

**KING ISLAND PROJECT**  
**RETENTION LICENCE 2 / 1998**

**ANNUAL REPORT**  
**2006**

*Prepared For:*

**Australian Tungsten Pty Limited**  
**Level 9, 1 York Street**  
**Sydney NSW 2000**

**10 November 2006**



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**NOTE: GEODETIC DATUM USED IN  
THIS REPORT IS GDA 94  
FOR REGIONAL DRAWINGS  
AND ISG FOR LOCAL  
DRAWINGS**

## 1. SUMMARY

Retention Licence 2/1998 was granted over the identified resources remaining at the Dolphin open-cut and underground mines near Grassy.

The strategy was to assess the potential of these resources to support a new open-cut operation delivering ore to an adjacent processing plant to produce scheelite concentrates for export.

The resources existed both as extensions of bodies mined in the former Dolphin open-cut and as mining remnants and extensions of bodies mined in the Dolphin underground mine.

Integrated evaluation studies of this opportunity commenced on the ground in early 2005, and included:

- resource definition drilling
- resource and reserve estimation
- mine design
- metallurgical test work
- mill and infrastructure design
- tailings dam design
- seawall design
- environmental management
- financial analysis

By February 2006 outcomes from these studies were sufficiently encouraging for the Company to commit to completion of both a Development Program and Environment Management Plan (DPEMP), and Bankable Feasibility Study.

To secure appropriate tenure to the project area, application was lodged on 10 February 2006 for a 560 ha Mining Lease, 1M/2006. This lease fell largely within RL 2/1998 with small peripheral areas within the contiguous ELs 19/2001 and 15/2002, both beneficially held by Australian Tungsten Pty Limited.

With the exclusion of ML 1M/2006, only three small sections of RL 2/1998 remain:

- an off-shore area (2.25 sq km) south of Grassy Harbour

- a 1 sq km area south of the Dolphin open-cut over the former golf course
- a 1 sq km area surrounding the southern, eastern and northern sections of Grassy township.

To date, KIS (ATPL) has spent approximately \$5M on evaluation of the Dolphin deposits. Future work will focus on development on ML 1M/2006, but longer term resource extension opportunities exist on RL 2/1998.

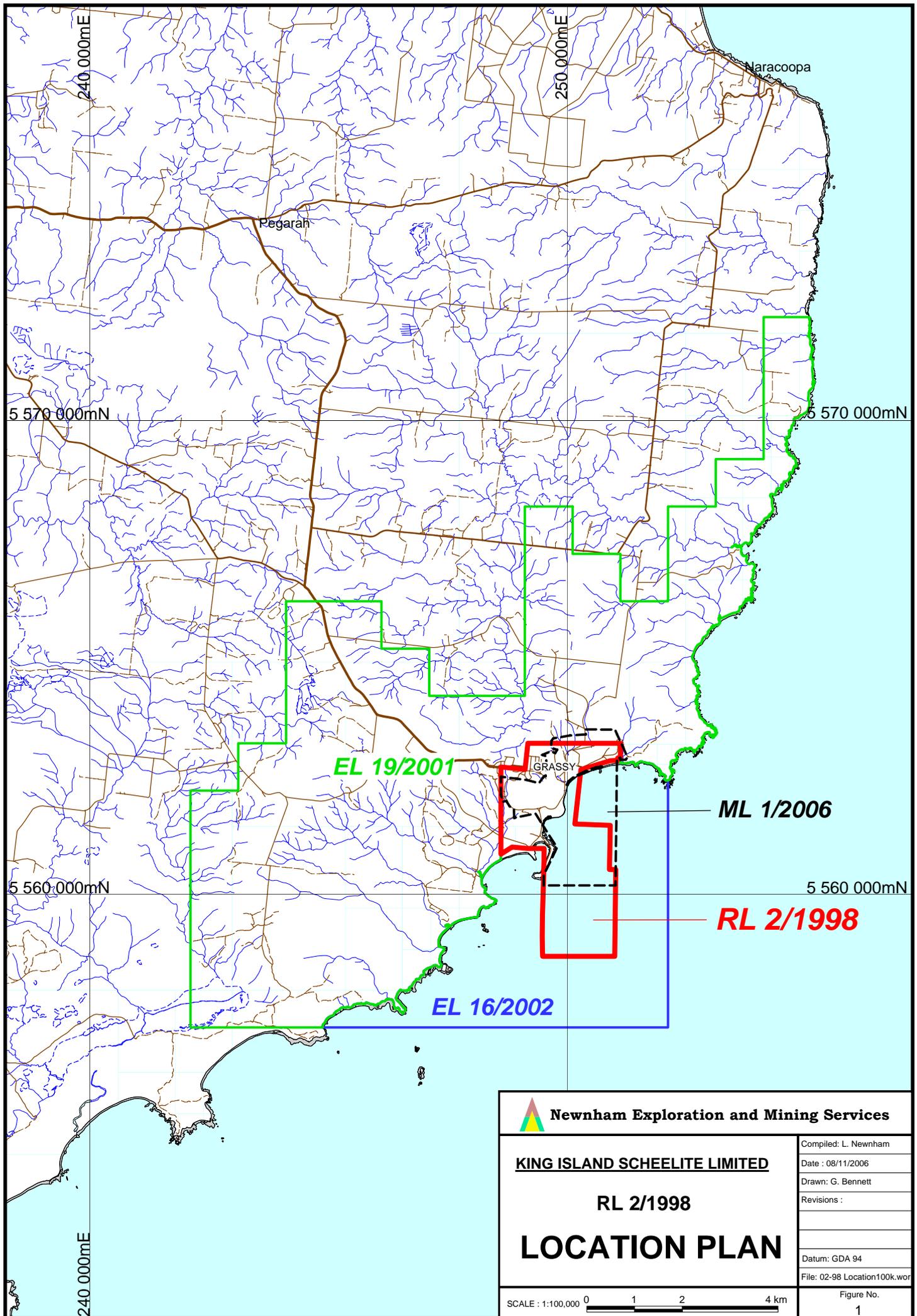
In 2007 it is planned to fly a high resolution aeromagnetic survey over the RL as the first step in the evaluation of this resource extension opportunity.

## **2. TENURE**

With the granting of ML 1M/2006 over most of RL 2/1998, the latter now exists in three (3) discrete sections (Maps 1 & 2).

The southern section is totally off-shore and south of Grassy Harbour.

The western section (over the former golf course) is largely private land and the northern section on the southern, eastern and northern outskirts of Grassy is largely private or local council land.



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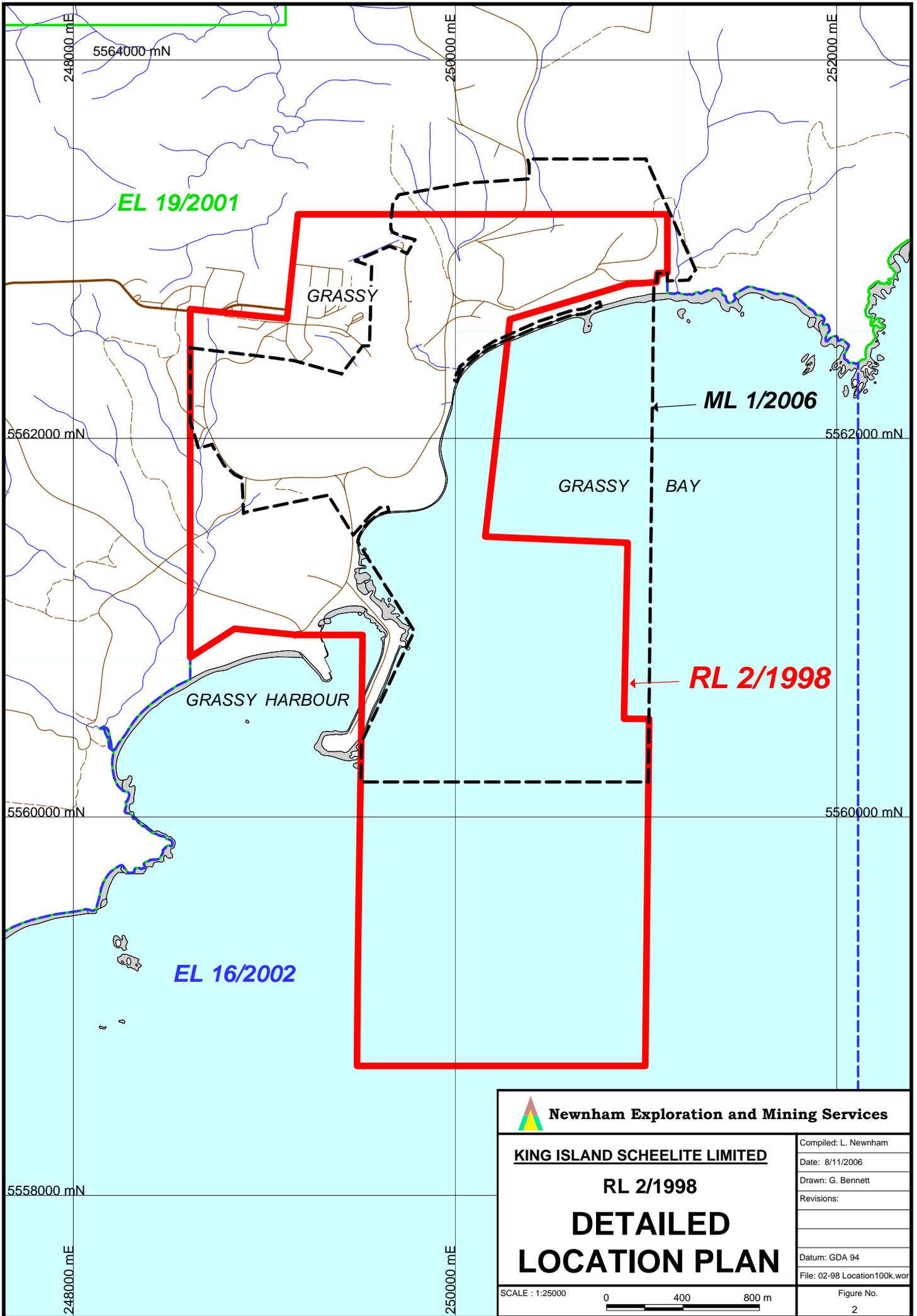
**RL 2/1998**

**LOCATION PLAN**

Compiled: L. Newnham
Date : 08/11/2006
Drawn: G. Bennett
Revisions :
Datum: GDA 94
File: 02-98 Location100k.wor

SCALE : 1:100,000 

Figure No. 1



 <b>Newnham Exploration and Mining Services</b>									
<b>KING ISLAND SCHEELITE LIMITED</b>									
<b>RL 2/1998</b>									
<b>DETAILED LOCATION PLAN</b>									
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Figure No. 2									

### **3. EXPLORATION OBJECTIVES**

The initial exploration objective on RL 2/1998 was to assess the commercial viability of remnant scheelite resources in and around the former underground and open-cut Dolphin mines.

Mining Lease 2/1998 now covers this area and the exploration objective on the remnant RL 2/1998 has shifted to assessing the longer term exploration opportunity to identify additional scheelite resources which could either extend or expand a new operation.

#### **4. WORK COMPLETED 2006**

Approximately \$3.9M was spent during 2006 on the RL area and the replacement ML area applied for in February 2006.

A summary of this work is attached as an appendix to this report.

