was reinforced on one occasion when the excavator got into a potentially serious bogged situation.



Gabions 2 and 3 were the most seriously affected control structures. The distorted wire baskets have now been buried and replaced with a continuous rock ramp (pictured left) that has been keyed at depth. Extensive channel armoring, and a design to incorporate a side flood overflow channel are part of the latest works.



Shallamar Creek has now been redirected back into the gully. Ponds are now features behind the lower gabion/rock structures (pictured left). The neighbouring tailrace remains an outlet for flood event runoff.



Pictured left, looking up the drainage line are repairs to Gabions 2, 3, and 4 carried out this year.

## **4. N2 Gully Maintenance, Endurance Mine, South Mt Cameron.**

### **Background and Works 2000/2001**

A network of steep gradient, steep sided erosion gullies draining scraper mined portions of the 1976 - 1981 'Clay Pit' stockpile sluice operations were rehabilitated by the Trust in 1998.



Major landscaping and gabion structures were constructed (see pictures taken in 1999, left and below). Attributes of this project are shown on Figure 9. Ongoing modifications and maintenance have been necessary.

Such activities has recently (the year 2000) involved labour intensive laying of scrub and straw, construction of small drainage control of structures, reinforcing the gabions and heavy fertiliser applications.

These measures have been most successful. Erosion is minimal and regrowth is steady.

The area has again been top dressed by hand this year with high analysis [10.17.8.1] fertiliser.



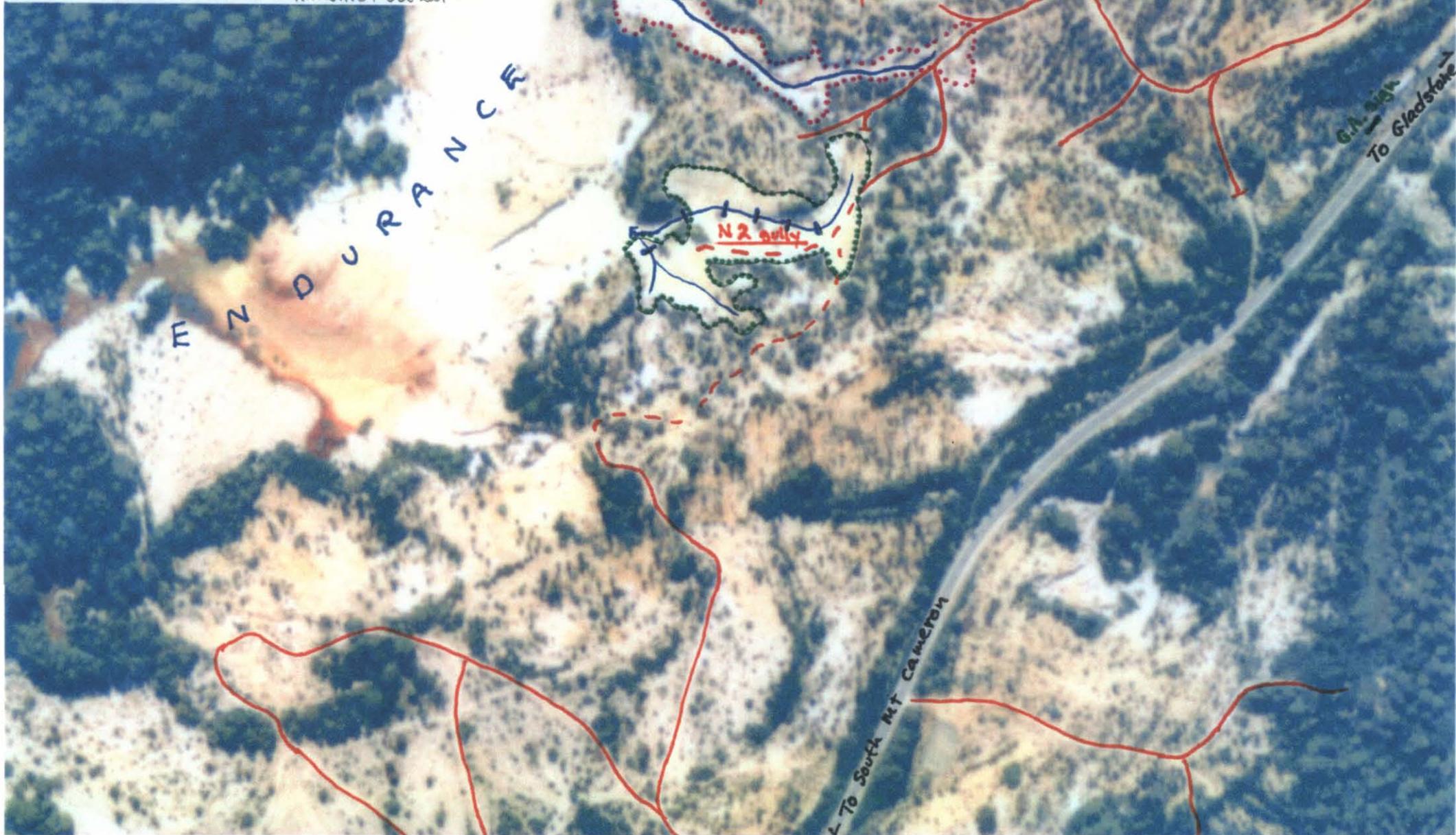
MINES REHABILITATION TRUST FUND  
NE TAS TIN MINE REHABILITATION PROJECT  
Location Photo-Map  
N2 Gully Maintenance



Figure 9.

Rehabilitated Gully showing  
gabion locations  
Area Seeded & Fertilised

R. Munro, Oct 2001



## **1. Ruby Creek Diversion, Riffle and Channel Erosion, vicinity of the Endurance Mine, South Mt Cameron.**

### **Background and Works 2000/2001**

In the late winter of 1999 it was necessary to hastily construct a riffle from imported basalt rock to stem very active back cutting channel that was close to draining a mine wetland. The location of this riffle and the associated diversion channel are shown in Figure 10. The riffle, before a follow-up maintenance and addition of more rock is pictured below. The logs in the foreground were displaced by water action.

Works this year has been limited to continued inspection. Both the riffle and the channel are stable. Ongoing inspection is recommended as it is apparent that the drain carries large amounts of runoff at times.



Figure 10

# Location Map - Ruby Creek Diversion erosion control.

