DRAFT NO. 1

GREENBUSHES TIN LTD. - C.A.L.M.

WORKING ARRANGEMENTS

1988

C O N T E N T S

WORKING ARRANGEMENTS

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INTRODUCTION

These working arrangements are the first attempt to colate and document all of the Companies and CALM's procedures for managing and rehabilitating the tin mining mineral leases at Greenbushes.

The contents are derived from the lease conditions and also take account of CALM's wider statutory responsibility for the long term management of the land and its wildlife.

Acknowledgement is also made of other Government authorities with responsibilities or interests in the area which impinge on the relationship between CALM and the Company.

A Working Arrangements document is not a statutory requirement of the Company or CALM and therefore does not have any sanctioned legal status. Its necessity arises from the practical requirement of interpreting and converting the formal lease conditions into procedures and practices that work on the ground.

In the developing field of mine management and rehabilitation a static set of lease conditions attempts to represent a constantly changing process during the life of the lease. A flexible and efficient system of translating the stark legal obligations of miners and Government into mutually approved results on the minesite is essential.

If the Company and CALM can agree on a set of written principles, objectives and methods for management and rehabilitation of the land affected by mining, the prospect of a satisfactory result is greatly increased.

Staff time spent in developing, maintaining and reviewing the working arrangements will produce more than compensating rewards. These should include improved cost efficiencies, well specified results in the field and an enhanced public attitude to the mining industry and the Government bodies that regulate them.

Working arrangements of this kind are proving effective with other mining companies.

S E C T I O N 1

THE LEASE AREA

THE LEASE AREA

LEASES

The mining leases held by Greenbushes Tin Ltd. (G.T.L.) in Mineral Field 001 are depicted on Map 1.

G.T.L. also hold CALM leases for other purposes, depicted on map ( ).

COMPENSIBLE AREAS

The central core of the mining area has been deemed non compensible by the Government as the usual compensible values have been removed by previous mining and not replaced prior to G.T.L.'s responsibility for mining. The area is registered by map CALM No. 1364D signed by the Company and CALM and dated 16th December 1988.

Whilst tin mining within the registered area will not attract a compensation payment all other conditions regulating mining apply.

STATE FOREST

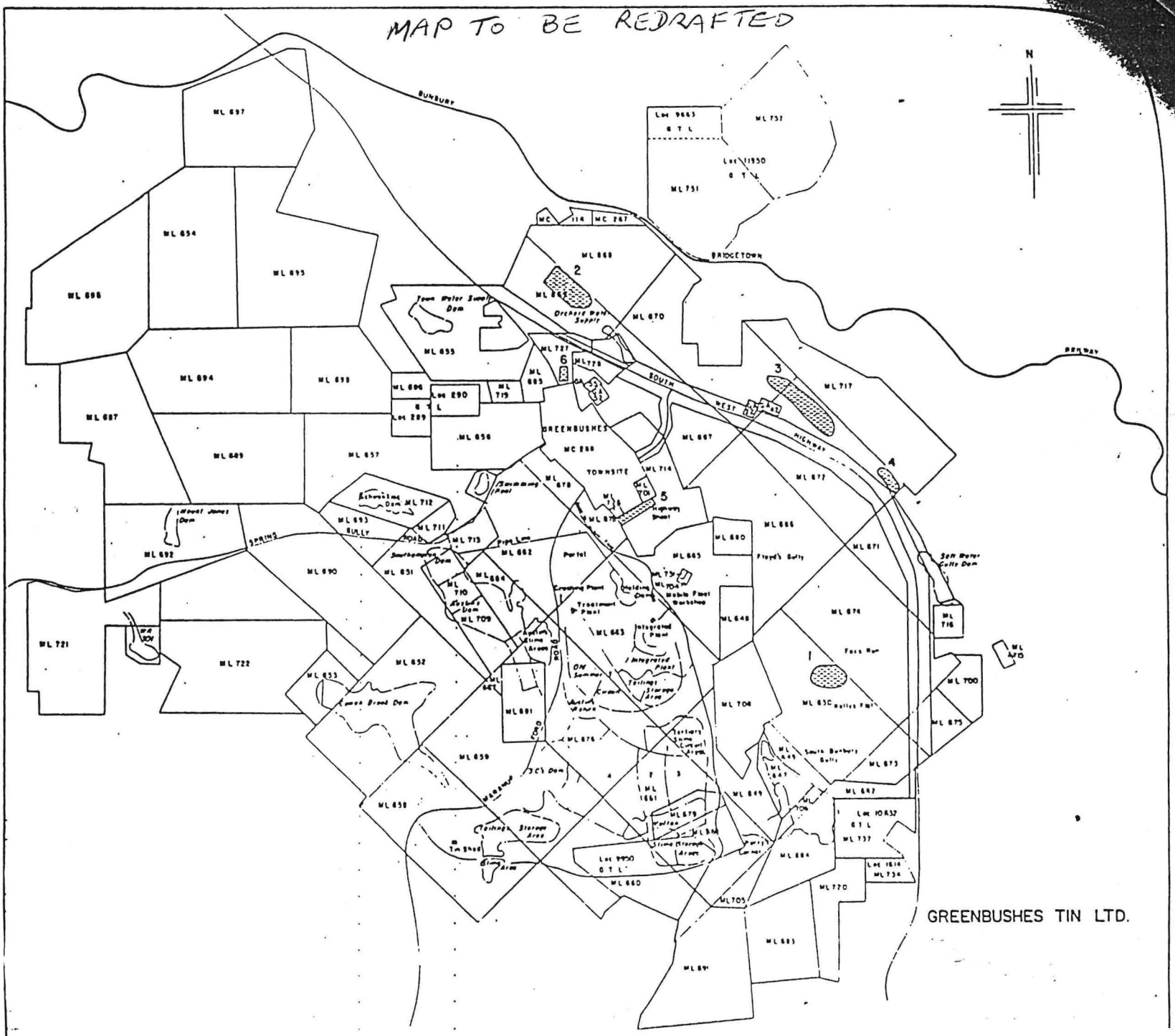
The mining leases fall within the Departments' ''Greenbushes Block'' of 7902 hectares which is further subdivided into eleven coupes of about 700 ha each. See map 2.

LAND USE

Greenbushes block is State Forest dedicated to multiple use management. The aim is to ensure that as wide a range of uses as possible are provided for, consistent with the designated priority use. The long term priority uses are timber production, mining and conservation. The conservation area was part of the Greenbushes M.P.A. for Flora, Fauna and Landscape under the previous General Working Plan 87 and has now been proposed as a Conservation Park in the Departments Regional Management Plan (Dec. 1987). The rest of the forest block will be managed for the other two priority uses with recreation as a compatible use when mine rehabilitation and public safety allow.

Table 1 Summary of land uses in Greenbushes Forest Block.