During the course of this major assessment program, geological studies of available data identified four areas which may contain possible extensions of the Dolphin deposits.

These areas, now contained within the remnant parts of RL 2/1998 are:

- off-shore south of Grassy Harbour where the B and C host rock lenses are projected to extend on the western side of the Grassy River Fault
- south of the Dolphin open-cut where new drilling by KIS indicated the contact between the underlying granite and the Mine Series formations may be further south (beneath dunes) than previously thought
- west of the Dolphin open-cut where existing drilling has inadequately tested opportunities for resource extensions at relatively shallow depths
- north of the Dolphin open-cut and south of the No 3 Fault, in close proximity to Grassy

## **5. WORK PLANNED 2007**

Further work on each of the four resource extension opportunities listed above is described below:

### **Off-shore Area:**

The resource opportunity in this area is deep and (obviously) under water. Future development is only conceivable as an underground mine, developed from within the new open-cut.

To better understand this opportunity, it is proposed to complete a high resolution aeromagnetic survey over the area in early 2007 to better define the granite boundary and peripheral structures.

### **South Dolphin:**

The potential for southern extensions beneath the dunes may be better understood when sand and waste rock excavation work for the new open-cut and sea wall developments commence. No drilling specifically to test this target is planned in 2007.

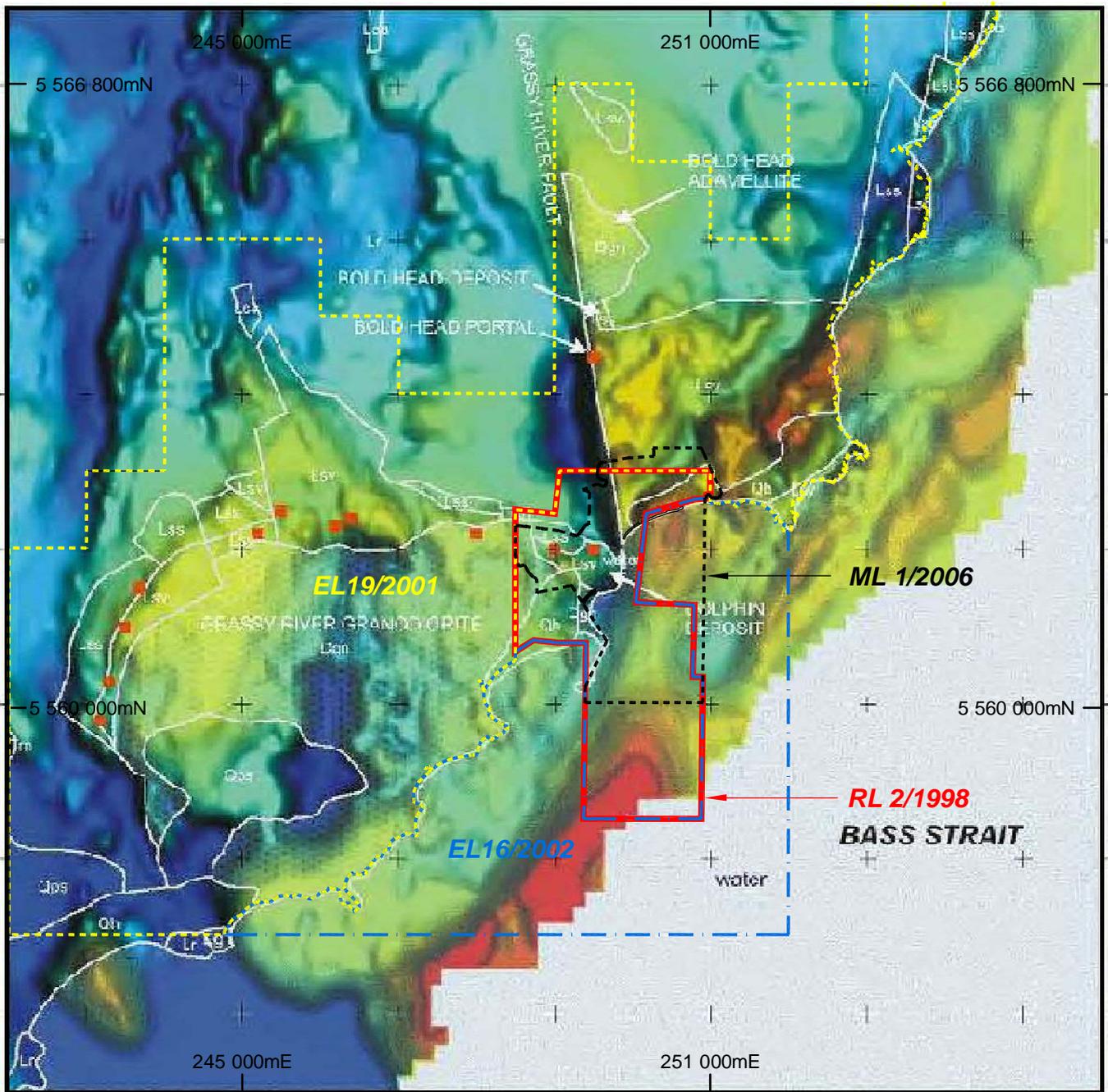
### **Dolphin West:**

A drilling program to test this opportunity is recommended to commence in March 2007. The most likely extensions will be from ML 1M/2006 into EL 19/2001, but there is a more distant possibility that extensions into RL 2/1998 could occur.

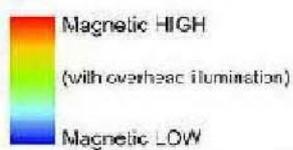
### **North Dolphin:**

No work is planned to assess this opportunity because of close proximity to Grassy.

The above work, principally the airborne survey, is estimated to cost \$150,000, with \$25,000 attributable to RL 2/1998.



**LEGEND**



SCALE APPROX 1:8000

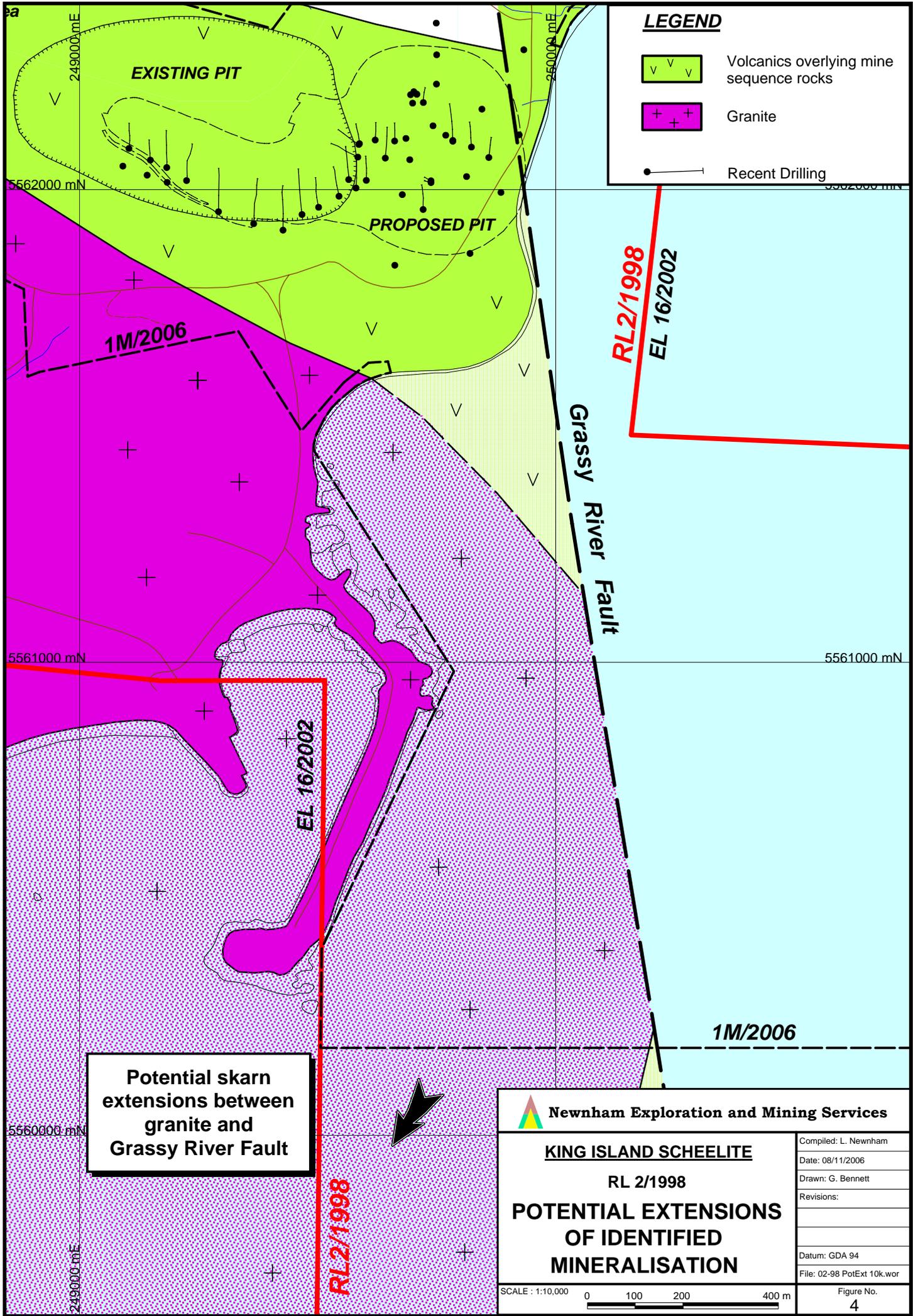
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**KING ISLAND SCHEELITE**  
**AEROMAGNETIC**  
**IMAGE**

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Date : 08/11/06
Drawn : G. Bennett
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File : KI Airmag A4



