NEWNHAM EXPLORATION & MINING SERVICES

MAIN CREEK MAGNESITE PROJECT

INFRASTRUCTURE ISSUES

OPTIONS AND INDICATIVE COSTS

Prepared For:

Golden Triangle Resources
Level 3
71 Queens Road
Melbourne, 3004

By:

L A Newnham, B.Sc., F.A.I.M.M.
PO Box 132
Riverside, Tas 7250

Ph: (03) 6394 3434
Fax: (03) 6394 3435

30 July, 1998

CONTENTS

1. SUMMARY

(a) Golden Triangle Resources NL is investigating mining 400,000 tpa of high grade magnesite on a long-term basis near Main Creek in Western Tasmania.

(b) Infrastructure options and indicative costs necessary to support such an operation and to deliver magnesite to a magnesium metal refinery have been reviewed. No major infrastructure problems were identified.

(c) Given the high grade nature of run-of-mine ore, it is recommended that it be single stage crushed, trucked to Whyte Hill south of Waratah and railed either to a refinery in Tasmania or to Burnie for shipment to a refinery outside Tasmania.

(d) Power would be provided to the mine site from Savage River substation.

(e) The road between the mine site and Whyte Hill would require extensive rebuilding and upgrading.

(f) A rail line would have to be relaid between Guildford and Waratah and new track extended to Whyte Hill.

(g) If closer analysis indicates excessive rail costs, the option remains to truck directly to the refinery or the port.

(h) This report concludes that, following capital expenditure of approximately $11M on infrastructure, magnesite could be delivered to a refinery near Burnie for approximately A4.6 cents/lb of magnesium metal or to a non-Tasmanian refinery for approximately A10.6 cents/lb.

Note:

These cost estimates are for ex-mine infrastructure costs only and do not include mining, environmental or management charges.

(i) **A summary of these costs are:**

Component	Capital	Operating Costs	
	($'M)	($/t magnesite)	(A cents/lb magnesium metal)
Site Development (including contract crushing & loading)	1.5	2.5	0.5
Power (mining & crushing)	2.0	3.0	0.6
Access Development & Magnesite Transport	7.5	15.0	3.5
TOTALS	**11.0**	**20.5**	**4.6**
Shipping to Non-Tasmanian Refinery	-	28.0	6.0
TOTALS	**11.0**	**48.5**	**10.6**

(j) Scope exists to reduce operating costs, firstly, by increasing capital contribution to the rail extension and, secondly, by negotiation with government on variable costs such as road maintenance, energy charges and royalty costs.

(k) Detailed studies will be required on these matters when this project proceeds to more advanced evaluation stages.

2. INTRODUCTION

This report reviews infrastructure issues and ball-park capital and operating cost estimates associated with delivering magnesite mined near Main Creek to a refinery either in north-west Tasmania or outside Tasmania.

The report is designed to supplement reports concurrently being prepared by Barrett Fuller Partners with reference to conceptual mine plans and costs, and by Natural Systems Research with reference to environmental issues and costs associated with the mine.

Combined, these three reports will deal with the major issues and costs associated with delivering 400,000 tpa of crushed high grade magnesite to a magnesium metal refinery.

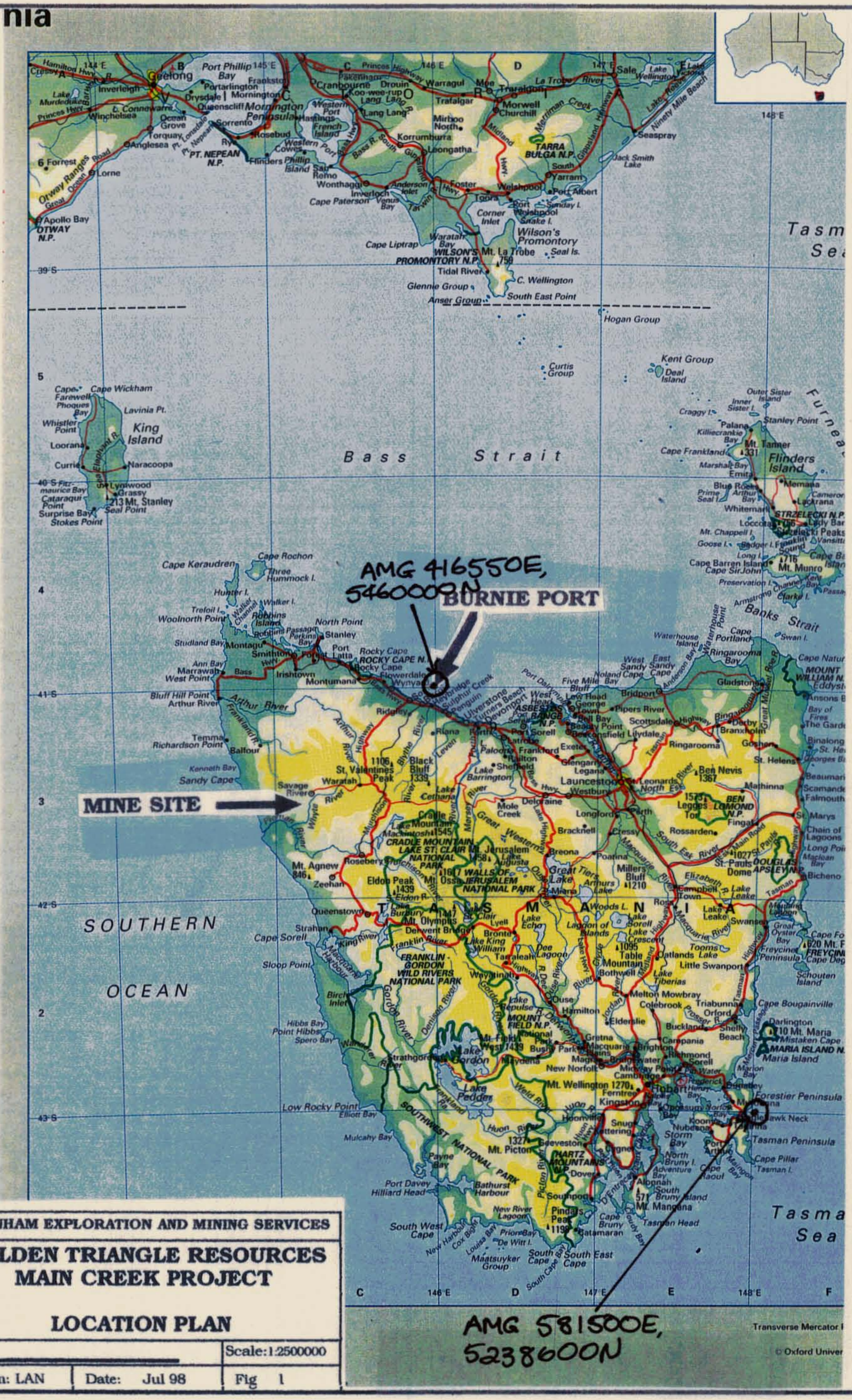
Throughout this report, it is assumed that five tonnes of run-of-mine magnesite, ie, unbeneficiated magnesite, will be required to produce one tonne magnesium metal.