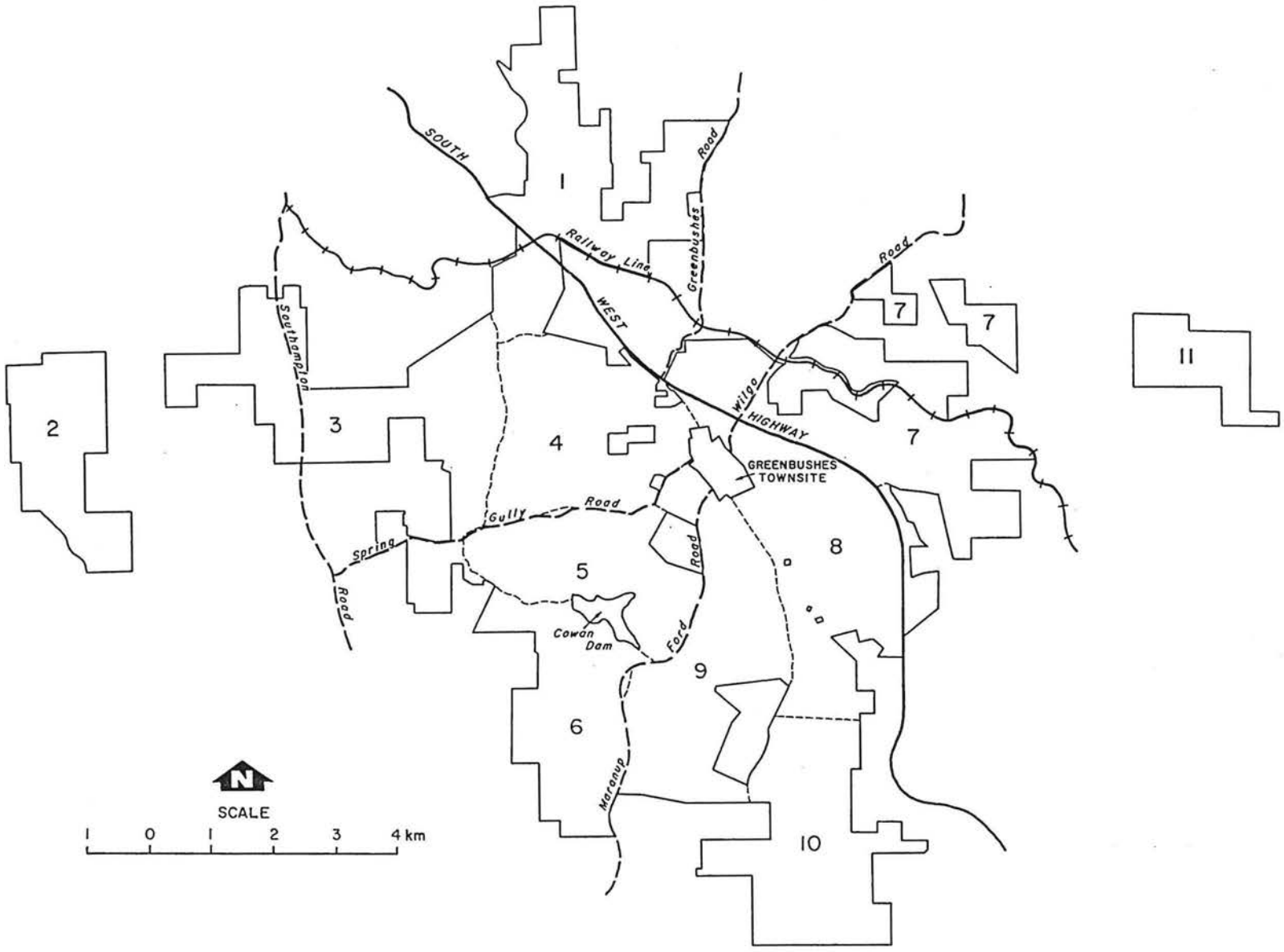
MAP TO BE REDRAFTED



MAP ONE

OUT of DATE

GREENBUSHES BLOCK · COMPARTMENTS



MAP TWO

TABLE 1

SUMMARY OF LAND USES IN GREENBUSHES FOREST BLOCK

LAND USE	AREA	%
State Forest	7902.6	
Conservation Park (proposed)	945	12%
Private Property	150	2%
Mining Leases	5522.5	70%
Forest Leases	95	1%
Greenbushes Township	75	1%
Water Authority Land		
Water Bodies	124	1.5%
Public Utilities		
Non Compensable Mining Zone	1600	20%
Cleared for Mining		
Deep Pits		
Shallow Pits		
Dry Waste Fills		
Wet Waste - Tailings		
Mining Infrastructure		
Rehabilitated Mining		

SECTION 2

THE LEASE CONDITIONS

THE LEASE CONDITIONS

The advent of the new Mining Act (1978) caused G.T.L. to convert their 1904 Act leases and this created the opportunity to revise the conditions (Appendix 1). The new conditions provide for the better management of mining and restoration of the land.

The conditions relevant to CALM are arranged in a logical sequence as follows:-

Planning

1. An initial (Dec. 1985) provision of conceptual landform plans for the leases.

2. A 10 year plan of mining with 5 yearly revisions ie:
   1985 - 1990
   1991 - 1995
   1996 - 2000
   2001 - 2005
   2005 - 2010

3. Annual mining proposals, providing six months notice of the intention to mine specific areas.

Exploration

1. Liaison on intended programme.
2. Precautions to prevent disease spread.
3. Precautions to prevent damage to forest.
4. Precautions to prevent pollution of streams.

Mining

1. To take the same precautions as for exploration with the aim of protecting adjoining forest values or those on route or down stream from mining.
2. To use the previously notified and approved methods of mining, water body management and roading.
3. Not to mine any areas other than those approved through the notice of mining.
4. Royalties shall be paid for any forest produce obtained from State Forest and crown land.
5. Compensation shall be paid for areas approved for mining outside the registered non compensible zone (Map F.D. 1364D). Compensation has been set for the period 15th February 1985 to 15th February 1988 by the Minister for Minerals and Energy after consultation with the Minister for Conservation and Land Management. It will be reviewed by the Ministers at the expiry of this period.

Rehabilitation

Annual programmes:

1. Consult the Department of Conservation and Land Management in the preparation of specifications for the proposed methods of rehabilitation.

2. Gain the approval of the Minister for Minerals and Energy for the annual rehabilitation programme.

3. There is a general requirement for the Company to rehabilitate all areas affected by their mining operations to the reasonable requirements of both the State Mining Engineer and the Executive Director of CALM.

Landform After Mining

The Company has provided a conceptual plan of final landform after mining and broad details of how it will be achieved.
A programme of works will be needed to bring the plan into effect.
The rehabilitation is to be supervised by the State Mining Engineer in conjunction with the Executive Director of CALM.

Other Environmental Matters

1. There is a general requirement to comply with relevant Acts of Parliament affecting the land.

   eg. Aboriginal Heritage Act.
   Water Authority Act.
   Bush Fires Act.
   Wildlife Protection Act
   Agriculture Protection Board Act.
   etc.

   Note: At present the CALM Act Section 143 provides that all activities within Greenbushes State Forest not under licence permit or lease, shall be subject to the approval of the Minister for Minerals and Energy.

2. Specific mention is made of protection from fire, dieback spread, and water quality.

Monitoring and Reporting Results

The Company submits to the State Mining Engineer and Executive Director of CALM a report on the previous twelve months (calendar year) progress and expenditure on rehabilitation. The report is submitted by the end of February in the following year.

SECTION 3

PLANNING

PLANNING

Background

There are unique difficulties confronting the planning process in the Greenbushes mineral field.

Alluvial and deep open cut mining are inherently problematic rehabilitation prospects, but the main obstacles are the long life of the main load and the remining of previously uneconomic alluvial ore grades.

In addition, there is the ongoing requirement for land for the disposal of processed waste, both dry and wet.

However, the companies 10 year plan predicts an end to the surface mining era as the alluvial and deep open cut mining exhaust the soft rock ore. Mining will then continue underground on the unweathered hard rock.

The long history of concentrated mining has provided little scope for lasting areas of rehabilitation. As a consequence at the cessation of surface mining there could be a substantial backlog of rehabilitation.

Therefore the main planning aim is a progressive programme of rehabilitation to fulfill the companies conceptual final landform plan.

This requires a balancing of new mining and its rehabilitation with a schedule for restoration of old mining disturbance.

Thus the process is divided into several planning horizons:

1. An annual programme.
2. A ten year programme with revisions every five years.
3. The return of the area to public land uses in the longer term.

Planning Liaison

Most operational planning will be conducted at a local level between company management at Greenbushes and the Departments District Manager at Kirup. The District Manager will refer matters to the Regional Manager at Bunbury and thence to State Operational Headquarters at Como as necessary.

However, formal reports and programmes required under the lease conditions should be sent to:

The Executive Director,
Department of Conservation β Land Management,
50 Hayman Road,
COMO.

with copies simultaneously sent to the Kirup and Bunbury offices.

Documentation and agreed procedures such as these, are only a complement to the all important co-operative relationships in the field. The District Manager will allocate responsibility for G.T.L. operations to a particular officer who will develop a close working relationship with the companies environmental scientist and works supervisor.