Figure No.  
3

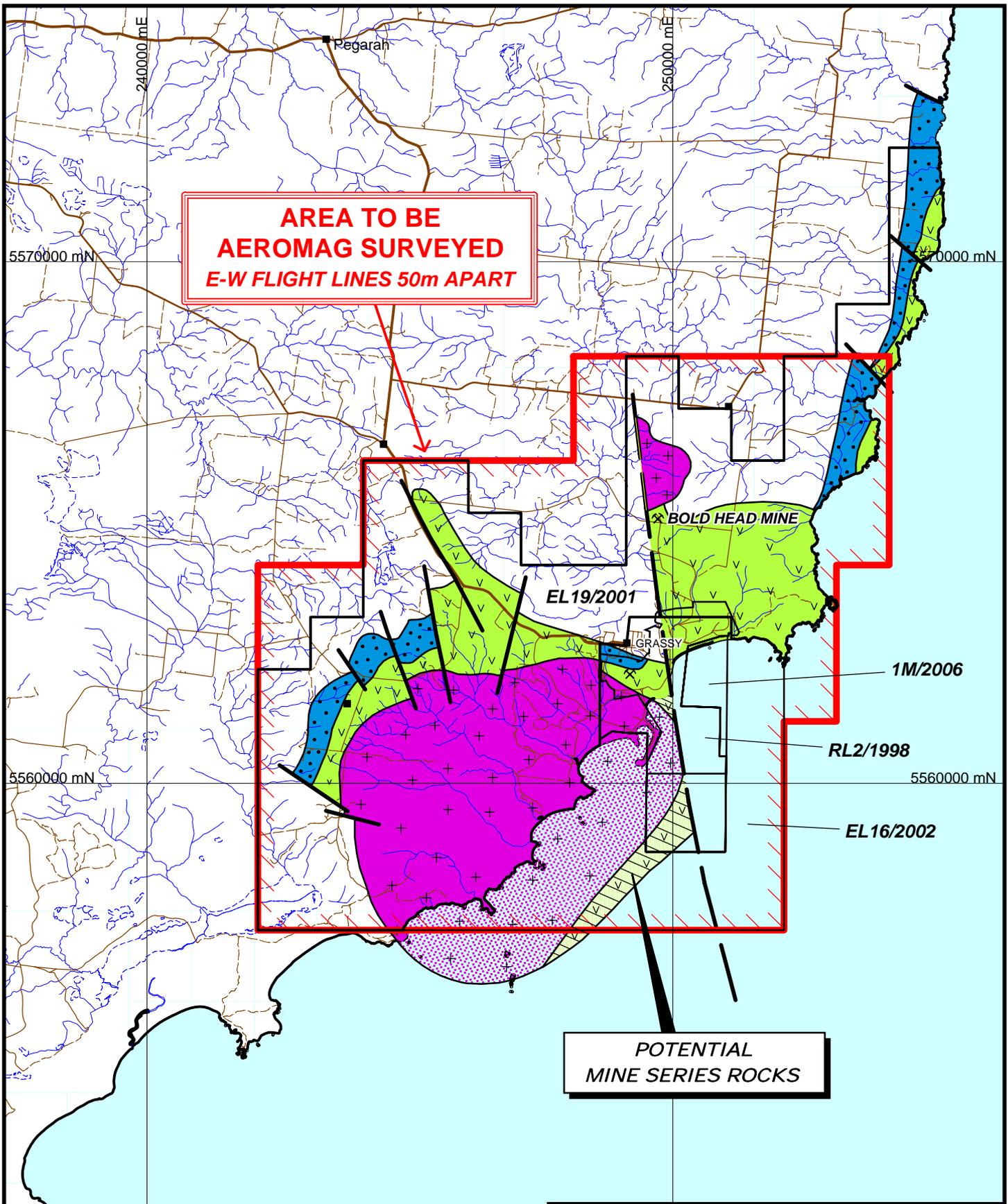


**LEGEND**

- v v v Volcanics overlying mine sequence rocks
- + + + Granite
- Recent Drilling

**Potential skarn extensions between granite and Grassy River Fault**

<b>Newnham Exploration and Mining Services</b>	Compiled: L. Newnham
	Date: 08/11/2006
<b>KING ISLAND SCHEELITE</b> RL 2/1998 <b>POTENTIAL EXTENSIONS OF IDENTIFIED MINERALISATION</b>	Drawn: G. Bennett
	Revisions:
SCALE : 1:10,000 	Datum: GDA 94
	File: 02-98 PotExt 10k.wor
	Figure No. <b>4</b>



**LEGEND**

- Mine Series Rocks
- v v v Upper-Volcanics
  - . . . Calcareous Sediments
  - + + + Carboniferous Granite

Topo base data supplied by the LIST - [www.thelist.tas.gov.au](http://www.thelist.tas.gov.au)

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**KING ISLAND SCHEELITE  
LOCAL GEOLOGY  
SHOWING LOCATION OF  
AEROMAG SURVEY**

SCALE : 1:100,000

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Date: 04/10/2006
Drawn: G. Bennett
REVISIONS :
Datum: GDA94
File: KI AeromagSurvey 1000
Figure No. 5

**APPENDIX**  
**KING ISLAND SCHEELITE -**  
**PROJECT SUMMARY**

**KING ISLAND**  
**SCHEELITE**



**Project**  
**Summary**

**30/10/2006**

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## **PROJECT SUMMARY**

### **1.1 HISTORY OF PROJECT**

Tungsten, in the form of scheelite, was discovered near Grassy on the south-east corner of King Island by a prospector, in 1911. Mining began on a small scale in 1917.

Mining on King Island was entirely by open cut methods until October 1972 when the Bold Head underground mine, located in a satellite orebody roughly three kilometres north of the open cut, entered production. The open cut ceased production in 1974 after 6.46 million tonnes of ore grading 0.53% WO<sub>3</sub> had been extracted. In 1969 KIS (1947 was taken over by Peko-Wallsend.

In 1973, an underground mine portal was constructed near the base of the open cut and the Dolphin underground mine entered production in 1973.

The mine was closed in 1990 due to low prices for Scheelite Concentrates. This was followed by the 2000 take over of North Ltd by Rio Tinto Ltd who instituted the final closure of the mine and dismantling and sale of the original plant and rehabilitated the entire site. The site was protected by a Retention Lease and the plans and documents were filed with Mineral Resources of Tasmania.

Rio Tinto acquired North in 2000 and sold the King Island Retention Lease and associated mining data to Australian Tungsten P/L in 2002 in consideration of a 1.5% Net Smelter Royalty and a small deferred cash payment. ATPL separately applied for and was granted an exploration lease surrounding the RL in 2001. An exploration lease covering the anticipated offshore extensions of the Dolphin orebody was granted in 2002. These three leases cover the known and presumed extensions of the Grassy tungsten occurrences.

In 2002 ATPL was taken over by the current owners, GTN Resources and in 2005 GTN changed its name to King Island Scheelite Ltd (KIS) to reflect the growing importance of the tungsten operation.

In 2004 a Prefeasibility Study was commissioned by King Island Scheelite with promising results and with the increases in price of tungsten concentrate commenced work in mid 2005 on preparing this Feasibility Study for the redevelopment of the mine.

### **1.2 BASIS OF THE FEASIBILITY STUDY**

This study was intended to eventually be a Bankable Feasibility Study and will be advanced to that stage when further optimisation work is completed. In the meantime it is intended to be used for information of potential equity investors and business partners.

Work started with a Prefeasibility Study which was commissioned in 2004 and carried out in accordance with the option Agreement between ATPL and GTN which required GTN to expend up to \$250,000 to complete a Pre-Feasibility Study relating to redevelopment of the King Island Scheelite mine within 6 months. When the PFS was complete, GTN proceeded with the acquisition of APTL and a full Feasibility Study was then begun in mid 2005. The outcome of the Feasibility Study work is presented in this Report.

**KING ISLAND SCHEELITE MINE REDEVELOPMENT FEASIBILITY STUDY**  
**PROJECT SUMMARY UPDATE**

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The work program included:

- a reassessment of the geology and exploration records related to the former operation,
- some limited confirmatory infill drilling,
- reinterpretation of the geology,
- a geostatistical analysis of the mineralisation in each lens,
- preparation of a block model of the orebodies,
- preparation of a JORC compliant resource statement ,
- preparation of a mining plan based on the resources resulting in a series of Whittle optimized pit shells,
- developing mine operating costs for the selected pit used for the mine plan,
- developing a mine waste disposal plan incorporating suitable cut off wall structure to prevent inflow from the areas where the pit will extend out into Grassy Bay,
- preparation of a JORC compliant Mining Reserve statement,
- carrying out metallurgical testwork on the ores with modern equipment and reagents for a gravity/flotation plant similar in concept to the original KIS plant,
- designing and costing a suitable flow sheet based on the work done to date and reasonable assumptions as to the final parameters for gravity and flotation circuits,
- locating, investigating, and designing a suitable storage facility for the tailings from the mill operations,
- Assessing the infrastructure requirements – power; fuel supply; housing and accommodation; and port facilities,
- Carrying out detailed environment and other investigation studies required for the Development Plan and Environmental Management Plan (DPEMP) required by Mineral Resources of Tasmania (MRT ) and the King Island Council to obtain approval to operate the mine,
- Preparing and filing the applications for dewatering of the pit in advance of mining,
- Filing the applications for approval of development of the project and the application for a Mining License to operate the mine, and
- Development of marketing information and pricing of scheelite concentrates.

This Project Summary has been prepared to reflect developments since the initial draft feasibility work was completed on 31 July, 2006. Subsequent to the completion of this Downside Feasibility study King Island Scheelite has completed a further program of work to optimise the project. A total of four additional cases were prepared as shown in Table 1 below

**Table 1. Selected Optimisation Cases**

	BASE CASE Case 0	EXPANDED CASE Case 2
Final Pit	Cut Back 2	Cut Back 5
Max. Mining Rate (M bcm pa)	1.9	3.5
Selective Mining	86%	86%
Call Factor	0	5%

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The **Base Case** has been prepared on the same basis as the Downside case but with provision for the potential benefits of Selective Mining applied resulting from the knowledge that within the ore envelopes for B and C lenses there are sections of waste that may be mined separately and therefore excluded from the Mill feed. This results in higher grades fed to the mill with consequent reduction in cost per Mtu of WO<sub>3</sub> produced. This case also falls within the provisions of KIS's current licence application.

The **Expanded Case** has been prepared to examine the possible overall resource potential. It assumes that mining will proceed to a depth of RL-245 in the pit, that selective mining will be used and also includes a 5% Call Factor reflection possible additional; ores from areas outside the current orebody outlines. This case shows the full upside potential of the Dolphin Pit operation but it should be considered speculative since further studies will be required to confirm engineering and geotechnical conditions relative to the stability of the pit walls at the greater depth and also the feasibility of construction a longer and deeper cut off wall required by the greater area of this pit and particularly the extensions eastward under Grassy Bay.

Figure 1. below shows the proposed site layout for the mine area.