All costs are in Australian currency, unless indicated otherwise.

This report represents a preliminary quantification of issues, options and costs, and is intended to provide a framework only, on which to advance the project to more detailed stages.

Costs, issues and options are based, firstly, on discussions with a range of providers in Tasmania (see Appendix A) and, secondly, on the author's 32 years of mining and mine development experience in Tasmania.

479006



NEWNHAM EXPLORATION AND MINING SERVICES

GOLDEN TRIANGLE RESOURCES MAIN CREEK PROJECT

LOCATION PLAN

Drawn: LAN	Date: Jul 98	Scale: 1:2500000 / Fig 1

3. INFRASTRUCTURE COMPONENTS

3.1 SITE ACCESS AND MAGNESITE TRANSPORT

3.1.1 Operational Concept:

This section reviews options and costs for providing and operating access to the proposed mine facility and transport of product of magnesite from the facility.

At this conceptual stage, it is envisaged a modern underground mine would be developed in the Bowry Creek or Main Creek area, supplying 400,000 tpa to a processing facility on site, which would prepare the magnesite for transport to either a magnesium metal refinery in north-west Tasmania or to a port for shipment to a processing plant either on the mainland or overseas.

It is assumed the project is long-term; (ie) >20 years.

3.1.2 Transport Options:

A good quality road to the site is, of course, a necessity in order to develop the operation.

However, there are a range of options to consider for transporting the product from the site to the refinery. These are:

- road
- rail
- conveyor
- slurry pipeline
- ship
- combinations of the above

The relative merits of these options are greatly influenced by the following principal factors:

- destination of the product
- life of the project
- government assistance.

Each of these factors are discussed in greater detail below, followed by a review of various transport options.

3.1.3 Product Destination:

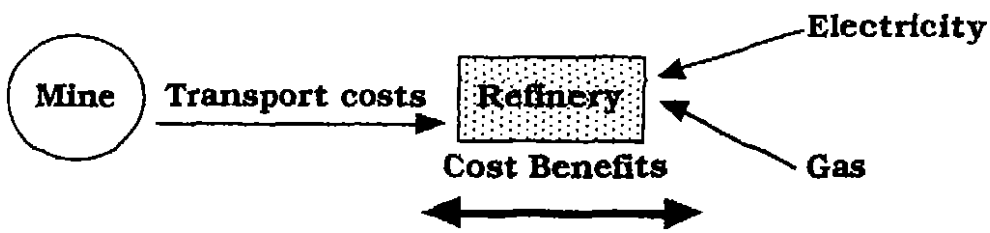
If it is decided to construct a magnesium metal refinery in Tasmania, the siting of such a facility will be influenced by:

- culture
- geography
- supply of electric power
- supply of gas

In summary: an elevated site, removed from population centres and areas of environmental sensitivity, in close proximity to the main State electricity grid, the on-shore gas supply, and transport routes from the mine, would appear to be the best choice.

The transport costs from the mine to the refinery are proportional to the distance between the refinery and the mine, but the cost of supplying electricity and gas to the refinery increases with distance from these services to the refinery.

For a long term project, most of these major costs are operating costs, and they will need to be weighed up carefully in refinery site considerations. For example, a refinery site which incurs higher magnesite transport costs could be more beneficial in the long term if electricity and gas costs were lower.



If it is decided to transport the raw magnesite from Tasmania to a refinery either on the mainland or overseas, the magnesite transport is only influenced by three factors:

- costs from mine to port
- selection of port
- shipping costs

Port Latta and Burnie are the only two ports worthy of practical consideration.

Port Latta has a number of disadvantages as a direct shipper of magnesite:

- remoteness
- exposed, fair-weather port
- jetty and loading facilities owned by ABM

Burnie has a number of advantages as a direct shipper of magnesite:

- rail and road access direct to shiploader
- all-weather port
- proximity to support facilities

3.1.4 Life of Mine:

The magnesite transport options are heavily influenced by the life of mine, because some options have high capital, low operating costs, and others low capital, high operating costs.

The longer the life of mine, the greater the relative merits of higher capital, lower operating cost options.

Presumably, if the mine was to be developed to feed a purpose built refinery either in Tasmania or elsewhere, it should be regarded as a very long life project.

If, however, the mine was to be developed to feed an unrelated refinery, either in Tasmania or elsewhere, then its life would only be as long as the supply contract.

3.1.5 Government Assistance:

The level of government capital assistance to infrastructure access would be negotiable and would depend on whether the magnesite was refined in Tasmania or exported as raw magnesite.

Because the provision of rail, electricity and gas reticulation are all privatised (or will be), direct Government assistance is likely to be restricted to capital road works.

However, this report assumes no Government assistance. Any which was forthcoming could be considered a bonus.

3.1.6 Road Only Transport: (Figs. 2,3)

The operation envisaged would require transport of 1,200 t crushed magnesite/day, six days/week, 50 weeks/year for the life of mine.

The current road consists of:

- High quality State Highway from Burnie to the Fingerpost (near Guildford).
- Sealed State Highway from Fingerpost to Savage River township 45 km. This road is quite tortuous and not designed for continuous high traffic heavy loads.
- Six kilometres of unsealed Corinna Road south from Savage River.
- Two kilometres of unmade access from Corinna Road to crushing sites A or B.