Planning Process and documentation

Final Landform Plan

Produced in December 1985 by the Company after a review of the draft by the Mines Department and Dept. C.A.L.M. It resulted from lease condition 10.
The aim was to present a long term objective for major landforming suited to appropriate, affordable and permanent land uses.
The plan recognised these landforms:

Residual after mining:

1. Deep open Cut pits (main pegmatite lode)
2. Shallow pits (alluvial deposits)
3. Overburden stockpile dumps
4. Tailings deposit heaps.
5. Tailings dams.

Proposed final land forms:

1. Chain of deep lakes (main pegmatite pits) surrounded by recreational parkland.
2. Forest on refilled ''en echelon'' deep pits.
3. A forested plateau arising from the waste filled valley.
4. Agroforestry on drained and resurfaced tailings dams.
5. Re-afforested confined alluvial valleys with some water pools.
6. Re-afforested broad alluvial valleys.
7. Shallow wetlands at the base of tailings dams.
8. Water reservoirs.

The plan described the earth moving, earth forming, drainage and revegetation required during both the surface and deepmining phases.

The actualization of the Conceptual Final Landform Plan should be achieved through the Ten Year and Five Year Mining Plans. Further development of the Conceptual Plan could include a map of the proposed landforms and a schedule of works to attain them based on the Ten Year and Five Year mining plans.

Ten Year Mining Plan

The ten year plan provides a strategic link between the final landform plan and operational plans. A Ten Year timescale is long enough to enable progress towards final landforms but short enough to predict realistic mining schedules. It provides the long term agenda for mine rehabilitation. C.A.L.M. uses the plan to guide its long term planning in Greenbushes Block, such as, the overall land use plan and operational considerations such as roading, recreation, conservation and silviculture.

This plan should also be the means of co-ordinating the environmental impacts of surface and underground mining. The disposal of waste rock and processed ore from underground workings must be integrated with surface mining plans.

Five yearly revisions provide for unexpected changes to the economic or mineralogical foundation of the plan. The Ten Year plan is a requirement of condition 11.

Five Year Mining Plan

The five year plan confers the maximum planning lead time based on reasonably detailed ore definition from drilling or costeening. It is the progressive process by which annual mining and rehabilitation phases are finally developed.
It assists the Company to do some economic planning beyond the immediate financial year and encourages the anticipation of rehabilitation issues in advance. C.A.L.M. will use the plan to co-ordinate its regular programmes which operate on timescales beyond the financial calendar year, such as burning, logging and dieback mapping.
The accuracy of the plan is maintained by annual revisions. Agreement on the plan was reached at a meeting between G.T.L. and C.A.L.M. on 4th July, 1985.

Exploration Plans

An exploration plan is required to minimise the potential damage to the forest. Exploration programmes should favour dry soil operations so they need to be sufficiently advanced to do this.

The plan should specify the type of exploration technique intended, the location and season (preferrably the month) of operation. A report of the rehabilitation of previous exploration should be included. eg. filling costeens and replanting. The exploration plan could be incorporated as a feature of annual mining plan or provided when they eventuate. Exploration plans are a requirement of lease condition 15.

Annual Mining and Rehabilitation Plan

The annual mining plan gives six months notice of the intention to clear a particular area of state forest for mining purposes. The plan should specify where, when and how the mining will proceed and how it is being manipulated to facilitate rehabilitation. A schedule of expected rehabilitation is required. The previous annual plan should be compared with the current plan and changes explained. Where the plan departs from the five year plan a comment would be warranted. All of the ancilliary mining activities which affect the land should be reported eg. waste disposal, roading, infrastructure. The plan is produced at the beginning of the calender year to which it refers and the Government authorities must respond to the Companies notice of mining within two months.
Compensation payment for mining state forest will be due on receipt of approval to mine and be calculated on the predicted area of mining. The payment will include an adjustment for the area actually mined and paid for the previous year after confirmation of any reported differential.

An annual mining plan is referred to in lease conditions 4, 5 and 12.

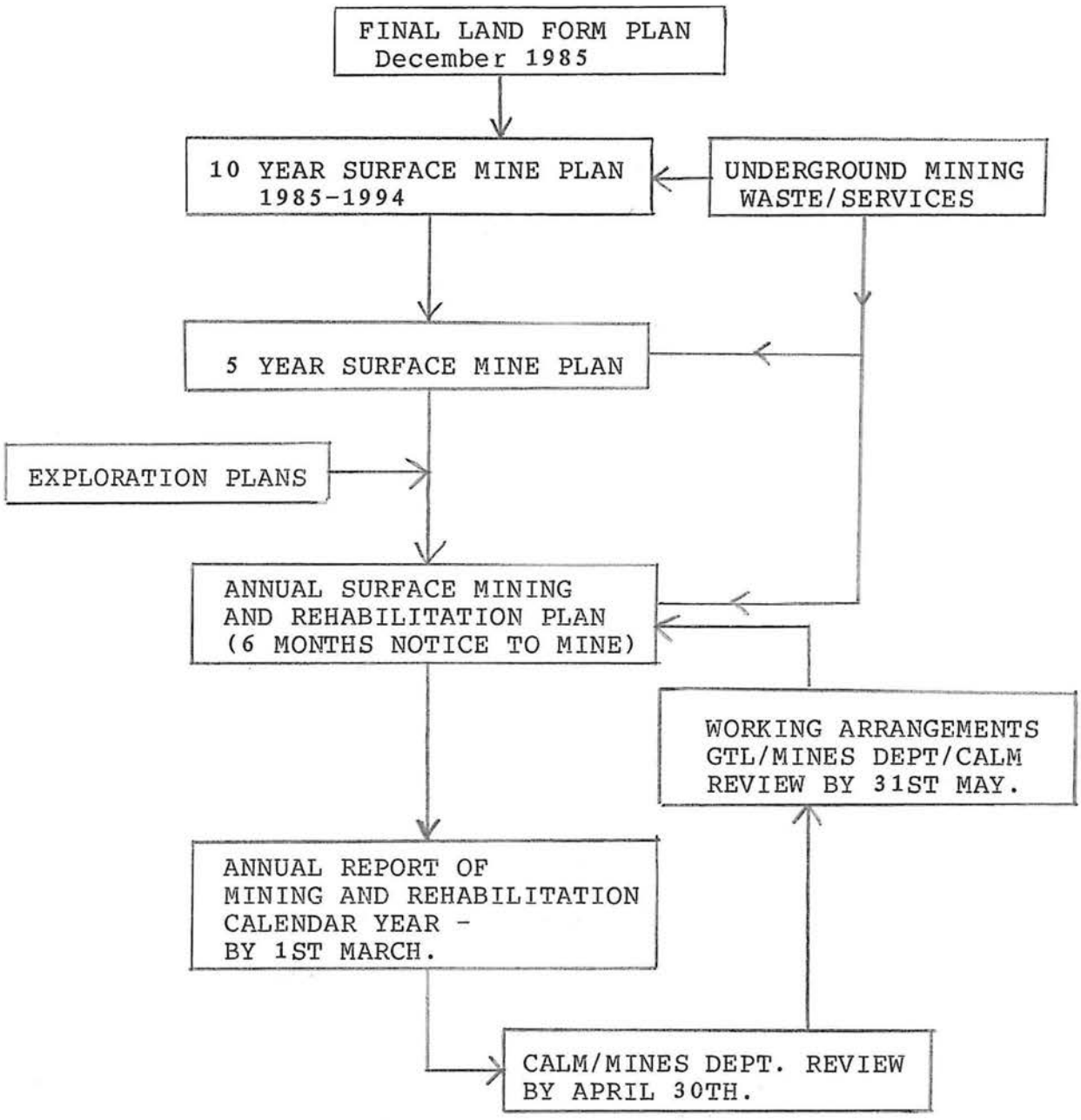
Annual Mining and Rehabilitation Report
The Company reports its mining and rehabilitation achievements each year, giving details of the landforming, drainage, topsoil handling, species sown and planted, fertilizing and after care. Usually this can be done simply by referring to prescriptions and procedures listed in the Working Arrangements. A map is necessary to exactly specify what was done where.
Any experimentation, research, monitoring or departures from the agreed prescriptions should be reported.
The report is produced by 28th February for the previous calender year and the Government Authorities are required to respond in writing within two months.
The report is a result of lease condition 13.