**Figure 1. Site Location and Layout**



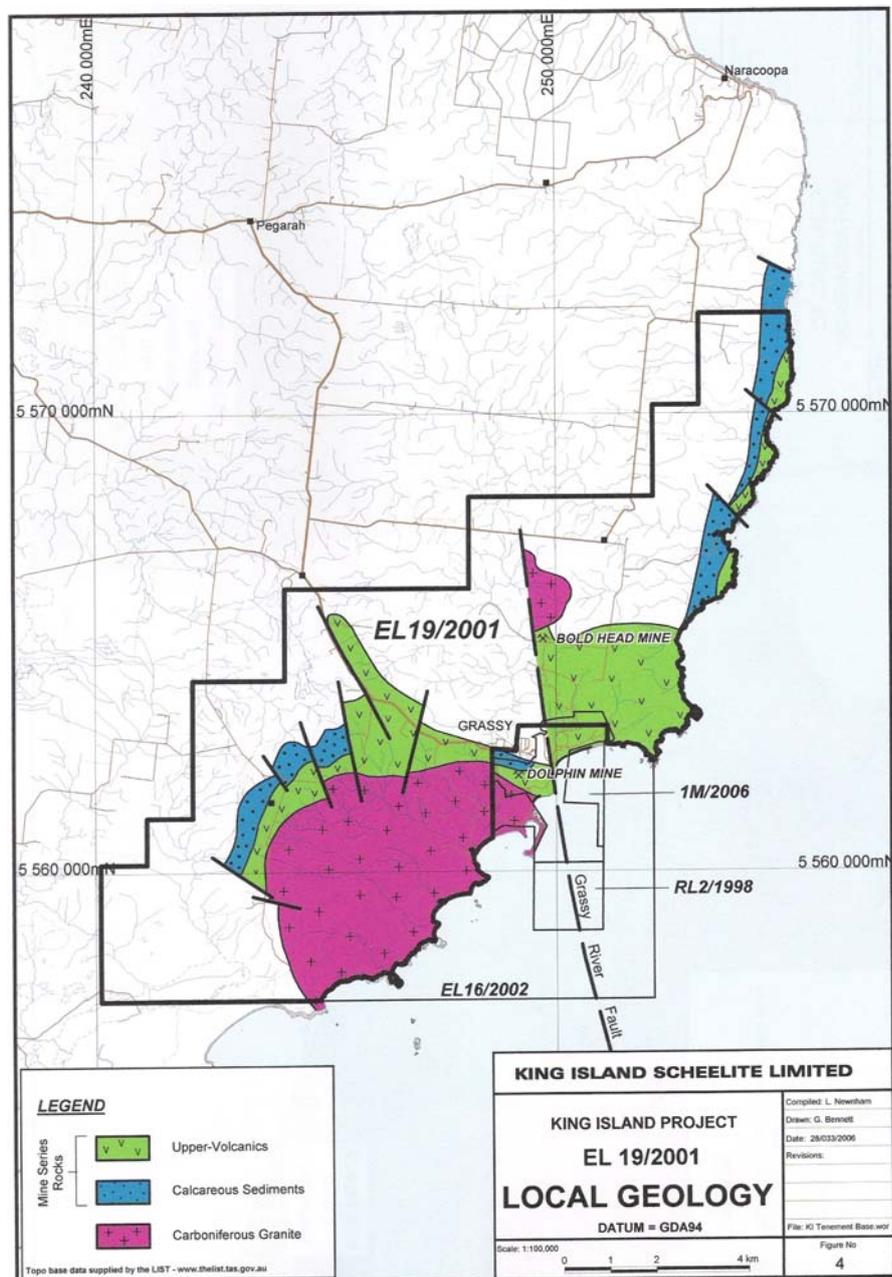
### **1.3 LAND HOLDINGS AND TENEMENTS**

Tenements held by KIS Include

- Exploration Leases                    EL19/2001  
    EL 16/2002
  
- Retention Lease                        RL2/1998
  
- Mining Licence                         1M/2006  
    (under application)

Figure 2. below shows the tenements accompanied by the relevant geological information associated with the mineralisation

**Figure 2. Relevant Geology and Tenements**



## **1.4      GEOLOGY AND RESOURCES**

Most of King Island is underlain by thick (13,000 + m) sequences of variably metamorphosed Proterozoic marine sediments, principally sandstones, siltstones and mudstones.

In the western section of the island, the sequences have undergone metamorphism and several phases of deformation. They are overlain to the east by less deformed pelitic sediments, and intruded by Proterozoic granites approximately 760 million years old.

The Proterozoic sequences are overlain by widespread Neoproterozoic-lower Cambrian shallow marine sediments, known as the Grassy Group, consisting of dolomitic siltstones, carbonates, sandstones, mudstones, shales and tillite. This group, which may correlate with the Success Creek Group elsewhere in Tasmania, is approximately 200 m thick and hosts the King Island scheelite deposits.

The King Island scheelite mine area is underlain by the economically important 200 m thick sequence of NeoProterozoic-Lower Cambrian sediments known as the Grassy Group (Mine Series).

The Grassy Group is underlain by a sequence of quartzites and sandstones ('footwall Quartzites') of indeterminate thickness, and overlain by a thick sequence of mafic volcanic rocks (Upper Volcanics). These formations were intruded in the Lower Carboniferous period by a granite, resulting in their extensive metamorphism and metasomatism.

Metasomatism associated with the granite intrusion converted the original Grassy group sediments into a series of fine grained biotite-actinolite hornfels, various biotite-garnet-pyroxene skarns, marbles and banded shale-skarn rocks.

The post-metasomatism stratigraphy of the mine series rocks is described in descending order as:

10-20 m:      biotite-actinolite hornfels

10-30 m:      B-Lens: biotite-pyroxene-garnet-marble skarn, minor pyrite,  
low-moderate grade scheelite.

5-50 m:      biotite-actinolite hornfels

10-50 m:      C-Lens: a thick skarn sequence with lenses of biotite hornfels (see further  
comment below), low-high grade scheelite

20-60 m:      banded footwall beds: interbedded biotite-actinolite hornfels, pyroxene,  
and pyroxene garnet skarns and minor marble

5-10 m:      lower volcanics: altered metavolcanics

An important feature of the mine series is the gradational nature of the contacts, with minor thin skarn units present in the biotite hornfels units above, below and between the major B- and C-Lens skarns.

Intrusion of the granite is interpreted as a rather rapid and violent event. The granite outcrops just north of the Port of Grassy and dips gently north beneath the mine. In the eastern section of the mine, it truncates the Mine Series rocks approximately 300 m

beneath surface. In the western section it reportedly truncates the mine series close to surface. Numerous granitic dikes cut the mine series. They vary in width, orientation and composition but all have very sharp margins.

Tectonism accompanied the intrusion of the granite. Abundant faulting accompanied the granite intrusion and accompanying arching of the sediments

The structural picture is dominated by the east-west North Boundary Fault which terminates the skarn hosts to the north, the No 3 Fault which may be a fault-displaced extension of the North Boundary Fault, and the Swan, Central and Decline Faults which internally disrupt the skarn deposits. The Wedge Fault is a north-west trending, south-west dipping reverse fault, possibly formed by dilation during cooling of the granite. The regional NNW trending Grassy River Fault terminates the skarns to the east but may have been a long-lived structure which predated granite intrusion. The mine area is affected by abundant smaller scale faulting (2-10 m)

The scheelite deposits at Grassy are tungsten skarn deposits formed by the intrusion of the granodiorite into a sequence of dolomites, limestones and calcareous shales and siltstones. Mineralising fluids within the granite escaped along pre-existing faults and fractures and metasomatically altered and replaced calcareous members of this sequence, resulting in the formation of andradite-grossularite-diopside skarns carrying variable amounts of scheelite, molybdenite and pyrite-pyrrhotite mineralisation.

The scheelite contains variable amounts of molybdenum, in the partial replacement series towards powellite and is evidenced by color variations in short wave ultraviolet light.

Scheelite distribution is erratic but is focused in the B-Lens and C-Lens skarns with lesser amounts in minor skarned carbonate beds in the hornfelsed pelitic sediments. The better scheelite grades typically occur in the calcareous garnet-diopside skarns.

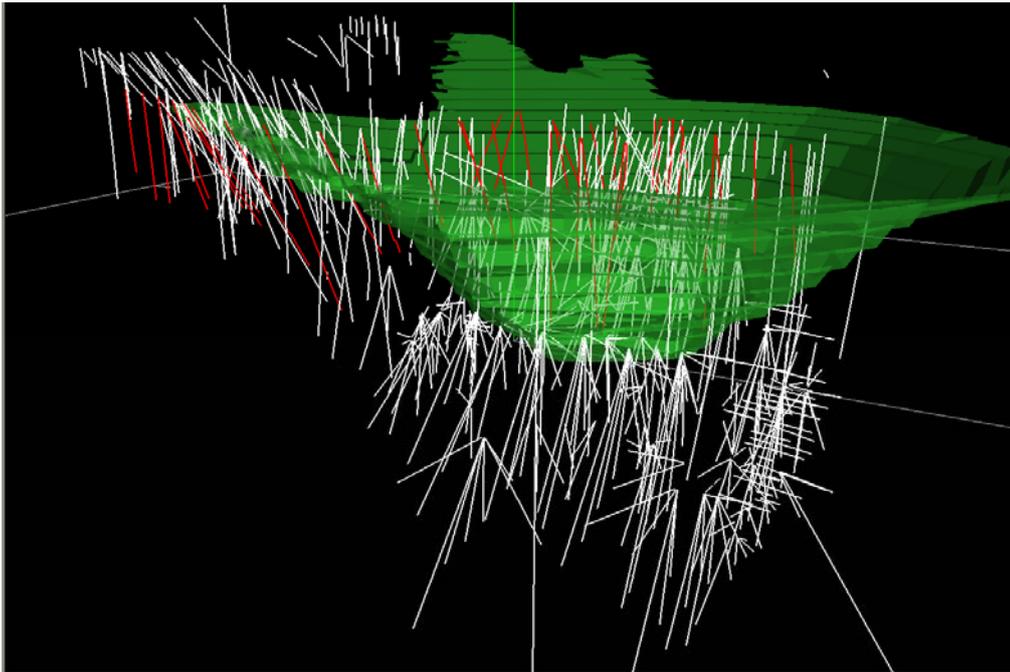
## **1.5 EXPLORATION**

First recorded surface exploration drilling occurred in 1947 and in the period 1947-1979 a total of 204 cored holes were completed. There was no surface drilling in the period 1979-2004. However, substantial programs of underground core drilling accompanied the mine development to assist with the closer definition of the C-Lens deposits and to explore. Between 1974 and 1983 a total of 422 underground drill holes were completed. There has been no drilling from underground since 1983.

Prior to 2005 a total 626 drill holes, combined with geological mapping in the open-cut and underground mines, have defined the scheelite deposits at Grassy for resource extensions. In 2005-06 a 42 hole surface core drilling program was completed south of the open-cut and to the east of the open-cut above the underground mine to assist with an estimation of the remaining resources, acquire samples for metallurgical test work and provide geotechnical knowledge for extension of the open-cut.

The total drill hole layout and the proposed pit is displayed in Figure 3. below

**Figure 3. 3D Drill Hole vs. Pit Outline**



Samples during previous operations were generally assayed by King Island Scheelite and no data is now available on the methods used or the checks and quality control measures carried out. There is no reason however to believe that these are unreliable since they were used to manage and control the mine operations. Recent drilling assays were carried out by Burnie Research Laboratories (BRL). Where practicable check assaying was carried out by Amdel Limited in Adelaide. BRL also carried out density determination on the core

Bulk density values of 3.4 t/m<sup>3</sup> for the C Lens and 3.1 t/m<sup>3</sup> for the B Lens were taken from the report by Balind 1988.

## **1.6      RESOURCE ESTIMATION**

AMC Consultants Pty Ltd (AMC) undertook an initial program of work for KIS that involved creating digital geological and stope models for the Dolphin Mine to a lower limit of 300m below surface. This encompassed digitising wireframes from plans and sections provided by GTN and integrating the input data. The geology interpretation was taken from cross sections and the stope shapes taken from level plans. Topographic models were also created

AMC was then engaged by KIS to prepare a computer block model, and estimate the mineral resources for the unmined parts of B and C Lenses of the King Island Scheelite Deposit, based on data and geologic interpretations provided by King Island Scheelite and in accordance with The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2004 edition (the JORC Code).

AMC's scope of work for the resource estimation included:

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- Creating a computer Block model for the resources remaining from previous mining in B and C Lens's,
- Carrying out a statistical evaluation of the drill hole data including variograms for each ore zone,
- Estimating the mineral resources from the block model based on a series of different cut off grades supplied by LIS,
- Reporting the resources in accordance with the JORC code, and
- Compare the estimated grade and tonnes within the stoped and decline wireframes with previous production records and resource estimates as a check on the estimation and modeling process.

A block size of 20m east-west and 10m north-south was selected to coincide with the drill-hole spacing (generally spaced on 20m north-south sections) and in the vertical direction to 6m to be consistent with the general stope height.