Transport Tasmania (State road authority) has indicated that the Savage River-Guildford road would require upgrading in order to take either B-double or Superdog trucks. Superdogs are the most likely. With an average load of 30-35 t, this represents approximately 40 trucks/day, for the life of mine.

Costs associated with road transport are:

- capital costs to construct and upgrade roads
- operating costs to transport product and maintain roads

Capital costs are estimated as:

- two kilometres of new haul road from Corinna Road to crushing site - $0.75M/km = $1.5M total
- six kilometres of upgrading on Corinna Road to Savage River - $0.50M/km = $3.0M total
- contribution on upgrading 40 km State road from Guildford to Savage River - 'guesstimate' - $0.1M/km = $4.0M total

Thus, total capital estimate: $8.5M.

Operating costs are incurred as:

- maintenance on 50 km road from Guildford to mine site - say $10,000/km/pa = $0.5M pa = $1.25/t
- transport costs, indicative prices - $0.10/t/km from mine to Burnie Wharf , 120 km at $0.10/t = $12/t
- if the refinery was built in the general Ridgley-Highclere area, this would reduce to $9-10/t
- assuming delivery to Burnie loader of 400,000 tpa, total transport and maintenance costs would be $5.3M pa = $13/t magnesite or $0.03/lb of magnesium metal.

Road Transport Summary:

Capital	:	$8.5M
Operating	:	$13/t magnesite delivered Burnie
	:	$0.03/lb magnesium metal

3.1.7 Rail Only Transport:

Tasrail operates the rail from Burnie down the west coast to Rosebery and Melba Flats. Between Guildford and Waratah (12 km), the old Mt Bischoff Mine railway formation still exists but would only require new ballast and track.

South from Waratah, the country remains relatively flat for approximately a further 12 km to Whyte Hill area. It would be possible to extend the line to this point.

Beyond Whyte Hill a relatively flat route could be selected to near the Castray River, but beyond that the terrain becomes difficult due to the Meredith Range and the Whyte River. The cost of extending the rail through this area would be prohibitive for the carriage of only 400,000 tpa.

Thus, rail transport all the way to the mine is considered uneconomic. However, a combination of rail and road is more attractive and is considered in more detail in 3.1.10 below.

3.1.8 Conveyor:

The mine lies only 40 km due west of the nearest point on the existing railway, or 20 km south west of Whyte Hill on an extended railway. The possibilities of conveying these distances were considered. Conveying has high capital costs but relatively low operating costs.

The option of conveying to the existing railway was rejected for two reasons:

- The tonnage is too small for economic conveying over 40 km. Minimum tonnages for such long conveyors are usually around 10,000-20,000 tpd - not 1,200 tpd as envisaged.

- The country between the mine and rail is formidable with numerous gorges and intervening ranges to cross.

The option of conveying to a Whyte Hill rail head requires investigation in more detailed future studies, but again tonnage and terrain may be against it.

3.1.9 Slurry Pipeline:

A slurry pipeline from the mine to Port Latta, duplicating the existing ABM iron ore pipeline, was considered. This would have high capital and low operating costs.

It would require additional crushing, grinding and slurry facilities on the mine site. If the intention was to ship offshore from Port Latta, a de-watering plant would be required at Port Latta to get the product into a form suitable for shipping. If a magnesium refinery was built near Port Latta, such a plant would not be required.

The biggest problem with a pipeline is again the relatively low tonnages to be piped - about an order of magnitude too low.

At this stage, the pipeline option is rejected. However if, in the future, a refinery at Port Latta was a possibility, the option could be reconsidered.

3.1.10 Road-Rail Option:

Transporting 1,200 tpa magnesite along the Savage River-Burnie area road system for a long term project does not have great appeal.

There appear to be logistical advantages to getting it onto rail as early as practicable.

A road-rail option has appeal based on the following scenario:

- Tasrail would refurbish the line from Guildford to Waratah and construct a new line to Whyte Hill
- crushed magnesite would be road hauled 35 km to a loading facility at Whyte Hill

Tasrail would **possibly** absorb the capital cost of the rail provided they could secure a long-term haulage contract of 10+ years. They have provided an indicative cost of transport to Burnie port of $11.60/t. However, this price could be viewed as an "opening-price" for negotiation.

This option has operational appeal for the following reasons:

- gets trucks off much of the busy State Highway system, particularly between Guildford and Burnie
- the rail goes right into the Burnie port shiploading facility

Capital costs:

- would be $7.5M to upgrade and construct road from the mine to Whyte Hill.

  It must be noted that Tasrail may require a capital input into the rail extension. This has not been allowed for in this report.

Operating costs:

- road maintenance: $0.3M = $0.75/t
- road transport: 35 km @ $0.10/t/km = $3.5/t
- rail to Burnie shiploader: $11.60/t
  (Less to a refinery in Ridgley-Guildford area)
- total operating costs to Burnie loader of 400,000 tpa = $15.50-16.00. After negotiation, say $15/t magnesite, or 3.5 cents/lb magnesium metal

Road-rail Transport Summary:

Capital : $7.5M

Operating : $15/t magnesite delivered Burnie
: 3.5 cents/lb magnesium metal

3.1.11 Shipping Costs:

In the event that the magnesium metal refinery was built outside Tasmania, crushed magnesite would be shipped directly from Burnie port.

Shipping costs vary little between domestic or international destinations; ie, it costs about the same to ship to Victoria, as it does to Queensland, as it does to (say) Malaysia.

Shipping costs (bulk) are approximately $20/t plus $4/t stevedoring at each end - total $28/t.

This equates to 6 cents/lb magnesium metal.