Working Arrangements

The Working Arrangements is the operations handbook for mining reabilitation. It aims to collect all useful planning and operational information into the one convenient document. By a process of operational use and annual review the Arrangements should be a current and mutually agreed set of guidelines for prescribing, managing and reporting mining and rehabilitation. The Working Arrangements are authorised by the consent of the Company and the Government Authorities.

PLANNING FRAMEWORK

Documentation



SECTION 4

EXPLORATION

EXPLORATION

1. Greenbushes Tin Ltd. will provide a five year plan of exploration programmes in State Forest outside of the non compensible mining zone in Greenbushes Block. The plan to be updated annually and submitted with the annual mining and rehabilitation plan.
   The purpose of this plan is to give at least three years notice so dieback symptoms can appear after burning.

2. The Company will prepare an annual exploration plan which describes in detail the areas to be accessed, the season of operation and the methods to be used.

3. No exploration programme is required for any exploration procedure which does not have the potential to transport soil or infected plant material or does not injure the vegetation.

4. CALM will respond to these plans by preparing dieback maps and determining the level of hygiene required.

5. Exploration prescriptions will provide for the rehabilitation of any damage to the forest caused by exploration. Disturbance of the soil surface or any other hazard to forest users is to be repaired as soon after exploration as possible eg. Costeens.

SECTION 5

CLEARING

CLEARING OF FOREST FOR MINING

1. A minimum of six months notice of the need to clear state forest for mining is required to allow time for dieback mapping and the hygenic removal and sale of forest produce.

2. Notice of clearing will be sufficiently advanced to promote the maximum use of dry soil conditions for clearing and mining.

3. The areas proposed for clearing are to be accurately flagged in the field for inspection at the time of clearing notification.

4. Proposed clearing is to take account of all the area of state forest required in connection with the area to be mined.
   eg. Waste dumps
   Overburden or topsoil dumps.
   Gravel pits
   Pits for fill material
   Additional area needed to achieve prescribed batters.
   New roads or road widening.
   Facilities corridors (water, power).

5. An accurate estimate of the area to be cleared is needed for the calculation of the compensation payment due. On approval of clearing the Company will receive an account for compensation payment.

6. The Company will inspect and take note of the species of flora on the sites to be cleared with the aim of returning as many species as possible, preferably from the original or nearby stock. This must be done before seed set in the previous summer.
   C.A.L.M. will check for gazetted rare species of plants or any other features of conservation significance.

7. The Company may be asked to facilitate access for logging.

8. Logging debris and waste wood is to be heaped by the Company at least twenty metres from the clearing edge and burnt prior to removal of topsoil. No debris is to remain beyond or on the forest edge where it will damage trees when eventually burnt. Where there is no topsoil or the topsoil is to be mined it may be preferrable to stockpile the waste wood. After the pit has been landformed the wood can be moved clear of the trees and burnt prior to ripping and planting. The provision of the Bush Fires Act apply, particularly with regard to the prohibited season. The Department is unwilling to ask for exemptions or special burning permits from Local Councils.

9. The clearing proposals are presented on plans of 1:1000 scale or larger. Each discrete unit of clearing is designated by a unique number identifying its time and place. eg. GT1/88 Greenbushes Tin area 1 of 1988. A mineral field place name may also be used in addition to the numerical system. The area of each unit will be noted on the plan.

SECTION 6

MINING

MINING

1. Planning

Mining plans need to consider rehabilitation requirements from the outset. The timing and method of mining can usually be organised to facilitate rehabilitation if planned as an integrated operation.

Together mining and rehabilitation personnel can predict the quantities of ore to be removed and therefore the approximate pit profile after mining. Prescriptions for final landform will suggest whether more clearing area is required, landfill needs to be imported or there is sufficient material to reprofile.

The mining plan indicates how each pit will be recontoured to blend into the adjoining forest and restore a compatible landform within the pit.

2. Timing

Dry soil mining is preferred for disease management and preservation of soil structure. Priorities for dry soil mining will be established to minimise impacts on high quality or vulnerable sites within the constraint of mining economy. It is desirable that rehabilitation follow as closely upon mining as possible.

3. Access

Access roads to pits should be low in the landscape to reduce risk of disease spread and favour already diseased or low impact routes. The forest at risk must be weighed against economic haul distances. The long term future of roads to and within pits is decided prior to installation. Thus the most appropriate routes and standards of engineering are chosen, and where mining impedes essential Government, public or private access, alternative temporary routes may be required.

4. Dieback Management

Detailed prescriptions for every aspect of dieback management have been developed by CALM.
However their application to the Greenbushes mineral field is complicated by the long history of mining, often in moist soil conditions, the apparent disease tolerance of much of the forest and the difficulty of mapping the disease.
Therefore the recommended procedure is:

1. Based on the 5yr. mining plan, CALM will develop broadscale dieback location and dieback impact plans for Greenbushes Block. From these an assessment of the best overall strategy will be made.
This survey may be upgraded by an air photo survey if warranted.

2. In the interim, hygiene prescriptions will be formulated from annual mining plans based on immediate ground surveys and assessment of disease risk and impact.

3. Proposed mining and access will be categorised as dieback, dieback free or uninterpretable. The prime strategies will be to operate within the one disease category as much as possible and to maximise dry soil operations. The feasibility of hygiene practices where operations cross disease categories will have to be determined for each case.

5. Additional Pits

Wherever possible borrow pits and storage areas will be contiguous with mine pits, otherwise they will be located where they have least impact giving consideration to economic haul distances.

6. Topsoil Recovery

The recovery and rapid re-use of topsoil is a priority concern. Rehabilitation personnel need to be aware for any opportunity likely to produce topsoil. In situ re-use or transferrance of topsoil is determined by the circumstances of the pits being rehabilitated.
Matters to consider include:

6.1 Disease status of donor and recipient pit.
6.2 Ecotypes.
6.3 Significance of seed store or neighbouring recolonisation.
6.4 Storage space
6.5 Season
6.6 Cost

7. Landforming

Final landforming is part of the rehabilitation phase, but there may be opportunities to move material during mining so as to reduce the amount required latter. This is particularly significant where there are large quantities of waste.

8. Water Management

Water management is essential to the functioning of tin mining and is also environmentally important. Methods of controlling turbidity and chemical pollution of stream zones mining into state forest and private property need to be applied.

Turbidity can be reduced by:

8.1 Silt traps
8.2 Settling ponds
8.3 Dry season operations.
8.4 Controlling erosion by advanced ripping, scarifying and seeding bare catchment areas.
8.5 Minimising the time of pit exposure.
8.6 Training of staff and supervision of contractors.

Chemical pollution can be reduced by:

8.7 Maintenance of equipment.
8.8 Reporting-disposal procedures.

The Companys thorough programme of water analysis and reporting to the Water Authority provides a safeguard against long term changes in water quality.

Temporary drainage measures may be needed on roads or in pits whilst mining disrupts the normal flow and discharge of water.

Post mining water bodies and drainage systems should be planned prior to mining based on the land uses desired, the natural drainage and pre-existing water rights or uses. It is essential to build the drainage alignments and falls correctly if erosion or quagmires are to be avoided. The emphasis of particular excavation and fill during mining according to a pre-determined drainage plan may reduce the work required during rehabilitation.

SECTION 7

REHABILITATION

REHABILITATION

OBJECTIVE

To create naturally sustainable forest ecosystems suited to the designated land use.