The parent blocks were sub-blocked in the east-west and north-south dimensions as shown in Table 2 below to enable the edges of the lenses to be reasonably defined. The stoped and in-ore decline areas were allowed smaller sub-blocks to provide a better definition of these areas. Sub-blocks in the vertical direction were not restricted in size to allow an accurate interpretation of surfaces in this direction'

**Table 2. Sub-block Sizes**

	<b>East-West (m)</b>	<b>North-South (m)</b>
C Lens & B Lens	5	2.5
Stoped Area	2.5	0.5

Based on the block and sub-block sizes above the wireframe outlines for the C Lens, B Lens, stoped area and in-ore decline were filled with cells independently for the resource estimation. During block grade estimation the sub-blocks were assigned the grade of the parent blocks.

Ordinary Kriging and 3m composited down-hole drill hole data was used for estimation of the individual block grades. High grades were not cut as the probability plot did not show these higher grades as outliers.

A three pass ellipsoidal search was used to ensure all blocks have an estimated grade. The search parameters used are shown in Table 3. for the C Lens and Table 4. for B Lens.

**Table 3. C Lens Search Parameters**

<b>Pass</b>	<b>Search Distance</b>			<b>Number of Samples</b>					
	<b>North</b>	<b>East</b>	<b>Vert</b>	<b>Min</b>	<b>Max</b>	<b>Min No Octants</b>	<b>Max per hole</b>	<b>Min per Octant</b>	<b>Max per Octant</b>
1	50	100	40	5	30	3	4	1	5
2	75	150	60	5	25	3	4	1	5
3	100	200	80	4	25	3	4	1	5

**KING ISLAND SCHEELITE MINE REDEVELOPMENT FEASIBILITY STUDY**  
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**Table 4. B Lens Search Parameters**

Pass	Search Distance			Number of Samples					
	North	East	Vert	Min	Max.	Min No Octants	Max per hole	Min per Octant	Max per Octant
1	100	100	60	5	30	3	4	2	5
2	150	150	90	5	25	3	4	2	5
3	200	200	120	4	25	3	4	2	5

The kriging parameters used were based on the results of the variogram analysis for the two lenses using a two structure spherical variogram. These parameters are shown in Table 5.

**Table 5. Kriging Parameters**

Area	Nugget	Structure 1				Structure 2			
		Range East	Range North	Range Vert	Sill	Range East	Range North	Range Vert	Sill
C Lens	0.21	26	7	13	0.44	90	62	50	0.34
B Lens	0.11	11	6	9	0.04	20	19	16	0.22

Dry Bulk Densities used were 3.4 t/m<sup>3</sup> for the C Lens and 3.1 t/m<sup>3</sup> for the B Lens

The estimated remnant mineral resource for both C and B lenses, at a cut-off grade of 0.25% WO<sub>3</sub> (as advised by KIS), to a depth of -308m RL and classified as Indicated and Inferred in accordance with the 2004 JORC Code, is shown in Table 6 and at a cut-off of 0.7% WO<sub>3</sub> in Table 7. below.

**Table 6. Mineral Resource at a Cut-off of 0.25% WO<sub>3</sub> to a Depth of -308m RL**

Area	Measured		Indicated		Inferred		Total	
	Tonnes ('000)	WO <sub>3</sub> %						
C Lens	-	-	11,350	0.68	-	-	11,350	0.68
<i>Less Upper Wedge Sill</i>	-	-	55	1.16	-	-	55	1.16
Total C Lens	-	-	11,300	0.68	-	-	11,300	0.68
B Lens	-	-	1,930	0.48	200	0.35	2,130	0.47
<b>Total</b>	-	-	<b>13,230</b>	<b>0.65</b>	<b>200</b>	<b>0.35</b>	<b>13,430</b>	<b>0.65</b>

**Table 7. Mineral Resource at a Cut-off of 0.7% WO<sub>3</sub> to a Depth of -308m RL**

Area	Measured		Indicated		Inferred		Total	
	Tonnes ('000)	WO <sub>3</sub> %						
C Lens	-	-	4,280	1.08	-	-	4,280	1.08
<i>Less Upper Wedge Sill</i>	-	-	50	1.22	-	-	50	1.22
Total C Lens	-	-	4,230	1.08	-	-	4,230	1.08
B Lens	-	-	240	1.01	0	0	240	1.01
<b>Total</b>	-	-	<b>4,470</b>	<b>1.07</b>	<b>0</b>	<b>0</b>	<b>4,470</b>	<b>1.07</b>

The estimated mineral resource for both lenses down to a depth of -150m RL is shown at

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a cut-off of 0.25% WO<sub>3</sub> in Table 8 and at a cut-off of 0.7% WO<sub>3</sub> in Table 9

**Table 8. Mineral Resource at a Cut-off of 0.25% WO<sub>3</sub> to a Depth of -150m RL**

Area	Measured		Indicated		Inferred		Total	
	Tonnes ('000)	WO <sub>3</sub> %						
C Lens	-	-	5,410	0.61	-	-	5,410	0.61
<i>Less Upper Wedge Sill</i>	-	-	55	1.16	-	-	55	1.16
Total C Lens Wedge	-	-	5,350	0.60	-	-	5,350	0.60
B Lens	-	-	1,300	0.50	120	0.37	1,420	0.49
<b>Total</b>	-	-	<b>6,650</b>	<b>0.58</b>	<b>120</b>	<b>0.37</b>	<b>6,770</b>	<b>0.57</b>

**Table 9. Mineral Resource at a Cut-off of 0.7% WO<sub>3</sub> to a Depth of -150m RL**

Area	Measured		Indicated		Inferred		Total	
	Tonnes ('000)	WO <sub>3</sub> %						
C Lens	-	-	1,670	1.02	-	-	1,670	1.02
<i>Less Upper Wedge Sill</i>	-	-	50	1.22	-	-	50	1.22
Total C Lens	-	-	1,620	1.02	-	-	1,620	1.02
B Lens	-	-	180	1.04	0	0	180	1.04
<b>Total</b>	-	-	<b>1,800</b>	<b>1.02</b>	<b>0</b>	<b>0</b>	<b>1,800</b>	<b>1.02</b>

Table 10. below shows the total combined resources at a cut off grade of 0.25% WO<sub>3</sub> at progressive 25 m depth intervals. This resource forms the basis for the Feasibility Study.

**Table 10. Total Resource at 0.25% WO<sub>3</sub> Cut-off**

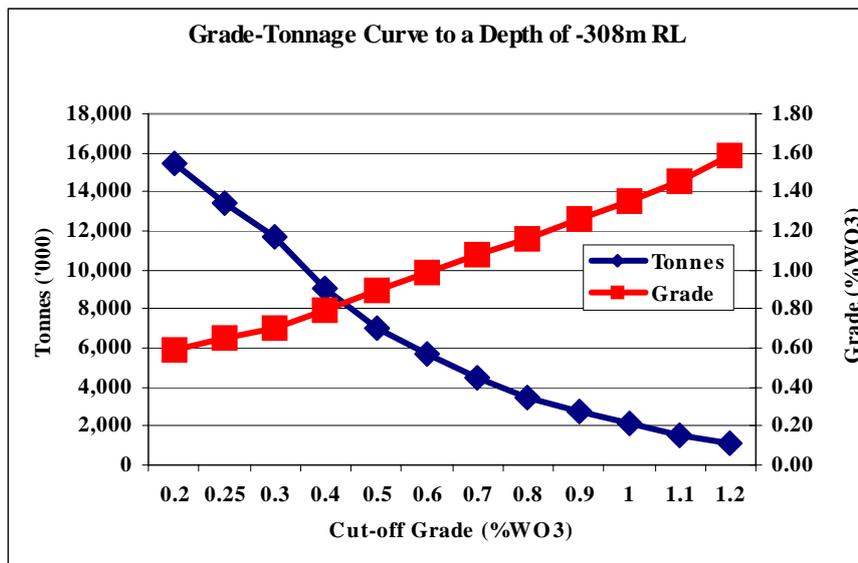
RL	C Lens		B Lens Indicated		B Lens Inferred		Total	
	Tonnes ('000)	WO <sub>3</sub> %	Tonnes ('000)	WO <sub>3</sub> %	Tonnes ('000)	WO <sub>3</sub> %	Tonnes ('000)	WO <sub>3</sub> %
25	440	0.31	-	-	-	-	440	0.31
0	20	0.26	40	0.38	-	-	60	0.34
-25	110	0.40	150	0.48	-	-	260	0.45
-50	660	0.46	200	0.45	-	-	860	0.46
-75	1,190	0.57	290	0.49	-	-	1,480	0.55
-100	860	0.60	300	0.60	-	-	1,170	0.60
-125	720	0.70	150	0.41	40	0.34	910	0.63
-150	1,350	0.76	160	0.49	80	0.39	1,580	0.72
-175	1,660	0.79	130	0.45	20	0.33	1,820	0.76
-200	1,070	0.70	200	0.42	40	0.33	1,310	0.64
-225	960	0.84	170	0.47	10	0.28	1,130	0.78
-250	1,200	0.72	50	0.50	-	-	1,250	0.71
-275	740	0.68	50	0.41	-	-	780	0.66
-300	300	0.63	50	0.43	-	-	350	0.60
-308	10	0.34	-	-	-	-	10	0.34
<b>Total</b>	<b>11,300</b>	<b>0.68</b>	<b>1,930</b>	<b>0.48</b>	<b>200</b>	<b>0.35</b>	<b>13,430</b>	<b>0.65</b>

The C Lens has been classified as Indicated as it has been drilled throughout on 20m spaced sections and previous mining has generally confirmed the results of this drilling. Uncertainty with the location and extent of some of the previous mined areas and therefore remnant mineralisation, the incomplete records relating to some of the old

drilling data and the lack of detailed knowledge of the mineralisation within the 'pgh' unit has prevented much of the mineral resource from being classified as Measured.

B Lens has been classified as Indicated in the areas generally drilled on the 20m spaced sections and Inferred in the other areas. The B Lens needs additional drilling in the area of the Inferred Resource generally located along the west edge. AMC also calculated total resources at a number of cut off grades and arrived at the following Grade/Tonnage curve for the pit to a depth of -308m RL displayed graphically in Figure 4. below.