3.1.12 Recommendations and Summary:

Principal recommendations are:

(a) if a refinery was to be built in the Ridgley-Highclere area, the magnesite should be transported by combined road-rail

(b) if a refinery was to be built in Port Latta area, a slurry pipeline option from mine to refinery should be investigated in addition to the favoured rail-road option

(c) if raw magnesite was to be shipped from Tasmania, Burnie is the recommended port

(d) if raw magnesite was shipped from Burnie, road transport to Whyte Hill, followed by rail to Burnie shiploader would be recommended

Transport Cost Summary:

Component	Capital	Operating	
		$/t magnesite	cents/lb Mg metal
Road Transport to Burnie	8.5	13	3.0
Road-rail Transport to Burnie	7.5	15	3.5
Shipping Magnesite from Tasmania	-	28	6.0
Total Delivered to Tas Refinery	7.5	15	3.5
Total Delivered to non-Tas Refinery	7.5	43	9.5

5 cm

SHIPPING COSTS TO MAINLAND OR OVERSEAS
$28/t magnesite
6 cents/lb Mg

Possible refinery site

Crest

Road and rail freight to Burnie
(assume no rail capital)
Road upgrade $3.0 M
Freight $15/t magnesite
3.5 cents/lb Mg

Road upgrade $4.0 M
Road freight to Burnie $13/t magnesite
3 cents/lb Mg

Possible rail head extension

Road construction $4.5 M
Power supply $2.0 M
0.6 cents/lb Mg

MINE SITE
Site costs $1.5 M

NEWNHAM EXPLORATION AND MINING SERVICES

GOLDEN TRIANGLE RESOURCES
MAIN CREEK PROJECT
KEY INFRASTRUCTURE FACTORS
INDICATIVE COSTS

	Scale: 1:250000
Drawn: LAN	Date: Jul 98
	Fig 2

479016

8 km new 22 kV transmission line

6 km. Corinna Road reconstructed

Crusher site for Main Creek development

Main Creek Deposits

2 km. new access road from Corinna Road

Crusher site for Bowry Creek development

Bowry Deposits

5 cm

NEWNHAM EXPLORATION AND MINING SERVICES		
GOLDEN TRIANGLE RESOURCES MAIN CREEK PROJECT SAVAGE RIVER - MAIN CREEK INFRASTRUCTURE		
Drawn: LAN	Date: Jul 98	Scale: 1:25,000
		Fig 3

479017

SAVAGE RIVER TO WHYTE HILL
Road requires upgrade and annual maintenance
27 kms

BURNIE PORT OR POSSIBLE REFINERY

EXISTING RAIL

Guildford - Waratah
EXISTING FORMATION
new track required - 15 kms

NEW RAIL EXTENSION
WARATAH - WHYTE HILL
12 kms.

MINE SITE - SAVAGE RIVER
2 kms new road
6 kms road reconstruction

MINE SITE

SUMMARY:

Total road distance : 35 kms.	
Total rail (to Burnie): 85 kms.	
Operating cost (mine - Burnie)	**: $15/t magnesite : 3.5 cents/lb Mg**
Capital (no rail contribution)	**: $7.5 M**

5 cm

NEWNHAM EXPLORATION AND MINING SERVICES

GOLDEN TRIANGLE RESOURCES
MAIN CREEK PROJECT

ROAD - RAIL FREIGHT OPTION

		Scale: 1: 100 000
Drawn: LAN	Date: Jul 98	Fig 4.

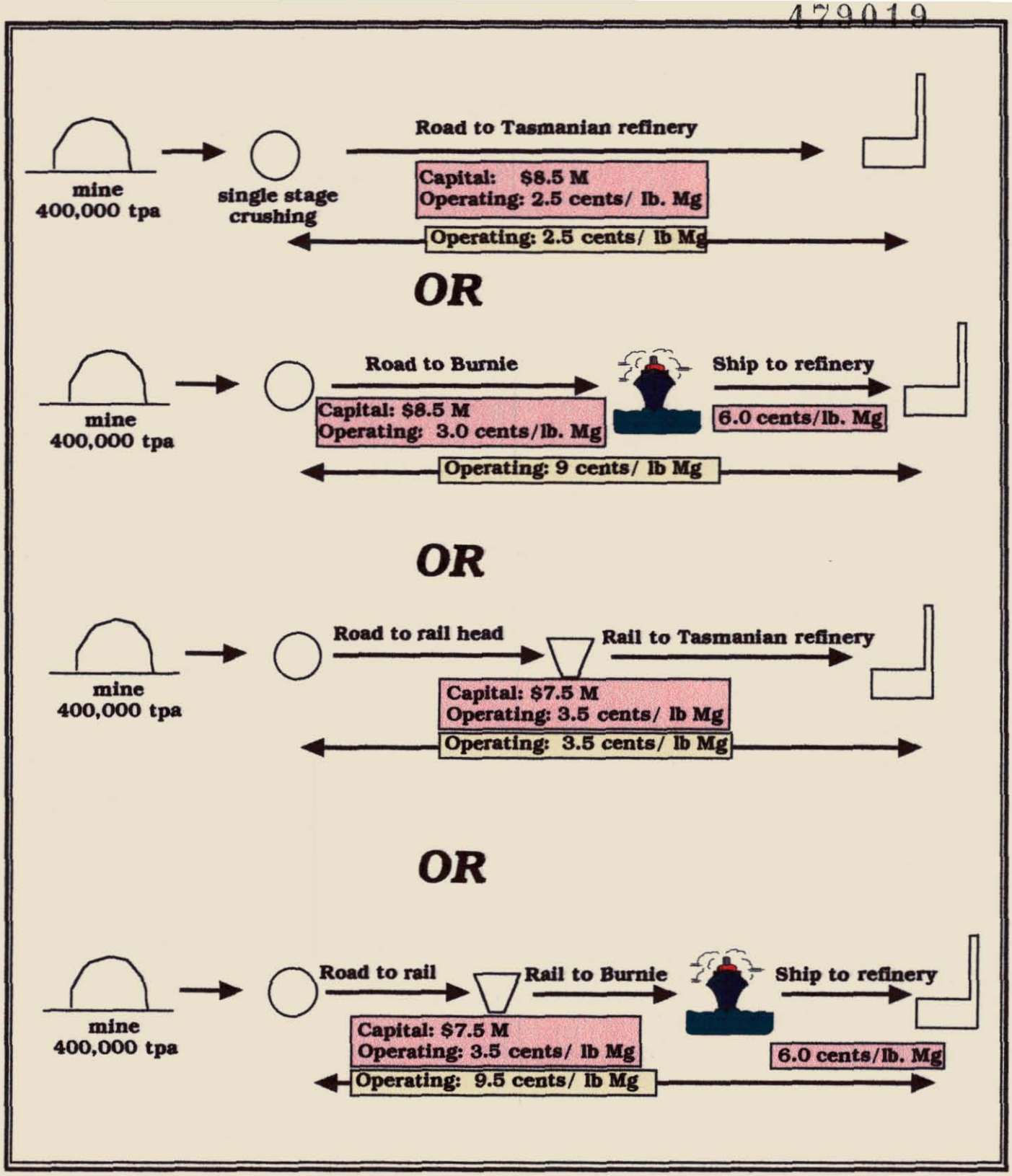


Fig. 5 : MAGNESITE - MINE TO REFINERY

PRINCIPAL TRANSPORT OPTIONS

3.2 SITE DEVELOPMENT

3.2.1 Site Layout:

This section on site development assumes that approximately 400,000 tpa magnesite would be trucked directly from the mine to a crushing facility.