Given the existing and possible long term land uses the following specific rehabilitation objectives are proposed:

1. **Native forest ecosystem**

   This strategy aims to quickly restore the native forest ecosystem.
   It applies where the environment favours the restitution of an ecology virtually the same as that existing before mining. As many of the original species will be sown as practicable, with the expectation of recolonisation by any missing species from adjoining areas.
   Established exotic weed species and dieback disease may influence what can be replaced but are not so dominant as to defeat the strategy.

   The alluvial runs are an example where the application of this strategy is appropriate.

2. **Modified multiple use forest**

   The long term aim is the restoration of a natural forest ecosystem providing the full complement of multiple use values. However, due to disturbance by mining and the presumed impact of dieback, initial rehabilitation favours trees and understory tolerant of disease and suited to timber production. Shrubs are chosen for their ability to thrive and re-establish an organic cycle and recondition the surface soil layer.

   Native tree species will be promoted to progressively replace any introduced species.

3. **Timber production forest**

   Some areas in the mineral field may present the opportunity for almost single purpose production forests. Such forests may provide the option for latter conversion to multiple use forests when economic and environmental conditions so dictate. An example of this somewhat speculative strategy might be a pulpwood plantation on the disused tailings dams, or an agroforestry regime.

4. **Recreation and landscape amenity forest**

The town zone, road approaches and waterbody surrounds may be best planted to shrubs and trees which enhance their tourist and recreation potential. In some situations exotic species may possess better attributes. Such a strategy must be implemented through an integrated concept landscape plan for the whole area to avoid a piecemeal development. Careful consideration of the implications of maintenance costs will be necessary.

5. **Wetlands**

Drainage and mined areas can be combined in places to produce wetlands suited to wildlife. A wetland strategy is desirable on mine damaged land where seasonal water levels can be easily managed. The wetland would be specifically designed to suit the habitat needs of particular types of wildlife.

6. **Waterbodies**

Deep waterbodies (ie. > 2m depth) are a beneficial landuse for mining, domestic, farming and recreation purposes. The retention of existing water bodies or the creation of new ones is to be based on a consideration of all costs and benefits. The daming of forested gullies should generally be avoided if possible.

REHABILITATION STRATEGIES

1. Prepare and maintain a land use plan for Greenbushes Block.

2. Produce 5 year mining and rehabilitation plans.

3. Produce annual rehabilitation plans and programmes.

4. Produce annual rehabilitation reports.

5. Continually revise rehabilitation prescriptions which specify the details of rehabilitation procedures.

6. Conduct research programmes to improve rehabilitation prescriptions.

7. Monitor the success of rehabilitation.

8. Implement remedial treatment of unsuccessful rehabilitation where necessary.

REHABILITATION PLANS

1. Five year plans (scale 1:12500)

To consider the following:

1.1 The sequence of mining and rehabilitation.
1.2 Access for mining, the public and future management.
1.3 Location of mine facilities.
1.4 Dieback control by hygiene and water management.
1.5 Aesthetic and landscape considerations.
1.6 Fire protection planning.
1.7 Integration of mining and land use plans so as to minimise adverse impacts on priority uses.
1.8 Requirements for long term management.
1.9 Broad description of site vegetation types and reconnaissance for rare flora.
1.10 Water management systems and water course protection.

2. Annual Plans (scale 1:5000)

To specify the following:

2.1 Pit identity.
2.2 Dieback hygiene, drainage, erosion control and water management.
2.3 Treatment and management of land over non-ore bodies within and adjacent to ore ie. islands of unmined forest.
2.4 Species to be used.
2.5 Internal access to pits for future forest management.
2.6 The location of mining facilities/structures.
2.7 Waste rock management.
2.8 Treatment of wastewood.
2.9 Movement, stockpiling and replacement of topsoil and overburden in relation to dieback spread within and downslope of the pit.
2.11 Any research plots proposed.
2.12 Any special features.

Dieback Management

Much of the dieback management strategy is determined for each pit at the mine planning stage. The rehabilitation phase requires an extension of those strategies allocated according to the dieback status of the pit or the downslope area of forest below the pit.
The apparent disease tolerance of forest in the alluvial ore areas is likely to simplify and limit disease management procedures.
The following practises only apply to pits thought to be disease free and where the rehabilitated forest community is likely to be vulnerable to the disease.

1. Dieback infected topsoil or soil suspected of being dieback infected must not be transferred to dieback free pits.

2. Rehabilitation machinery must be clean when entering diebackfree pits.

3. Vehicles visiting the pit in moist soil conditions are to remain in the nearest dieback infected zone or downslope from the pit on approved access.

4. Planting stock are to be free of P.c.

5. Drainage from or within the pit will be designed to minimise the spread or intensification of the disease within the pit and/or downslope.

Access

1. Temporary access within pits may be needed for planting.

2. Permanent access will usually be designed at the pit development stage but actual alignments and profiles will be determined in the pit during final landforming.

Landforming and Finishing

1. Pit walls will be battered and smoothed. Slopes are to be safely trafficable by pedestrians, and stable. Slope angle results from the amount of fill available. If there is insufficient fill in the pit to achieve reasonable slopes, imported material will be needed. Backfilling is usually preferable to clearing additional forest for battering. ''Overclearing'' is a final resort but if needed should be predicted at the clearing application stage.

2. Pit batters and contours should simulate the natural land profiles of the forest. Sudden changes of slope are to be avoided.

3. Rocks and other non degradable materials are to be burried.

4. If topsoil was not removed from the pit prior to mining (due to presence of ore) the waste wood from clearing may have been stockpiled. This is to be reheaped away from the forest edge and burnt prior to ripping and planting. If topsoil is to be imported it may be less damaging to heap and burn the wood debris prior to distributing the topsoil.

5. The topsoil is spread evenly over the pit. The depth is nearly always determined by the volume available. A topsoil substitute may be preferrable to no topsoil, depending on the texture of the material comprising the pit floor and its general quality as a seed bed. Mulching may be desirable on harsh sites if suitable material is available.

6. Every pit is to be ripped after topsoil replacement to allow root development, facilitate water penetration and reduce erosion. Ripping is at planting spacing or closer to achieve complete soil fracture.
Riplines follow the contours to avoid channelling of water and gully erosion. Further light scarifying can be beneficial where soil texture is poor. Ripping must be completed before the soil moisture limits its effective.

Water Management

1. The primary drainage patern for each pit is provisionally planned at the time of clearing application. However the final alignment and grades of water courses and the exact positioning of water-bodies is determined at the rehabilitation stage.

2. Wherever possible the original drainage patern should be restored. Where mining has created a hole below the water table there is the option of creating a water body or refilling with waste material. Very large pits such as occur on the main lode cannot all be filled. Some of the smaller en-echelon pits can be filled, and this is very desirable. Smaller waterbodies can enhance the recreation, scenic and wildlife values of the forest, but they must be designed to preserve the following:

   i) Water quality (an exchange of water necessary)

   ii) Water depth (an input/output balance)

   iii) Accessibility (recreation and wildlife)

   iv) Safety (batters, floor, snags, signposting)

   v) Free of weeds and pests.

3. As much of the area mined in Greenbushes block is alluvial, adjoining or forming the drainage pattern, there is a limited risk of dieback disease intensification due to water retention strategies. The main problem is erosion control. Ripping and rapid revegetation will control the bulk of the erosion, but in some situations there may be a need for temporary artificial drainage structures (eg. Jute mesh and bitumen drains). Mined stream zones may require structures to reduce water velocity and close monitoring until the stream beds and sides stabilize.

4. Drainage lines passing beneath forest roads require well designed culverts. Concrete pipes are preferred.

Planting

General guidelines:

1. As a general principle, trees will be planted in mixtures to provide diversity and buffer the failure of particular species or provenances. Exceptions will be made for specialised site preference or landscape considerations.

2. Plant spacing will be varied according to the annual detailed site rehabilitation objectives. In certain situations, areas such as prominent view points and along selected roads, some areas may be left unplanted. In other instances, trees may be planted in small groups or clumps to minimise the rigid plantation effect created by row planting on a regular spacing.