**Figure 4. Grade Tonnage Curve for Resources in the Pit to -308m RL**



AMC

also

provided the following Statement re JORC Compliance/

**JORC Compliance Statement**

*'Information in this report that relates to scheelite mineral resource estimates prepared by AMC Consultants Pty Ltd for the King Island Scheelite deposit, is based on information compiled by Mr R L Webster, who is a Member of The Australasian Institute of Mining and Metallurgy and a full-time employee of the AMC Consultants Pty Ltd. The estimates were based on exploration data provided by King Island Scheelite Pty. Limited, which takes responsibility for its quality and reliability. Mr Webster has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity, which he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.*

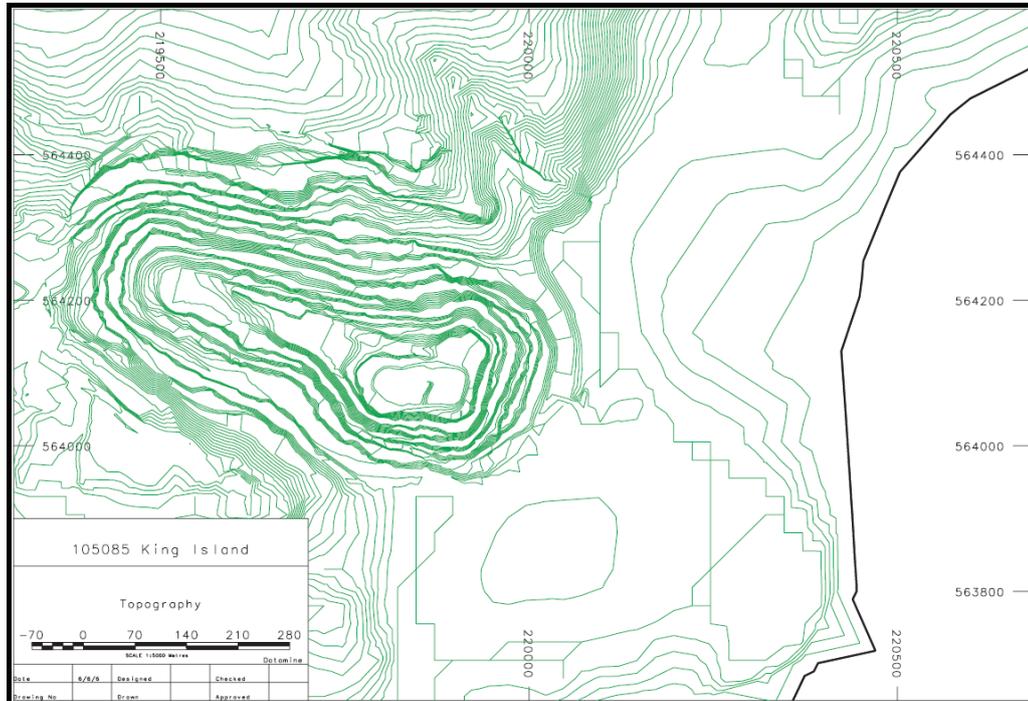
**1.7 MINE DESIGN**

**1.7.1 History**

The Dolphin open pit mine was excavated to a depth of approximately 65 meters below sea level and was operated from about 1959 until the start of the underground mine in the 1960's. (Fig 5. below) It was operated at a nominal production rate of 400,000 tpa of ore which figure is comparable to the currently planned rate of 600,000 tpa.

The underground mine was accessed by a decline and portal from the open pit and the mining method was post pillar cut and fill. Ground conditions were generally good and the old pit walls have now been stable for 45 years. However, some underground mining encountered difficult ground conditions which required the back-filling of some mined out stopes, and sometimes abandonment of lower grade ore blocks. At times scheelite prices were depressed which resulted in the final closure of the mining operations in 1989.

**Figure 5. Old Dolphin Mine Pit**



## **1.7.2 Mine Planning**

### **1.7.2.1 General Approach**

The King Island mine has been designed as a series of open pits. The old mine, known as the Dolphin Mine, was historically operated as an open pit down to RL-65 followed by an underground decline operation. Remaining ore and remnant pillars from the underground mine will be recovered by the proposed open pits.

The planned open pits in this Feasibility Study are an eastward extension of the old open pit mine, and will extend the pit down to RL -190 and extract ore from a part of the ore body previously mined by underground methods. This will result in the boundary extending 300 metre eastward out into Grassy Bay and will require suitable structures to manage and control ingress of water.

An initial study was carried out as part of the scoping study by a mining consultant Brian Speechly who designed two pits, an initial pit to RL- 165 m and a further long term pit to a depth of RL-275M. This Feasibility Study proposes an optimum pit to 190m below sea level which will provide ore for treatment at a rate of 0.6Mtpa for 13.5 years. Mining below RL-190m will require detailed mining planning in the future. Optimisation work undertaken in this Feasibility Study indicates that mining to this depth by open pit methods could be justified in the long term given favourable economic conditions.

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Mine planning for this Feasibility Study has focused on:

- Resource development
- Geotechnical investigations to ensure open pit wall slope stability
- Detailing mining methods and costs – considering contractor or owner-miner options
- Pit optimization studies to confirm viability of pit
- Production scheduling from staged pits
- Detailed engineering of a Breakwater and Cut Off Wall to allow open pit mining in areas reclaimed from the ocean
- Ore Reserve Estimation

The proposed mining operation will be extended from the existing open pit which will be dewatered in advance of the mining operations. The pit has been designed in five stages progressing deeper to the east from the old open pit. Mining is currently scheduled from Year 1 to Year 11 with Year 1 being a pre-stripping year. Treatment will begin in Year 2 and continue at 600,000 tpa for 13.5 years. After Year 5 low grade ore will be stockpiled allowing the early treatment of high grade ore. The low grade stockpiles will be treated after the completion of mining in Year 11 until Year 14.

Some resource development has been undertaken by surface drilling programmes particularly to define the near surface B Lens. Under the direction of consultant Lindsay Newnham in conjunction with Rod Webster of AMC who has carried out the optimisation work and prepared the initial pit plans in conjunction with Mining Consultant William J Holly

The optimisation work used Whittle software applied to AMC's Ore Resources Block Model and based on: the following information provided by KIS and their consultants as follows

- *Kevin Rosengren and Associates* - geotechnical information,
- *Mine Consult P/L* - mining costs
- *Terry Weston* - processing costs
- *Terry Weston* -metallurgical recoveries, and
- *King Island Scheelite P/L* - concentrate sale pricing

Pit Shell 24 shown in Figure 6. below, extending to RL-190 m. was selected for the purposes of the Feasibility study but it was noted that the pit might be extended to RL-275 m. depending on further confirmation of orebody extensions and reasonable economic conditions. This pit is not considered in the Feasibility Study but provision has been made in the layout of facilities to avoid the sterilization of any ground that might affect the future mining to this depth



It is noted that the pit will progress easterly into Grassy Bay. Mine waste disposal is also planned for placement of this material as reclamation of part of Grassy Bay following the previous practice of the former operations. A hydrology study was carried out by Consultant hydrologist Peter Dundon on the existing fill material in this area concluding that fill material (old and new) and the underlying sands were quite permeable and that a suitable sealing structure would be required to manage water inflow.

### **1.7.2.2 Sea Wall Design**

The firm of Gutteridge, Haskins and Davies (GHD) were engaged to evaluate the situation and advise on a suitable design for sealing off the water from the pit operations and also on the design of a suitable structure to prevent erosion by wave action of the fill.

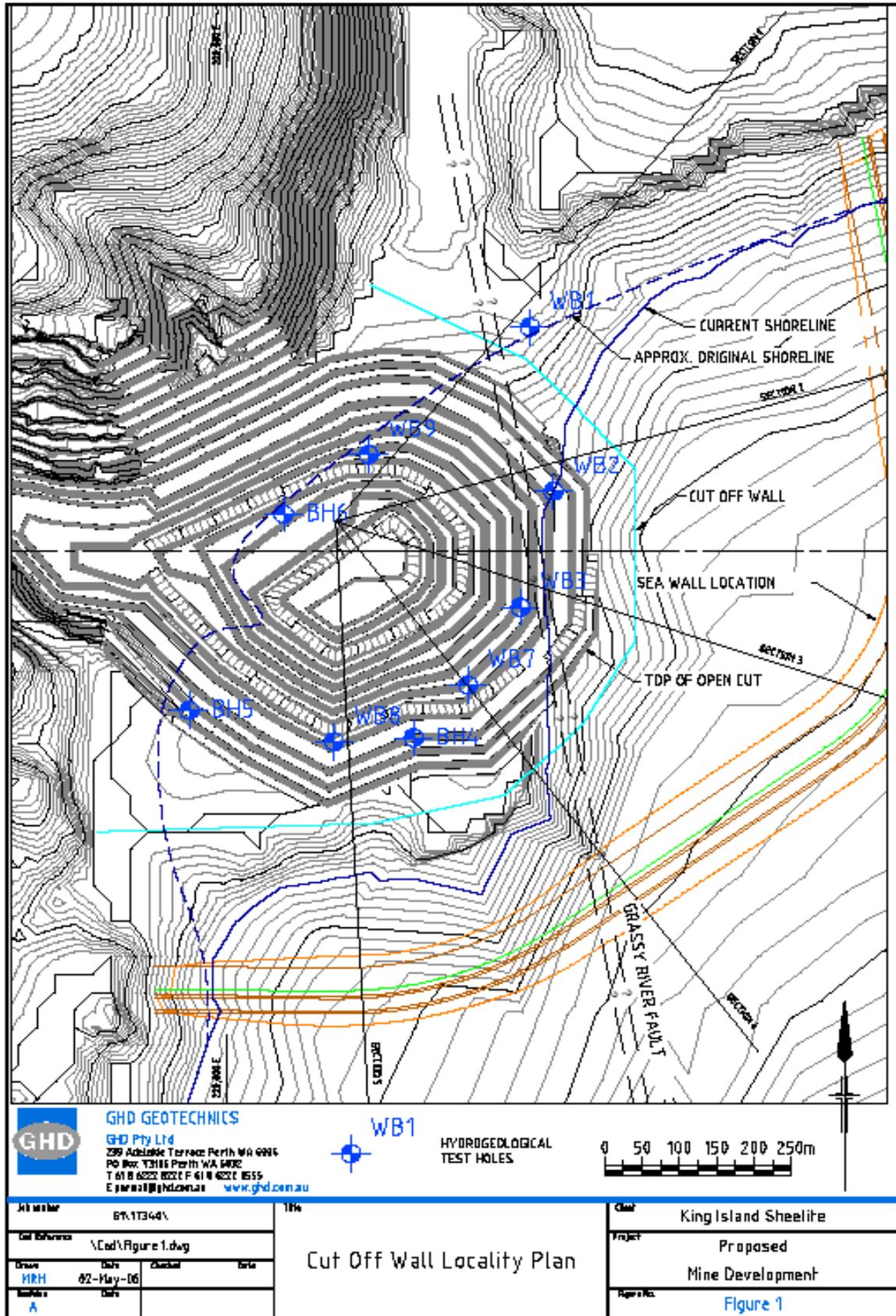
They assess three key issues to be addressed:

- i. Provision of wave protection to protect the works from damage by storm wave action (Breakwater) and
- ii. Provision of water inflow protection of reduce water transmission into the pit to acceptable limits (Cut-Off Wall) and
- iii. Ensuring the long term stability of the sand exposed in the pit face

After consideration of a number of different options GHD has recommended that two structures will be required to manage this area. A carefully designed Breakwater will be required to manage the wave action on the fill material and a cement slurry cut off wall extending down to impermeable basement rock be placed 50 metres outside of around the periphery of the exposed pit wall to control water inflow. See Figure 7. below