The attached Fig 3 shows the recommended crushing sites as **Site A**, if Bowry Creek was to be mined and **Site B**, if the Main Creek lenses were to be mined.

The haul road from Bowry Creek to Site A would be approximately 400 m at a gradient of 1:10, and relatively inexpensive to construct and maintain.

The haul road from Main Creek to Site B would be approximately 1.5 km at a gradient of 1:10. It would be tortuous, and expensive to construct and maintain.

Once the trucks reached the crushing site, they would ideally dump directly into a single stage crusher which would discharge in large bins for direct loading into trucks over a weighbridge.

A stockpile area would be required for ore which, for various reasons, could not be fed directly into the crusher.

Another stockpile area would be required for any waste products returning from the refinery, for backloading underground as fill.

Most mine back-up facilities would be established on the crusher site.

These would include the following:

- general office (administration, technical)
- laboratory
- change rooms, ablutions, lamp room
- first aid/mine rescue
- crib room
- workshop
- diesel station
- electrical sub-station

- security gate
- car park

Additional but minor roads would be required to the water supply dam/pump and magazines.

The total site area would be approximately two hectares and a generalised schemata is illustrated as Fig 6.

The two sites recommended are relatively flat and vegetated by dense low scrub. This scrub and topsoil would have to be removed and a well drained, solid surface approximately 150 x 100 m prepared. This may require establishing a rock base topped with screenings and rolled.

3.2.2 Site Development Costs:

The "indicative only" estimates below do not include the cost of establishing the crusher and loading bins:

	$'M
Site clearing, surfacing	0.3
Office, change room, ablutions, crib	0.3
First aid, mine rescue, fire	0.2
Laboratory	0.2
Workshop	0.3
	$1.3M

3.2.3 Crushing, Loading:

There are essentially two options to crushing and loading:

- Company provides crushing and loading facilities, and an operator loading contract trucks
- the whole crushing, loading and trucking operation be provided, maintained and operated by a single contractor

The style of operation envisaged provides for ore to be fed directly by mine trucks into a continuously operated single pass hammer or impact mill which would reduce the magnesite to approximately 40 mm. The crushed magnesite would be fed by conveyor into two large storage bins with bottom discharge directly into trucks standing on a weighbridge.

This is a very conventional style of quarry operation and well within the capability of several competent operators in Tasmania.

For the purposes of this report, it is assumed that the complete crushing and loading exercise would be run by contractor.

The contractor would provide a single stage crusher with a capacity of approximately 300 tph, powered by a 415V or 3.3 kV motor. Such a crusher significantly exceeds a continuous 24 hr/day operation requirement of approximately 50 tph, but would allow for the crusher to continuously operate, say, 1-2 shifts/day, six days/week, which may be a more efficient way to operate.

The contractor would also provide loading bins, and a front end loader for both feeding any stockpiled magnesite to the crusher and backloading the mine trucks with any waste mine fill.

The Company would provide all power and services to this facility.

Indicative costs from one local contractor for such an operation are $2.00-$2.50/t.

If the Company was to supply, erect and maintain the crushing and loading facilities and a contractor only supply trucks, the estimated capital cost would be $2M (including front end loader) and operating costs of aproximately $1/t (excluding power).

3.2.4 Site Water Management

Water management requires supply of adequate water to the site buildings and crusher, and disposal of waste water.

Water quality should be potable to cover drinking, ablutions, workshop, crusher and fire fighting requirements.

The most likely scheme would be a small weir on a nearby creek; eg, Bowry Creek, pump, head tanks and reticulation piping. The scheme **may** also be required to supply the mine.

Waste water disposal would be sewage to septic tanks and gray water to settling ponds.

Approximate capital costs would be:

	$'M
Weir	0.03
Pump	0.01
Head tanks	0.05
Septic system	0.01
	$0.1M

3.2.6 Communications:

The mine and site facilities would require high quality voice and data transmission facilities.

An exchange still exists at Savage River township and the most reliable and cost effective supply would be a land line from this exchange to the site with an extension to the mine and leaky feeder communications underground.

The cost of supplying such land lines is today subject to negotiations with the provider. It may be possible to secure a long-term usage contract which requires no capital outlay. However, an allowance of **$0.05M** is provided for.

3.2.7 Diesel Fuel:

Diesel will be required for both the mine and the crushing site. The actual tank would be provided by the fuel supplier. The Company would be responsible for providing a bunded facility and this is provided for in site development.

3.2.8 Site Costs Summary:

Item	Capital ($'M)
Site Development	1.3
Crushing, Loading	Nil if contract ($2 M if Company built)
Water Management	0.1
Communications	0.05
Contingency	0.05
Total (contract crushing)	1.5
Total (Company crushing)	3.5