3. An initial stocking of about 625 planted trees per ha.

4. Planting will commence in June when the soil profile is sufficiently wet to sustain the trees and conclude by the 1st of August.

5. Indigenous trees species which have been planted will also be broadcast sown at the rate of 1000 viable seed per hectare.

6. Apply 200 grams of diammonium phosphate per plant, placed approximately 15cms from the base of the plant, in a spear hole or stamped depression.

Tree and understorey species selection:

The species returned to any area will be determined by the following considerations:

- Size of the area.
- Shape of the area (closeness of native forest edge)
- Soil quality (subsoil and topsoil)
- Original and surrounding vegetation type.
- Landscape values.
- Land use proposed (eg. recreation, conservation, production)
- Disease tolerance.
- Availability of seed.

Four planting regimes are currently recognised:

<u>Natural forest type</u>
There are areas where mining rehabilitation has been able to restore sufficient of the original site capacity to warrant the expectation of a rapid return of the original ecosystem. Also, the designated land use is best served by

a restored natural vegetation type. An example would be the valley-confined alluvial runs where high soil quality, favourable moisture and nearby original forest will promote ready rehabilitation (eg. Cowan Gully). Another might be small pits surrounded by intact forest where topsoil has been saved and returned, (eg. Austin's West). Generally, this rehabilitation type occurs in the Bridgetown Complex. The aim would be to only return species endemic to that particular area or at least that particular ecotype. Prescriptions would have to be developed from vegetation surveys and an analysis of the ecotype. An example of an appropriate prescription is Greenbushes Tin Ltd. ''AL'' type, see Table 2.

Modified multiple use forest

This rehabilitation objective applies where the post mining soil character requires a lengthy period of reconditioning and upgrading before one can expect the natural ecological balance to re-establish.
The absence of topsoil or a truncated subsoil profile would be examples. Ineffective drainage or high predicted disease impact might also be indicative, as could a very exposed drought prone site.

Combinations of native and introduced eucalypt species of proven initial capacity for rehabilitating mined forest will be used. The qualities most sought are timber productivity and dieback tolerance. The introduced species are mostly a hedge against failure of the local trees particularly jarrah. However it is hoped that the forest can be progressively converted to a stable native forest.

Jarrah and marri will be sown on all sites.

The understory will be selected from robust species with an ability to build up soil organic matter and nitrogen and are tolerant of dieback disease. Excessively woody large species are excluded due to their flamability.
Legumes, particularly the acacias are currently favoured.

Other understory species can augment the ''site conditioning'' species subject to their prospects for survival and the availability of seed. Monitoring of rehabilitation and control plots will reveal which species might be added or deleted from prescriptions.
We can expect prescriptions for this rehabilitation objective to be regularly altered as field results are assessed.
The Greenbushes Tin Ltd. species list ''PG'' and ''PP'' (Table 2) are examples of current prescriptions for this rehabilitation type.

Timber production forest

Areas severely altered by mining may present an opportunity for timber priority production forestry. A single landuse would only be contemplated where environmental, landscape, protection and economic factors were favourable.
Rehabilitation landforming sufficient to eventually convert the plantation to a modified multiple use forest would be desirable. The series of terraces formed by the wet tailings settling ponds is a distant candidate for this treatment.
C.A.L.M. has developed several production prescriptions which serve as current examples (eg. Agroforestry, pine plantations, hardwood plantations), but these will be supplanted by others in time. The economics of production and harvesting will generally prohibit the establishment of small plots ie < 40ha.

Recreation and Landscape amenity forest

Mining has had a considerable impact on Greenbushes Forest Block in the past one hundred years and will continue to be the main influence for many decades more. Some of the impacts of mining are irrevocable and have permanently changed the potential landuses and the character of parts of the forest environment. It may be possible with foresight and imagination to transmute these changes into land use assets by emphasizing recreation and tourist values.
The combination of a major highway, an historic town, large waterbodies, forest streams, rolling topography and attractive intact forest is a good start. It could be greatly enhanced by landscaping and the provision of facilities for visitors.
There are presently no prescriptions for dedicated recreation and landscape treatments, (other than the restoration of the natural values). The prospects should be evaluated through the mechanism of the land use and final landform plans and executed through the 10yr and 5yr mining plans.

Wetlands

The rainfall, topography, drainage and mining patern presents the possibility of developing wetlands in Greenbushes Block. As wetlands are diminishing in the South West, any potential for creating them should be examined.
Some guidelines:

1. Water containment structures must be stable and require low maintenance in the long term.

2. Water quality must sustain an adequate food production webb for vertebrates, particularly waterfowl.

3. Water depth, mostly shallow ie. <1M except for a moat around the perimeter to restrict preditors and human interference.

4. Maximise length of water/land interface.

5. Create refuge islands.

6. Thick fringing vegetation (> 20m) able to withstand inundation and drying, to provide a diversity of nesting and roosting habitats.

7. Weed control eg. Typha. (Impacts on water depth).

8. Suitable access and observation structures.

Control the structure of the fringes by landforming the moisture gradient to suit the whole range of wetland forms, trees shrubs, rushes, herbs.
Greenbushes Tin Ltd. prescription ''WL'' provides a framework species list for rehabilitating wetlands, see table 2.

Waterbodies

Waterbodies for the of potable water supply will be specified by the West Australian Water Authority.
Large water containment structures will be designed by appropriately qualified engineers and approved by the relevant Government authority.

Water bodies (other than water supply) are classified as shallow (< 2m) or deep (> 2m).
As a general rule, the shallow water bodies are likely to be managed mostly for wildlife purposes and the deep bodies for recreation when their original purpose (eg. mine water supply) is finished.
Prescriptions will be developed for each individual waterbody as they are proposed.
General aspects for inclusion in prescriptions:

1. Water quality.
2. Water quantity.
3. Containment structures and drainage.
4. Habitat enhancement and biological function.
5. Accessability.
6. Safety.

The deep pits over the main load are a particularly difficult prospect in relation to access and safe batters.

TABLE 3

REHABILITATION PRESCRIPTION (APRIL 1984)
NEW ZEALAND GULLY
STAGES 1 & 2

Step 1: Drainage channels to be sown with a clover mix (Trikkala, Esperance, Dinninup) at a rate of 20kg/ha and at a width of 5m. The clover will be innoculated and lime pelleted.

Step 2: The entire area (16ha) will be fertilized with superphosphate at 500kg/ha.

Acacia seed, comprising:
- Acacia extensa,
- A. pulchella
- A. myrtifolia
- A. urophylla
- A. dentifera and
- A. drummondii

will be mixed in with the superphosphate and broadcast simultaneously with the superphosphate at the rate of 1kg/ha, once the season has broken.

Step 3: Eucalypt seedlings comprising:
Eucalyptus maculata
E. resinifera and
E. wandoo,
will be planted at the rate of 500 trees/ha.

All roads will be revegetated. Access will be limited t a road around the perimeter of the planting which will also as as a firebreak.

SECTION 8

FINAL LANDFORM

AND

LANDUSE

FINAL LANDFORM AND LANDUSE

1. A Land Use Plan will be developed for Greenbushes Block using the land use values, land uses and principles outlined in the CALM Central Forest Region Management Plan (December 1987).
   This will provide the broad basis for more detailed plans.

2. Greenbushes Tin Ltd. Conceptual Plan Showing Post Mining Final Land Form (Dec. 1985) will be reassessed with a view to progressively implementing the plan.
   Implementation will be effected through the 10yr. and 5yr. Mining and Rehabilitation Plans.

3. The plans will address the question of public access and use of Greenbushes Block. Time frames for the various land uses in relation to the mining programme will be explored.

4. The plans will ensure the pre-eminence of the priority land uses so that mining and forest protection are not impeded.

SECTION 9

FOREST OPERATIONS

YES
1,000

FOREST OPERATIONS

If thought useful a section on forest operations can be included.
It would briefly describe the cycle of operations CALM expects to conduct in Greenbushes Block.
Reference could be made on its interaction with mining and other land uses.
The following would probably be mentioned:

- Timber Production and minor forest produce.
- Fuel reduction programme.
- Dieback mapping and hygiene.
- Research/inventory plots.
- Access and road maintenance.
- Basic raw materials.