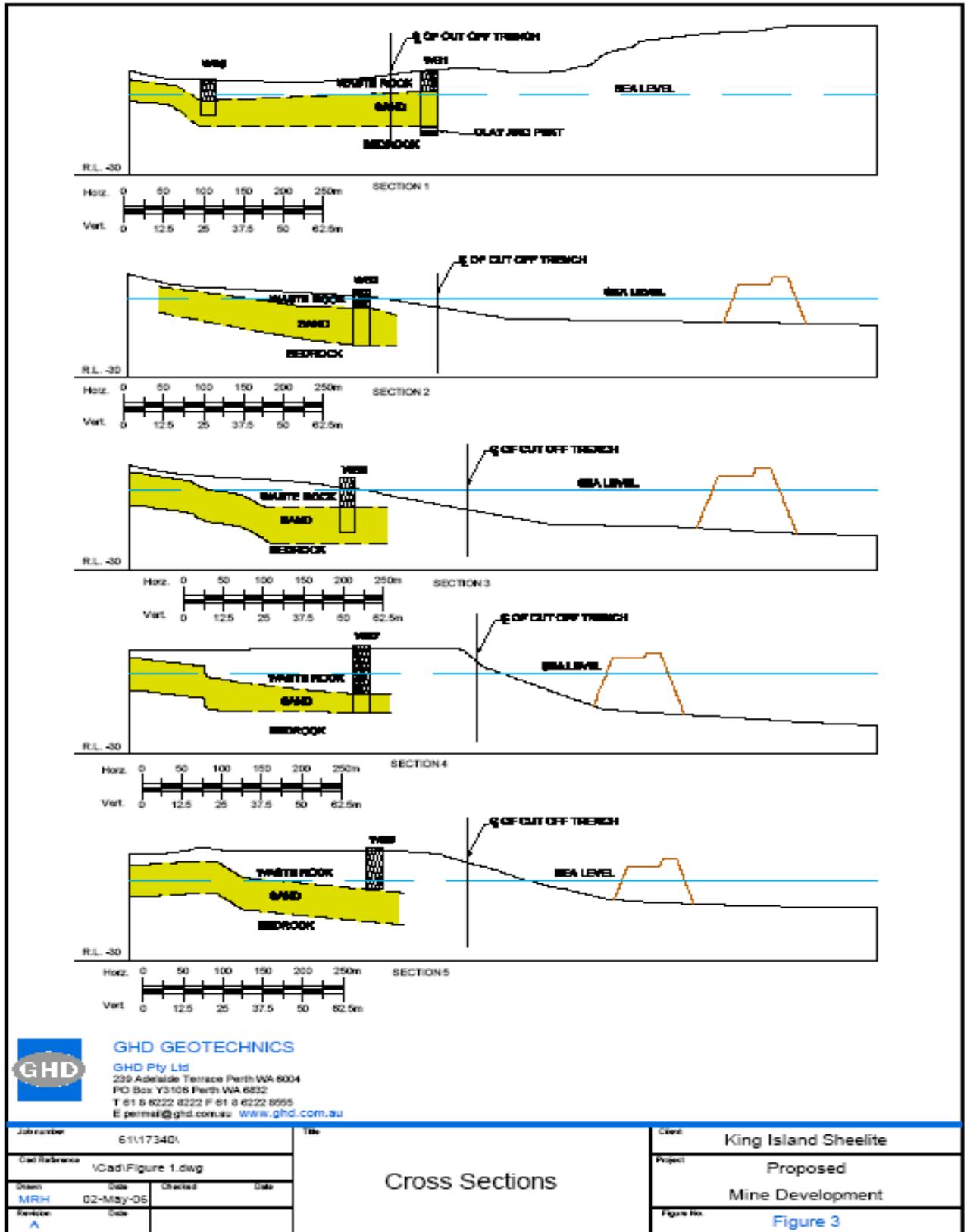
The technique proposed is used in a number of areas for the sealing of similar materials and is well tried and tested. Details are shown in their report "**King Island Scheelite Pty Ltd. Report on Sea Wall, April 2006**" included in Appendix 4. - Mine Design

**Figure 7. GHD Cut Off Wall Locality Plan**



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**Figure 8. Cut off Wall Crosssections**



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**1.7.2.3 Open Pit Design**

The initial pit design was carried out by AMC Consultants based on the block-models prepared for the resource estimates. Key parameters included:

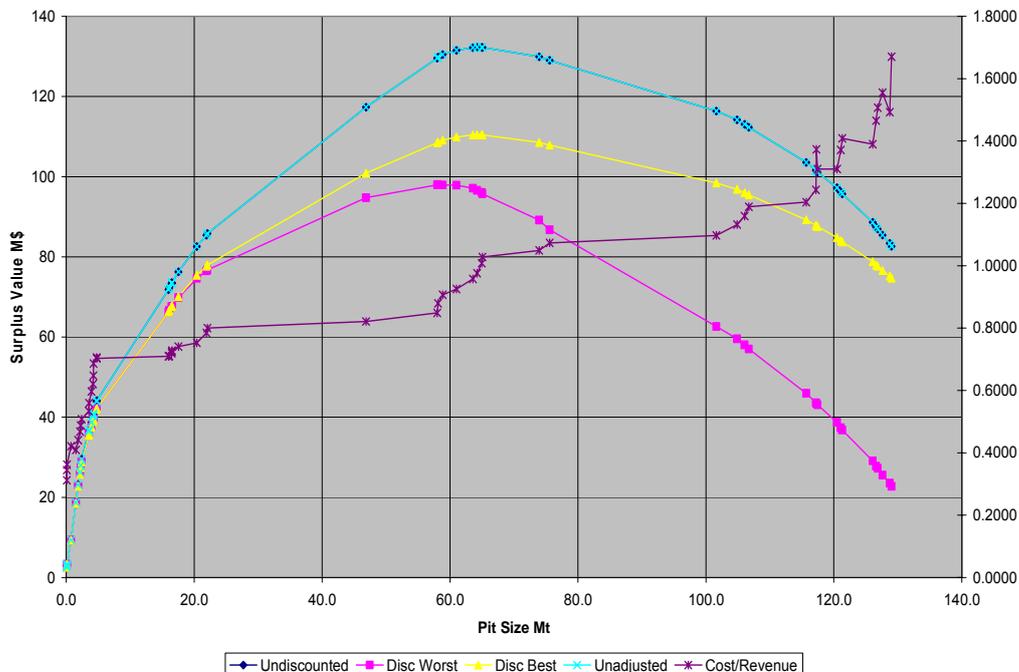
- Mining costs - Ore and Waste: as per January 2006 proposal from mining contractors Cooks Construction. Rates varied from \$6.50 /bcm at surface to \$16.95 /bcm at -165RL,
- Rosengren's recommendations for wall design parameters were adopted for the design as in Table 12 below.
- Processing cost : \$14.77 per tonne ore Sensitivity +/- \$2 per tonne ore
- Mining dilution and losses :Ore dilution was 10%
- Mill recovery : 85%
- Product Sales price: A\$133/ metric tonne unit.(mtu)

**Table 12. Pit Design Geotech Parameters**

ITEM	West of Decline Fault & South of North Boundary	East of decline Fault & North of North Boundary	Upper Material – waste rock and sand – to 20m deep.
Bench height	20m	20m	20m
Bench Slope	65 <sup>0</sup>	60 <sup>0</sup>	45 <sup>0</sup>
Berm width	6m	10m	10m
Inter-ramp slope	54 <sup>0</sup>	43 <sup>0</sup>	27 <sup>0</sup>

The resulting optimum pit from the Whittle optimization study is demonstrated graphically in **Figure 9.** below.

**Figure 9. Pit Shell Results**



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Pit Shell 31 containing a total of 61 million tonnes of material was determined to be the optimum. This optimum pit was used as the basis for detailed practical pit design.

Waste will be dumped to create the Breakwater (sea wall) depicted in Figure 28. As the pits progress waste will be dumped inside this Breakwater limit. In the longer term further dumping capacity may be required utilising the old pit for backfilling, and conventional dumps created on land.

Production scheduling has been carried out by MineConsult as part of their review and costing of the proposed Mining Plan as displayed in Table 13 below

**Table 13 Production Schedule**

		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 1-10
Total Waste	kbcm	510	1,556	1,811	1,459	1,633	1,784	1,825	1,869	1,523	153	14,122
Total Ore	kbcm	90	44	89	441	267	116	75	31	377	334	1,866
Total Ore	kt	289	142	286	1,412	866	370	241	98	1,207	1,059	5,970
Total	kbcm	600	1,600	1,900	1,900	1,900	1,900	1,900	1,900	1,900	487	15,987
Strip Ratio	bcm:bcm	6	36	20	3	6	15	24	61	4	0	7.6

In brief, the production schedule comprises:

- Life: 11 years.
- Ore Production: total of 6 Mt  
Range: 0.1 to 1.4 Mtpa
- Waste Production: total 14 MBCM  
Range 0.5 to 1.9 MBCM pa
- Total Movement: 2 year build up to 1.9 MBCM pa
- Strip ratio average 8 (bcm:bcm).

KIS also specified that two seawalls as follows are to be built:

- Seawall 1: 1.59 Mlcm, and
- Seawall 2: 1.83 Mlcm.

### **1.7.2.4 Mine Operation Plan**

KIS will carry out the mining operation with their own equipment and personnel with the use of a mining contractor as an option yet to be considered. There will be no free digging material in the pit although there will be some existing backfill waste material that will require removal to uncover the hard rock surface. Drill and blast of all material has been assumed for costing purposes.

The Operation plan is based on bulk mining of all waste and ore with waste hauled to external dumps, commencing with breakwater/bund establishment prior to infill. For costing purposes it has been assumed that waste dumps will generally be within 500m of the pit exit. Some waste material will be used for tailings dam construction.

All ore will be hauled to the ROM area for re-handle by front end loader  
The approach to mining will be by hydraulic excavator loading rear dump trucks. Drill will be by conventional rotary drills.. Blasting will occur in five or ten metre deep shots. Waste will be loaded out in five or ten metre benches. Ore loading will be on five metre benches for effective grade control and dilution management. Ore loading will be supervised by grade control technicians.

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Table 14 below shows the equipment fleet used of costing purposes.

**Table 14. Proposed Equipment Fleet**

Item	Manufacturer & Model	Description	Fleet Number	Remarks
Hydraulic Excavator	Hitachi	100 t	1	Pit Only
Truck - Rear Dump	Caterpillar 777D	97 t	5 - 7	<i>Ore and Waste Haulage</i>
Grader	Caterpillar 14H	160 kW	1	Pit and Site Road Maintenance
Watercart	Caterpillar 773D	45 kl	1	Pit and Site Road Dust Suppression
Dozer - Track	Caterpillar D9R	302 kW	1	Waste Dumps
Dozer - Rubber Tyre	Caterpillar 824G	235 kW	1	60% Waste Dump
D Drill	DrillTech D40KS	152 - 203 mm	2	
Front End Loader	Caterpillar 992	6.4 cu.m.	1	ROM and Crusher Feed

The mine will operate on varying rosters and crewing will change over time according to the needs of the pit as it develops as indicated in Table 15 below.