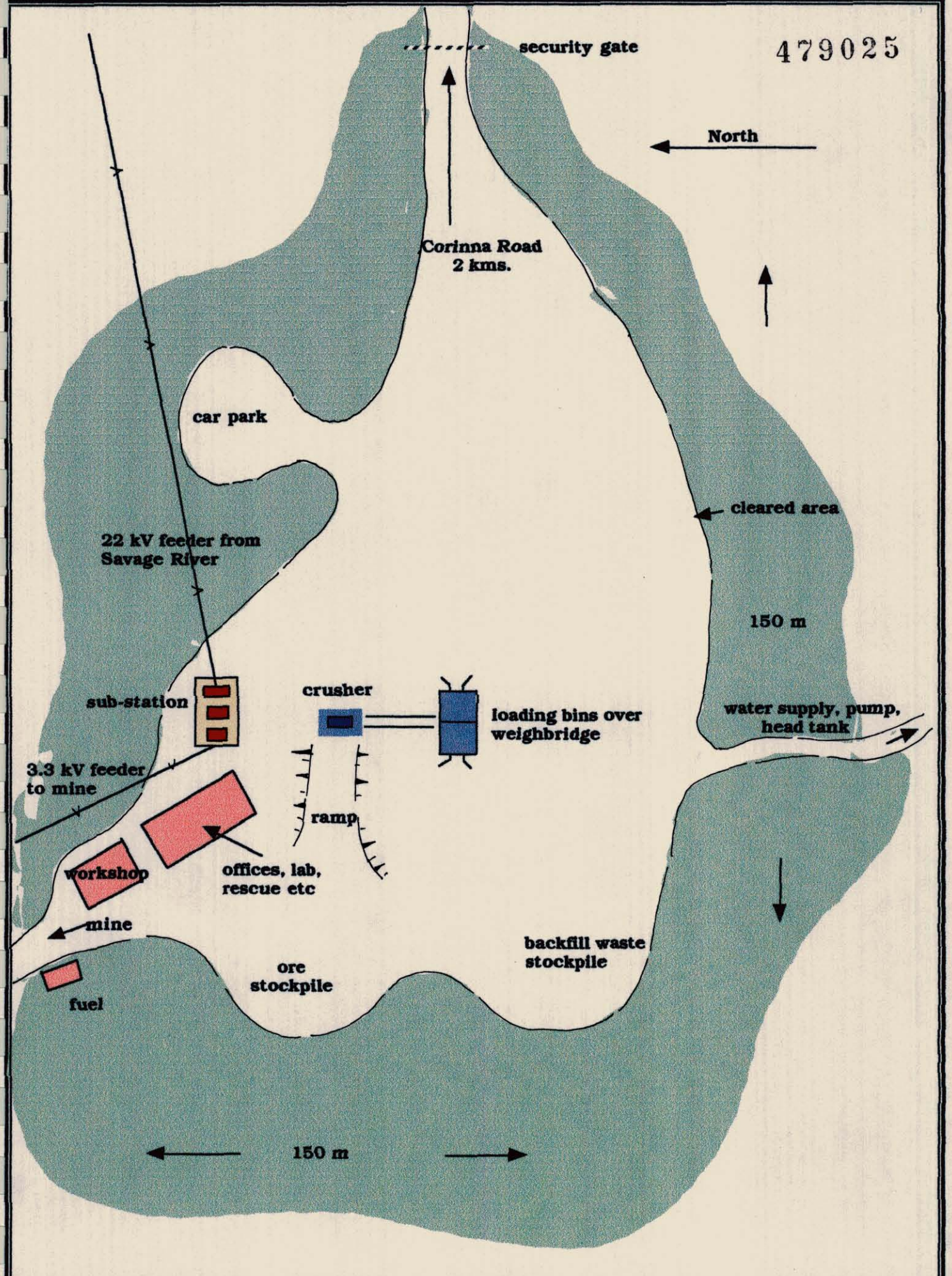


Fig. 6 : SCHEMATIC SITE LAYOUT

3.3 ELECTRIC POWER

3.3.1 Demand:

Power demand has been estimated on the basis of the following project:

- a 400,000 tpa ***underground mine***, delivering ore directly to a single stage crushing operation which would automatically load trucks for transport off site

On this basis, demand can be estimated with reference to three areas:

- mine
- crushing
- site general

Mine Demand:

-	jumbos:	400 kW
-	fans:	200 kW
-	pumps:	200 kW
-	lighting general:	200 kW
-	other:	500 kW

1.5 MW

Crushing:

Single stage 500 kVA crusher, together with ancilliary items such as loading hoppers, lighting, etc

1.0 MW

Site General:

-	offices, change rooms, mine rescue, ablutions	150 kW
-	laboratory	100 kW

-	workshop	200 kW
-	water supply pump	50 kW
		0.5 MW

Power Demand Summary:

mine	1.5 kW
crushing	1.0 kW
site	0.5 kW
TOTAL	3.0 MW

This is considered to be a maximum demand figure. If a smaller tonnage was mined, or if mining was by open-cut, then power usage would be lowered.

However, it is considered prudent to work on the high side rather than the low side to avoid the costs of unexpected requirements; eg, a substantial increase in underground pumping.

3.3.2 Supply and Reticulation: (see Fig 7)

Power to the site would be effected by **Aurora** which is the energy utility responsible for providing power to customers from the State Grid which, in turn, is controlled by **Transend.**

Aurora would construct a dedicated 8 km long 22 kV line from the Savage River substation which is currently supplied by a 110 kV single radial line within the State Grid.

To ensure continuous supply, a new dedicated standby transformer would have to be installed in the Savage River substation. This is not a necessity but is recommended for a long-term operation because, if the existing transformer failed, repair/replacement times can be substantial.

The 22 kV line would terminate in a site substation where transformers would be installed to deliver power to the crusher, the mine and the general site.

For the purposes of this exercise, it could be assumed that 3.3 kV power would be delivered to the mine and the crusher. Thus, the site substation would require three transformers for 3.3 kV, 415 V and 240 V distribution. A separate underground substation would be required with possibly three transformers - 1 kV, 415 V, 240 V.

The general reticulation scheme is shown on Fig 7 .

3.3.3 Cost Estimates:

Costs can be grouped into:

- capital off-site
- capital on-site
- operating

Capital off-site costs (indicative figures only) provided by Aurora are:

	$'M
- Savage River Substation (transformer, circuit breaker)	0.9
- 22 kV x 10 km transmission line (most likely 8 km)	0.35
- site substation (22 kV/415 V transformer)	0.25
Total	**$1.5M**

Capital on-site costs (indicative costs only, dependent on distances and equipment sourced):

- main sub-station, additional transformers	0.2
- mine substation and transformers	0.2
- reticulation, cable, trays, etc	0.1
Total	**$0.5M**

Operating costs consist of a combination of peak demand and energy rates.

On a straightforward operation such as this, it should be possible to minimise peak demand by start-up scheduling. For a 3 MW operation, mining and crushing 400,000 tpa, peak demand charges may be in the range $0.2-$0.3/t. The energy rate of $0.0566/kWh translates to about $2.70/t mined ore.