Local operators may feel this information is already well appreciated, so there is no need for it.

APPENDICES

APPENDIX 1

SCHEDULE OF CONDITIONS - MINING LEASES 01/1 TO 01/11

1. Survey.

2. Compliance with the provisions of the Aboriginal Heritage Act, 1972 to ensure that no action is taken which is likely to interfere with or damage any Aboriginal site.

3. Compliance with the provisions of the:
Water Authority Act, Regulations and Bylaws,
Forests Act and Regulations,
Bush Fires Act and Regulations.

4. The Lessee shall give the Executive Director six (6) months notice in writing of its intention to enter upon any area of State Forest or Crown Land for the purposes of mining or operations associated with mining.

   The Conservation and Land Management Department reserves the right to remove any marketable timber from such area in advance of mining operations.

5. The Lessee at its own expense shall rehabilitate all areas affected by mining or operations associated with mining including the rehabilitation enrichment of dieback or other forest disease affected areas resulting from the lessee's mining or operations associated with mining to the reasonable requirements of the State Mining Engineer and the Executive Director.

6. The Lessee shall within ninety (90) days of the granting of the lease enter into and maintain a bond of Fifty Thousand Dollars (50,000.00) with an approved surety with the Mines Department for due annual performance of the approved rehabilitation programme.

7. At the completion of mining operations and wherein the opinion of the Mining Engineer/District Inspector of Mines a hazard exists to the Public, adequate safety precautions must be taken by the Lessee including provision of regularly maintained effective fences.

8. The Lessee shall pay royalty at current rates to the Executive Director for any forest produce obtained from State Forest and Crown Land used in connection with mining operations on the leases.

9. The Lessee shall pay to the Executive Director compensation for forest destroyed by or in connection with mining. The rate of compensation within Greenbushes Mineral Field will be determined annually by the Minister for Minerals and Energy and the Minister for Forests.

   No compensation payment is required for such land defined as

totally disturbed by mining (Definition of disturbed and undistrubed land is as per Greenbushes Tin Limited Map Number F.D. 1364D, dated 16 December 1983). Such payments will be made in advance in the month of January of each year on the area of forest proposed to be affected in that year and payments by way of any necessary adjustment shall be made in the month of January next following.

10. The Lessee undertakes to formulate detailed rehabilitation proposals within twelve (12) months of the granting of the leases.

    The Lessee shall prepare a conceptual plan for the consideration of the State Mining Engineer and the Executive Director indicating the final land form after mining and the broad details of how this plan will be achieved. The supervision of the rehabilitation shall be carried out by the State Mining Engineer in conjunction with the Executive Director.

11. After consultation with the State Mining Engineer and the Executive Director, the Lessee shall prepare and submit to the State Mining Engineer no later than the 30th June, 1985, a plan of reasonable detail of its proposed mining operations upon the leases during the succeeding ten (10) years and such plan after like consultation shall be reviewed and re-submitted thereafter at five (5) yearly intervals.

12. The Lessee shall also prepare and submit to the State Mining Engineer with a copy to the Executive Director its detailed annual mining proposals and management programmes which will specify such matters as the areas it is proposed to mine, the method of mining and the proposed method of rehabilitation, water body management and road access for approval by the Minister for Minerals and Energy. The Lessee undertakes to consult with the State Mining Engineer and the Executive Director in the preparation of these programmes.

13. The Lessee shall submit Annual Reports on progress and expenditure relating to rehabilitation to the State Mining Engineer and the Executive Director. Such reports shall be submitted by February 28th of each year. Reports will cover the twelve months period ending the 31st December.

14. The Lessee shall take all precautions necessary to prevent damage to the forest and pollution of streams within State Forest and Crown Lands.

15. The Lessee at his own expense shall carry out all necessary measures to prevent the spread of jarrah dieback disease on the area of the lease and shall liaise with the Divisional Forests Officer before commencing exploratory work outside areas being mined.

16. The Lessee shall take all such necessary precautions as may be indicated by the Executive Director to prevent the occurance or spread of any fire within or adjacent to the leased area.

17. The grant in respect of all private land being confined to below a depth of 30 metres from the natural surface.

and in respect to the following:

Mining Leases 01/1 to 01/3, 01/10 and 01/11

18. Mining on any road or road reserve being confined to below a depth of 15 metres from the natural surface.

Mining Leases 01/2 and 01/3

19. Mining on Miner's Homestead Leases 01/1 and 01/8 being confined to below a depth of 15 metres from the natural surface of the land.

Mining Lease 01/2

20. The complete excision of any portion encroaching on Water Right 01/301.

Mining Lease 01/3

20. No mining on Recreation and Swimming Pool Reserve 22315 without the prior written consent of the Minister for Minerals and Energy.

Mining Leases 01/4 to 01/9

18. No excavation, excepting shafts, approaching closer to the South Western Highway or the road reserve than a distance equal to twice the depth of the excavation and mining on the South Western Highway being confined to below a depth of 30 metres from the natural surface, and on any other road, to below a depth of 15 metres from the natural surface.

Mining Leases 01/4, 01/5, 01/8 and 01/9.

19. No mining on a strip of land 60 metres wide with the Bunbury-Northcliffe Railway Line as the centre-line and no materials being deposited or machinery or buildings being erected on such strip of land.

20. Blasting operations being controlled so that no damage or injury can be caused by fly rock, concussion, vibration or other means.

Mining Leases 01/4 and 01/9

21. No mining being commenced until the lessee has constructed to the satisfaction of the Public Works Department, such dams, banks, culverts and other works as are required to prevent any impairment by the mining operation of the physical, chemical or biological condition of the waters in the Dumpling Creek Dam. The lessee maintaining and keeping in repair these works for the duration of the mining operation.

22. The lessee being responsible for all costs incurred by the Public Works Department in treating the water or developing a new source, should the failure of these works or the mining operation result in impairment of the physical, chemical or bioilogical quality of the water in Dumpling Creek Dam to the extent that it no longer conforms with the Desirable Current Criteria for Drinking Water of the National Health and Medical Research Council.

23. The lessee being responsible for the cost and expense to construct, operate and maintain such dams, pump stations, pipelines and works as are necessary to augment the Dumpling Creek Dam storage so that the demand of the Greenbushes Townsite is met at all times.

24. The lessee arranging for the water delivered to Dumpling Creek Dam to be sampled monthly and analysed for physical and chemical characteristics by a recognised laboratory to ensure that the quality of the water being delivered by the lessee to Dumpling Creek Dam conforms with the Desirable Current Criteria for Drinking Water in Australia of the National Health and Research Council of Australia, and the results of the tests being forwarded to the Public Works Department within one week of the sampling date.

25. The lessee within two weeks of receiving any test results referred to in condition 24 above that shows the water being delivered by the lessee to Dumpling Creek Dam is not meeting the Current Desirable Criteria for Drinking Water, shall arrange for treatment of the water or for supply to be drawm from another source or take such other action as may be necessary to ensure that the quality of the water to the dam is maintained.

26. The lessee, within three months of completing mining, unless granted an extension of this approval by December 31, 1986, rehabilitating to the satisfaction of the Public Works Department all mining pits, tailings dumps and other works on the catchment to the extent necessary to ensure that the flow of water to Dumpling Creek Dam is not impaired in quantity or quality.

Mining Lease 01/4

27. No mining on North Greenbushes Townsite, Gravel Reserves 6890 and 29038, Water Reserve 38419 and Camping Reserve 7005 without the prior written consent of the Minister for Minerals and Energy.

28. No mining on Cemetery Reserve No. 6889 and mining within a distance of 140 metres laterally from the Reserve being confined to below a depth of 50 metres from the lowest part of the surface of the land with rights of ingress to and egress from the said Reserve being at all times preserved to the public.