Power Summary:

Off-site capital		**$1.5M**
On-site capital		**$0.5M**
Total capital		**$2.0M**
Operating	**$/t magnesite**	**$2.5-3.0**
	c/lb magnesium	**0.6**

3.3.4 Power Issues:

No significant issues or problems were identified with respect to provision of power.

If, for some planning reason, demand beyond about 5 MW was required, Transend may be required to upgrade the Savager River feeder and substation.

Negotiations with government may reduce off-site capital and operating costs. Such negotiations would benefit from a decision to down stream process the magnesite in Tasmania.

On site capital costs would be affected by sourcing used, rather than new, transformers.

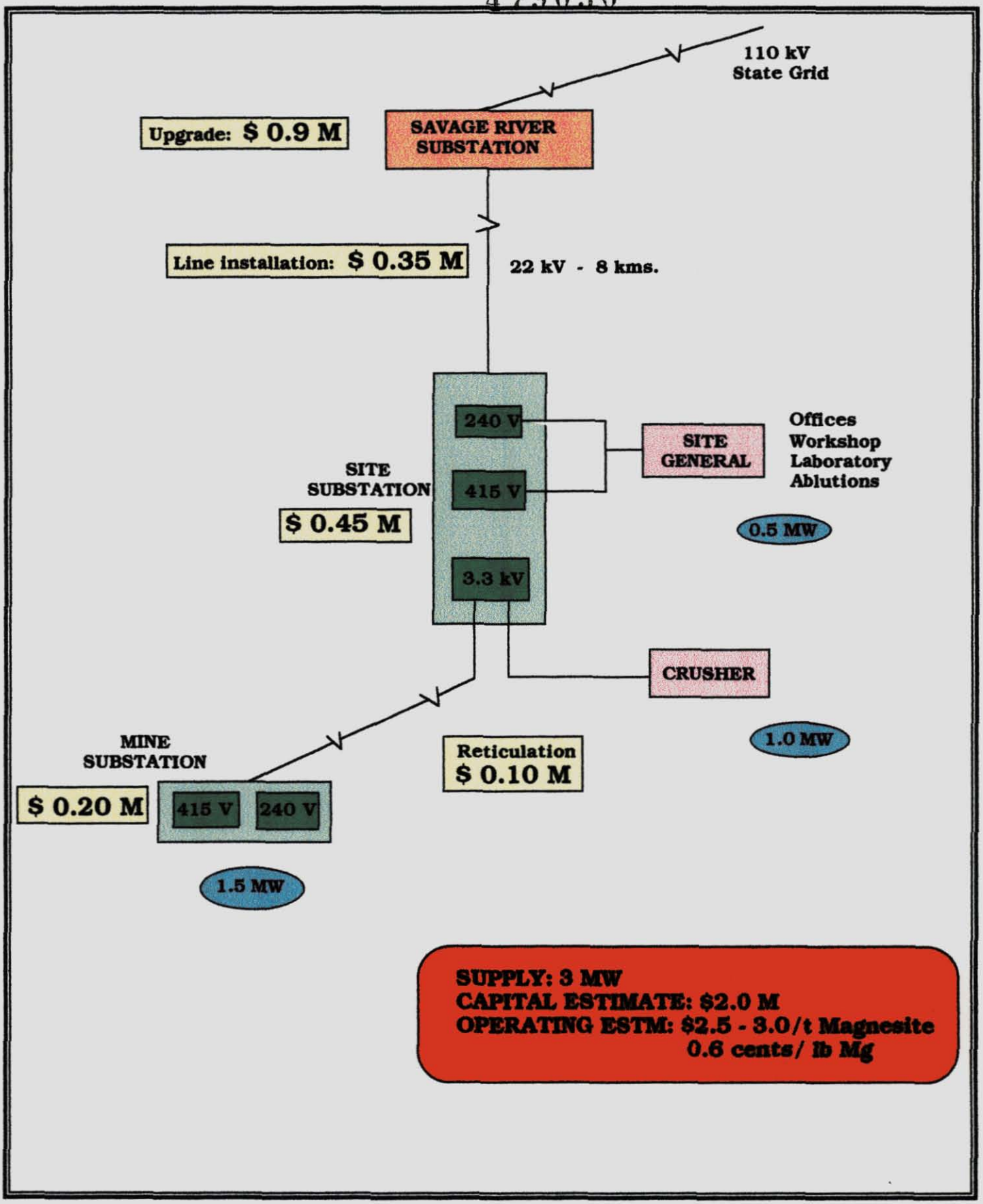


Fig. 7: MINE SITE POWER SUPPLY

4. COSTS AND ISSUES SUMMARY

No insurmountable or substantial infrastructure issues were identified in the proposed operation of a magnesite mine at Main Creek.

The principal issues revolve around the destination of the ex-mine magnesite.

If the refinery were to be built in Tasmania, the magnesite could be delivered to the refinery by a combined road-rail route at an ex-mine cost of A4.6 cents/lb magnesium metal.

If the magnesite was to be delivered to a refinery outside Tasmania, the ex-mine cost would be A10.6 cents/lb magnesium metal.

This additional A6 cents/lb magnesium metal would have to be weighed against capital and operation cost benefits of building/supplying a refinery outside Tasmania.

The infrastructure capital cost is relatively low at approximately $11M.

This capital estimate assumes:

- contract crushing and loading
- Tasrail laying approximately 30 km of new track at their expense
- the Company bearing most of the road development and upgrade costs

A more detailed financial analysis may show that, for a long-term project, the Company could achieve lower operating costs by, firstly, constructing and operating the crushing/loading facility and, secondly, contributing to the rail extension. Combined, these two items could increase capital to approximately $20M, and possibly lower operating costs by around A0.5 cents/lb magnesium metal.

Substantial advantages are perceived in getting the magnesite off the road system and onto rail as early as possible.

The above capital and operating estimates assume no Government assistance. If the refinery was built in Tasmania, Government assistance would probably be negotiable in the form of:

- road works (capital and maintenance)

- power (energy) charges
- royalty relief

All other infrastructure costs are independent of Government. If the refinery was built outside Tasmania, little Government support could be anticipated.

Following is a summary of the ex-mine infrastructure cost estimates detailed in this report based on the following assumption:

- 400,000 tpa magnesite mined
- 400,000 tpa single pass crushing and loading onto trucks, all by contractor
- road transport to Whyte Hill then rail transport to refinery in Tasmania
- if refinery destination outside Tasmania, magnesite would be railed to Burnie port and direct shipped to the refinery

Item	Capital $'M	Operating	
		$'/tonne magnesite	A cents/lb magnesium metal
Road-rail Transport to Refinery near Burnie	**7.5**	**15.00**	**3.5**
Mine-site Development	**1.5**	**-**	**-**
Mine-site Crushing and Loading	**-**	**2.50**	**0.5**
Electric Power to Mine-site	**2.0**	**3.00**	**0.6**
TOTAL	**11.0**	**20.50**	**4.6**
Freight to Non-Tasmanian Refinery	**-**	**28.00**	**6.0**
TOTAL	**11.0**	**28.00**	**10.6**

APPENDIX A

CONTACTS LIST

CONTACTS LIST

Major Projects Tasmania:

Brian McBride
Gary Swain

Ph: (03) 6233 5872
Fax: (03) 6233 5711
Post: 10th Floor, 22 Elizabeth Street, Hobart, Tas, 7000

Road - Government:

John Pauley
Director, Land Transport Planning Branch
Department of Transport

Ph: (03) 6233 2461
Fax: (03) 6233 4978
Post: GPO Box 936J, Hobart, Tas, 7001

Road - Private:

Brambles:

Tony Rowsthorn
State Manager

Ph: (03) 6431 3677
Fax: (03) 6431 8156
Post: Box 580, Burnie, Tas, 7320

Michael Beswick:
North-West Manager

Ph: (03) 6431 3844
Fax: (03) 6431 8063
Post: Box 580, Burnie, Tas, 7320

Ian Smith
Quarry Manager

Bonney-Fox:

Byron Bonney
Managing Director

Ph: (03) 6344 7344
Fax: (03) 6343 1604
Post: Box 357, Prospect, Tas, 7250

Rail:

Tasrail:

Michael Ward
Marketing Manager

Ph: (03) 6337 2210
Fax: (03) 6337 2219
Post: Box 140, Newstead, Tas, 7250

Robert Evetts
Manager

Power:

Aurora:

Tony Warnock
General Manager,
Business Development

Ph: (03) 6230 5834

Bruce Holland
Group Manager
Business Development

Ph: (03) 6230 5468
Fax: (03) 6231 1017
Post: GPO Box 355D, Hobart, Tas, 7001

Transend:

Dennis Crawford
Senior Engineer

Ph: (03) 6230 5858
Fax: (03) 6231 2172
Post: GPO Box 1801, Hobart, 7001

Project Engineering:

Dennis Bewsher
Principal Engineer
SEMF Holdings

Ph: (03) 6231 1211
Fax: (03) 6234 8709
Post: 45 Murray Street, Hobart, Tas, 7000

Transport Infrastructure General:

Warwick Counsel
Tasmanian Transport Association

Ph: (03) 6257 5256
Mob: 0419 361 269

APPENDIX B

INDICATIVE POWER COSTS

479038

Aurora ENERGY

Friday, 17 July 1998

Mr Lindsay Newnham
Newnham Exploration and Mining Services
P O Box 132
Riverside
TAS, 7250

Dear Lindsay,

Further to our meeting in Hobart 10 July 1998, I am pleased to provide indicative capital and cost of supply estimates, on a non binding basis for the provision of an electricity supply to the proposed Golden Triangle magnesite mine site near Savage River.

The site would be supplied from the Savage River (SR) Substation which in turn is supplied via a single radial 110 kV transmission line.

Approximate Capital Costs ($98);

New Transformer at SR Substation (if required)		$ 800,000 *
10 km of 22kV overhead line from SR Substation to mine site		$ 350,000
3MVA 22kV/415V substation at mine site		$ 250,000
Feeder circuit breaker and associated works at SR substation (if required)		$ 100,000 *
	TOTAL	$1,500,000

* Expenditure is dependent upon the nature and size of expected load

The following are the indicative ongoing supply costs in 1998 dollars.

Rates and Charges

High Voltage Demand

Services Charge	137.9 c/day
Meter Charge	38.1 c/day

Aurora Energy Pty Ltd
4 Elizabeth Street
GPO Box 191
Hobart Tasmania 7001
Telephone: 03 6237 3400
Facsimile: 03 6230 5520
ACN 082 464 622

479039

Aurora ENERGY

Peak Demand Charge	
First 250 kVA p.a	$128.58/kW
Next 250 kVA p.a	$107.75/kW
Next 500 kVA p.a	$ 81.69/kW
Next 500kVA p.a	$ 62.60/kW
Remaining kVA p.a	$ 62.60/kW
Energy Rate	
All kWh	5.66 c/kWh

Please keep in mind that the prices for capital are indicative only. If the project was to proceed to full feasibility, we would need to review the pricing.

If I can provide anything further, please don't hesitate to call.

Yours sincerely

B. Holland

Bruce Holland
Group Manager
Business Development

Aurora Energy Pty Ltd
4 Elizabeth Street
GPO Box 191
Hobart Tasmania 7001
Telephone: 03 6237 3400
Facsimile: 03 6230 5520
ACN 082 464 622

APPENDIX C

INDICATIVE RAIL COSTS

479041

Tasrail

ACN 078 295 468
Australian Transport Network

PO Box 140
35 Hoblers Bridge Road
Newstead Tasmania 7250
Australia
Tel: 61 3 6337 2210
Fax: 61 3 6337 2219
E-Mail:mwar1@tasrail.com.au

Facsimile Cover Sheet

Attention

Lindsay Newnham
Company

Golden Triangle
Facsimile

6394 3435
From

MICHAEL WARD

Date 24 July 1998 **Total Pages** ONE

Reference: INDICATIVE FREIGHT RATE WARATAH - BURNIE

We have had to make some assumptions to arrive at a figure excluding capital cost of relaying/extending the track. Our estimate is $11-50 for railage, storage and loading over the Burnie port shiploader. I have not included the cost to cart from the mine and load into wagons as we have not yet received those prices from Bonney Fox. Would expect to have them Monday and will revert when they are to hand.

Regards