29. Mining on Miner's Homestead Lease 01/4 and 01/6 being confined to below a depth of 15 metres from the natural surface of the land.

30. The complete excision of any portion encroaching on Garden Area 01/19 and mining thereunder being restricted to below a depth of 15 metres from the natural surface.

Mining Lease 01/5

21. No mining on Water Supply Reserve 30597 without the prior written consent of the Minister for Minerals and Energy.

22. Mining on Miner's Homestead Lease 01/6 and 01/7 being confined to below a depth of 15 metres from the natural surface of the land.

Mining Lease 01/6

19. No mining on Greenbushes Townsite, Rubbish Tip Reserve 22224 and Recreation Reserve and Swimming Pool Reserve 22315 without the prior written consent of the Minister for Minerals and Energy.

20. The complete excision of any portion encroaching on Mining Lease 01/1.

Mining Lease 01/7

19. No mining on Cemetery Reserve No. 10819 and mining within a distance of 140 metres laterally from the Reserve being confined to below a depth of 50 metres from the lowest part of the surface of the land with rights of ingress to and egress from the said Reserve being at all times preserved to the public.

20. No mining on Water Reserves 1381 and 1382 and Residence and Business ASrea Reserve 8048 without the prior written consent of the Minister for Minerals and Energy.

21. The complete excision of any portion encroaching on Mining Lease 01/1.

Mining Lease 01/8

21. No mining on Recreation Reserve 8361 without the prior writte consent of the Minister for Minerals and Energy.

22. The complete excision of any portion encroaching on Garden Areas 01/27 and 01/42 and mining thereunder being restricted to below a depth of 15 metres from the natural surface.

Mining Lease 01/9

27. No mining on North Greenbushes and Greenbushes Townsite, Water Reserves 1929 and 15466, Camping Reserve 7005, Recreation Reserves 2687 and 8361 without the prior written consent of the Minister for Minerals and Energy.

28. The complete excision of any portion encroaching on Water Right 01/302.

29. The complete excision of any portion encroaching on Garden Areas 01/49, 01/50, 01/52, 01/55 and 01/62, Residence Area 01/353 and mining thereunder being restricted to below a depth of 15 metres from the natural surface.

30. Mining on Miner's Homestead Lease 01/35 being confined to below a depth of 15 metres from the natural surface of the land.

APPENDIX 2

DEPARTMENT OF CONSERVATION & LAND MANAGEMENT
POLICY GUIDELINES
MINING AND REHABILITATION

MINING

Objective

To ensure that approved exploration and mining operations proceed according to conditions specified to minimise environmental damage and to rehabilitate in conformance with the purpose of vesting.

Specifically, the aim is to:

abide by the Mining Act which allows for proposals to be rejected or approved subject to conditions by the Hon Minister for Conservation and Land Management on national parks, State forest and A class reserves,

ensure that when any proposal for exploration or mining is submitted involving land and waters under CALM management that the land values affected by the proposal are fully considered,

where conditions applying to exploration and mining are being considered by Government, ensure the development of the most appropriate conditions to preserve the values for which the land was reserves,

liaise with Mines Department, the Department of Resources Development and the Environmental Protection Authority to ensure that the most appropriate conditions for exploration and/or mining on parks, reserves and forests, are developed,

ensure that conditions applied to exploration and mining are complied with,

continue research into techniques aimed at minimising environmental damage and land use conflict,

liaise with exploration companies to ensure they are aware of the effects of mining on the environment and other land uses, and of rehabilitation techniques,

liaise with authorities responsible for administering mining agreements and with other organisations authorised to study mining effects and rehabilitation techniques,

rehabilitate areas affected by mining to suit the designated

land use, and in accordance with conditions imposed by State Government under the various special agreement Acts and Mining Act.

Strategies

(i) Seek the inclusion of appropriate conditions governing evironmental protection into the mineral leases issued under the Mining Act.

(ii) Ensure that exploration on CALM land is conducted in strict adherence to conditions stipulated by the relevant departments.

(iii) Seek to direct mining operations into areas where there will be least conflict with other land uses.

(iv) Where possible obtain realistic compensation from companies mining on CALM land to cover loss of conservation values, land purchase and the continuing cost of rehabilitation and management of areas affected by mining.

REHABILITATION

Objective

To regenerate degraded land with self-regulating ecosystems consistent with the purpose of the land and, where possible, to restore indigenous biological communities.

Specifically, the aim is to:

rehabilitate land managed by the Department which has been degraded by disturbance so that it will best meet the needs of the designated land use for the area,

apply restoration techniques which favour natural values, wherever possible,

ensure that the cost of rehabilitation is borne by the agency responsible for site degradation, wherever possible,

ensure that rehabilitation provides for as many secondary land uses as possible,

monitor regeneration programs and encourage research to ensure that the aims are being achieved and that techniques are continually being improved,

liaise with other Government departments, miners, industry and other land users to continue the exchange of ideas, techniques and standards for rehabilitation.

Strategies

(i) Ensure that agreements and planning for disturbances on CALM land make provision for rehabilitation.

(ii) Employ species and genotypes native to the original site in restoration, whenever possible.

(iii) Encourage natural regeneration of indigenous vegetation.

(iv) In the absence of natural regeneration, planting or seeding procedures should be planned to simulate the original vegetation with respect to species diversity, composition and spacing.

(v) For areas where nature conservation is not the priority use, if naturalness cannot be achieved, rehabilitation should enhance priority uses or maintain them at an acceptable level as determined by landscape architects.

TABLE 2 - Greenbushes Tin Ltd. Rehabilitation prescriptions:(Modified) Planting & seeding

PG = Shallow pits with good topsoil.
PP = Shallow pits with poor topsoil.
AL = Alluvial sites with good loamy soils.
WL = Wetland sites.

SPECIES	PG	PP	AL	WL
PLANTING: (No./Ha				
Eucalyptus resinifera ?	200	200	0	0
Eucalyptus calophylla	180	180	180	0
Eucalyptus patens	0	0	300	0
Eucalyptus marginata *	160	160	15	0
Eucalyptus maculata	30	30	0	0
Melaleuca preissiana	0	0	0	120
SEEDING: (g/ha)				
Acacia pulchella	150	200	50	0
Acacia drummondii	50	50	25	100
Acacia extensa	150	200	35	100
Acacia celastrifolia	50	150	15	0
Acacia lateriticola	100	200	50	0
Acacia urophylla	50	50	10	0
Acacia saligna	10	10	5	0
Acacia nervosa	10	10	0	0
Agonis linearifolium	0	0	25	50
Agonis parviceps	50	20	0	0
Albizia lophantha	0	0	25	0
Anigozanthos manglesii	10	0	10	0
Banksia littoralis	0	0	15	0
Baeckea camphorosmae	0	0	3	3
Boronia metastigma	0	0	0	5
Bossiaea aquifolium	0	0	15	20
Bossiaea ornata	20	40	0	0
Chorizema ilicifolium	5	0	10	0
Casuarina humilis	4	0	4	0
Casuarina fraseriana	2	0	0	0
Clematis pubescens	3	0	3	3
Daviesia cordata	20	0	25	0
Dryandra nivea	1	0	1	0
Eucalyptus marginata	200	0	130	0
Eucalyptus calophylla	130	130	130	0
Eucalyptus patens	0	0	30	0
Hakea amplexicaulis	5	0	10	0
Hakea lissocarpa	2	2	8	0
Hovea chorizemifolia	1	0	2	0
Hypocalymma angustifolium	0	0	6	3
Juncus pallidus	0	0	0	15
Kennedia coccinea	100	100	200	0
Kennedia prostrata	150	100	300	0
Lepidosperma sp.	0	0	100	100
Melaleuca preissiana	0	0	0	10
Oxylobium lanceolatum	0	0	60	50
Podocarpus drouynianus	100	0	0	0
Scirpus sp.	0	0	0	100
Sollya heterophylla	40	40	0	0
Trymalium spathulatum	0	0	10	0
TOTAL: (Kg)	1.41	1.30		

* E. marginata to be planted only in well drained areas.