**Table 15. Crew Rosters**

Period	Rosters and Crew Levels
Years 1 to 5:	5 days/week, 2 x 8h shifts/day, plus Saturday dayshift, 2 crews
Years 6 to 8:	7 days/week, 2 x 10.5h shifts/day, 3 crews
Year 9:	5 days/week, 2 x 10.5h shifts/day, plus Saturday dayshift, 2 crews
Year 10:	5 days/week, 2 x 8h shifts/day, plus Saturday dayshift, 2 crews
Years 11:	5 days/week, 1 x 8h shift/day, 1 crew

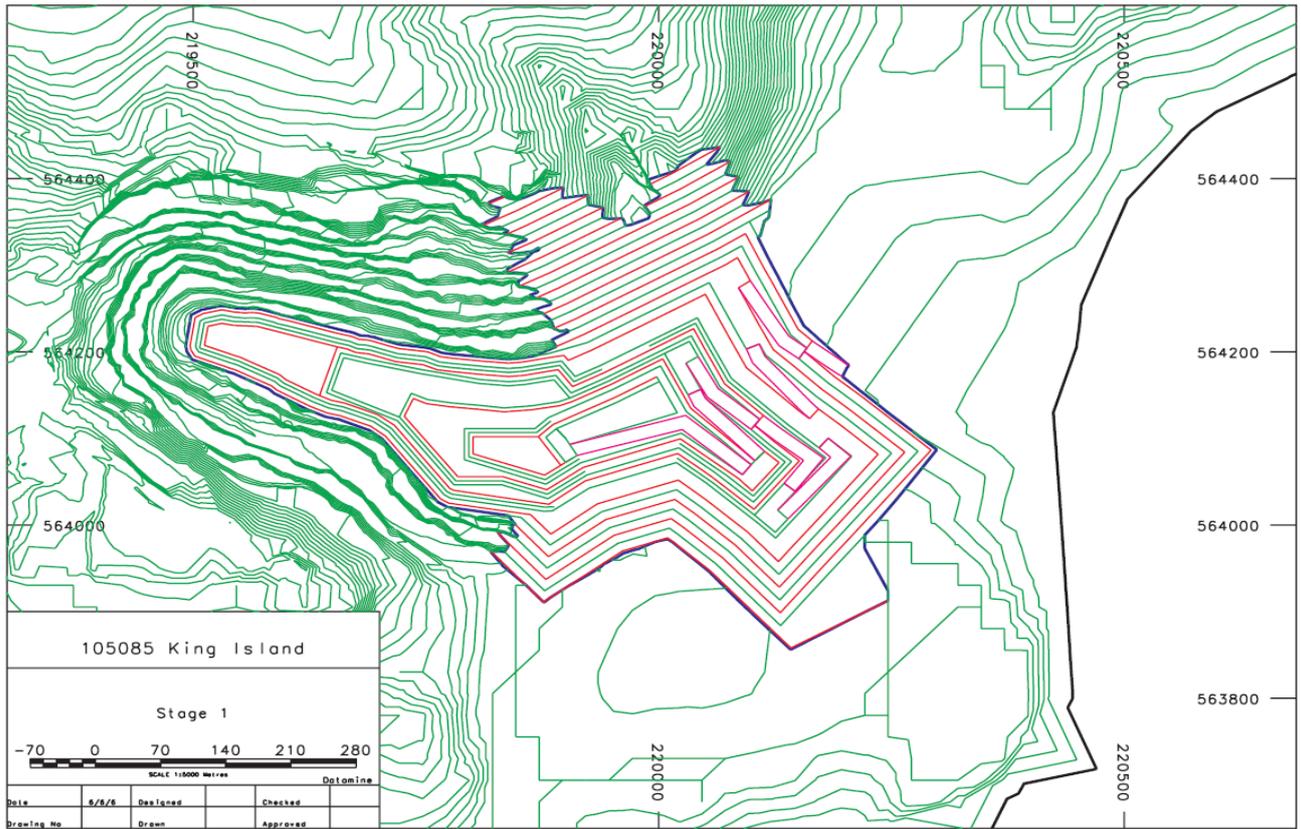
Manpower requirements are displayed in Table 16 below

**Table 16. Manning Schedule**

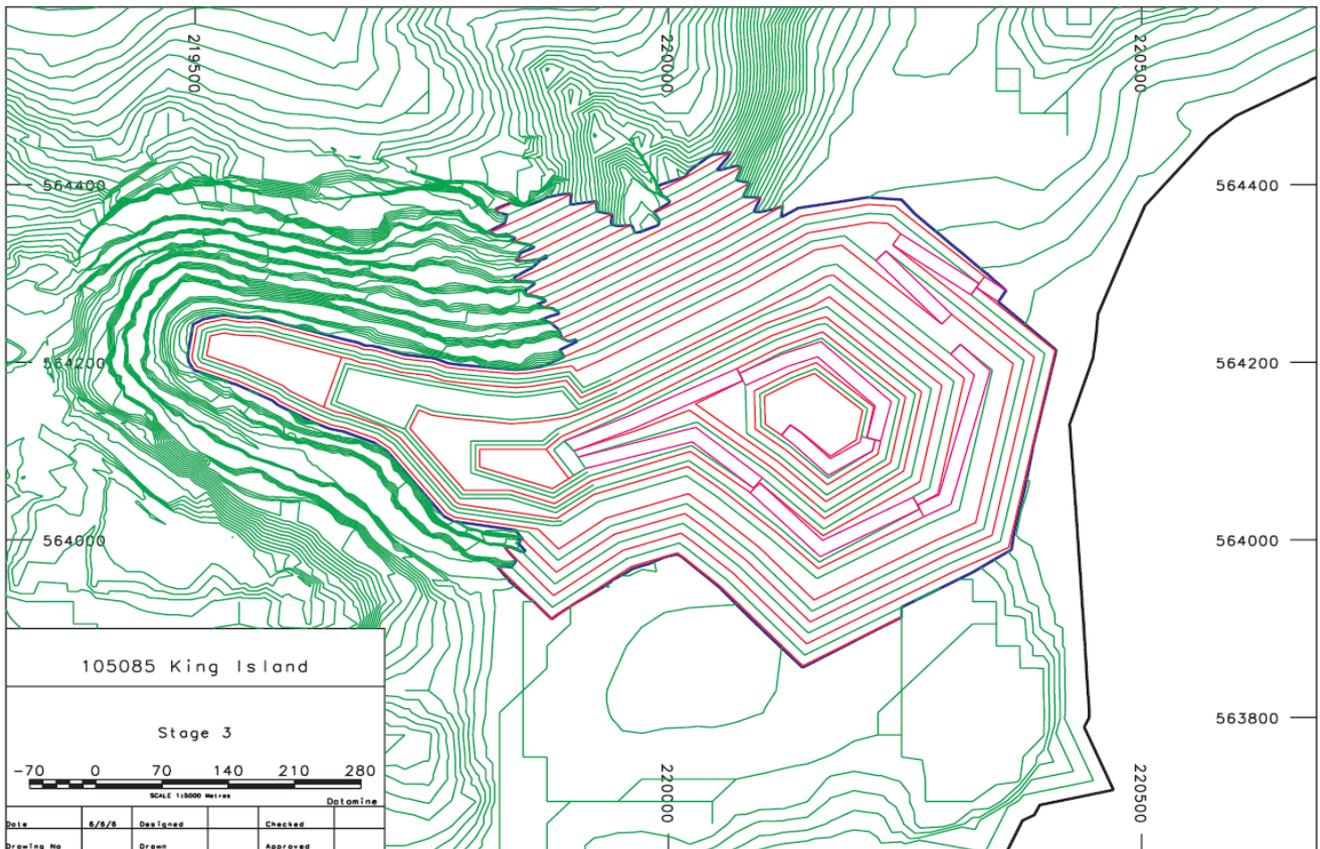
Discipline		Yrs 1 to 3	Yrs 4 to 6	Yr 7	Yrs 8 -10	Yr 11
Operators	no.	35	28	19	8	5
Maintenance	no.	13	11	7	3	2
Staff, Supervisory and Support	no.	29	29	26	22	22
<b>Total Mining Workforce</b>	<b>no.</b>	<b>77</b>	<b>68</b>	<b>52</b>	<b>33</b>	<b>29</b>

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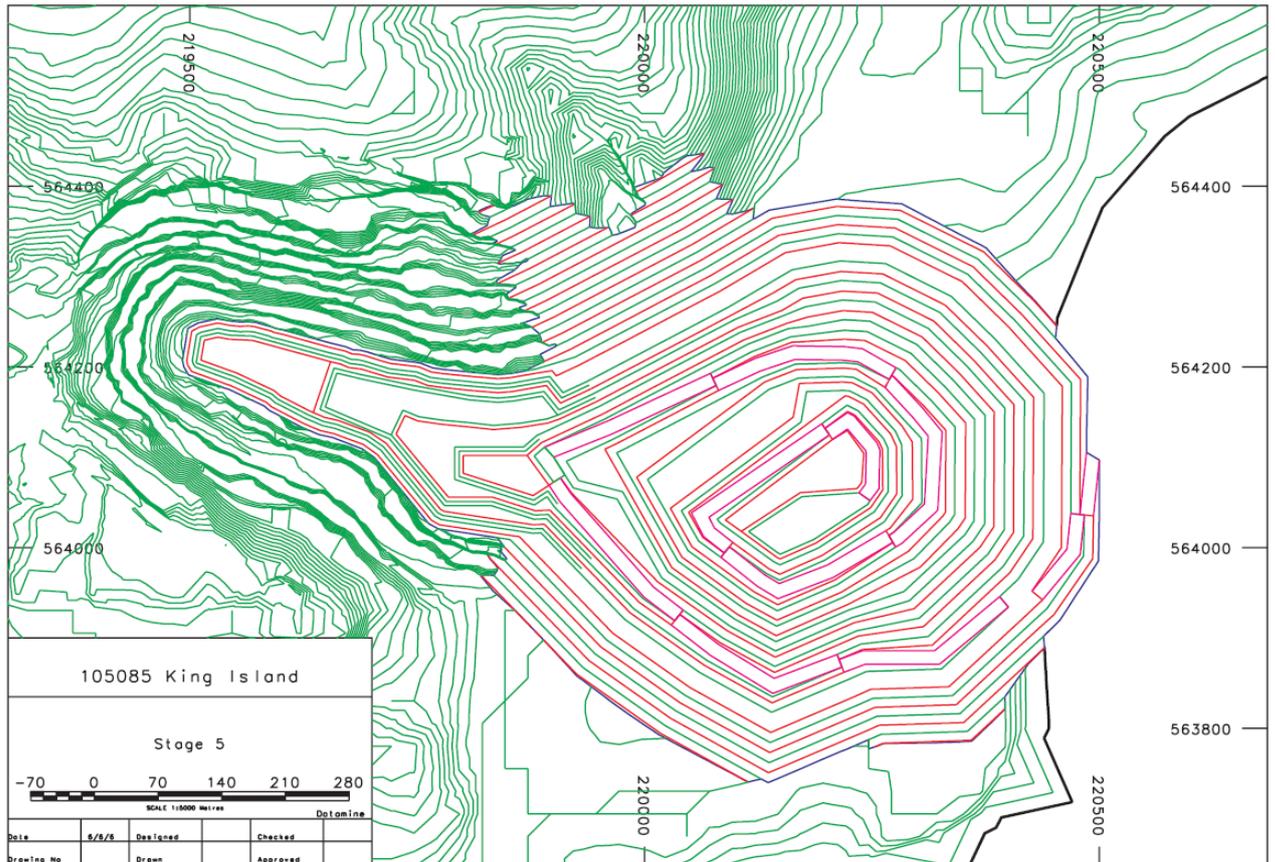
**Figure 10. Stage 1 Layout**



**Figure 11. Stage 3 Layout**



**Figure 12. Final Pit Layout**



## **1.8 METALLURGY AND PROCESSING**

An extensive program of metallurgical testwork has been carried out by KIS under the supervision of Terry Weston – Consulting metallurgist, to investigate the best way to treat the ores taking into account recent developments in equipment and performance and to optimize performance balancing concentrate grades, costs and recovery.

Work has been carried out by Burnie Research Laboratories, SGS, Roche Mining (Kelsey Jigs), and Koepfer (HPGR). This work has included testwork on different grades of ore ores from B and C lenses for ore characterization and recovery test purposes including

- Grinding and abrasion tests for Rod and Ball mills,
- Unconfined Compression and Density,
- High Pressure Grinding Rolls,
- Heavy media Sink Float,
- Tabling (Gravity),
- Falcon Concentrator (gravity),
- Kelsey Jig (gravity),
- Extensive multi-stage flotation tests.

Details can be found in Appendix 5 of this report.

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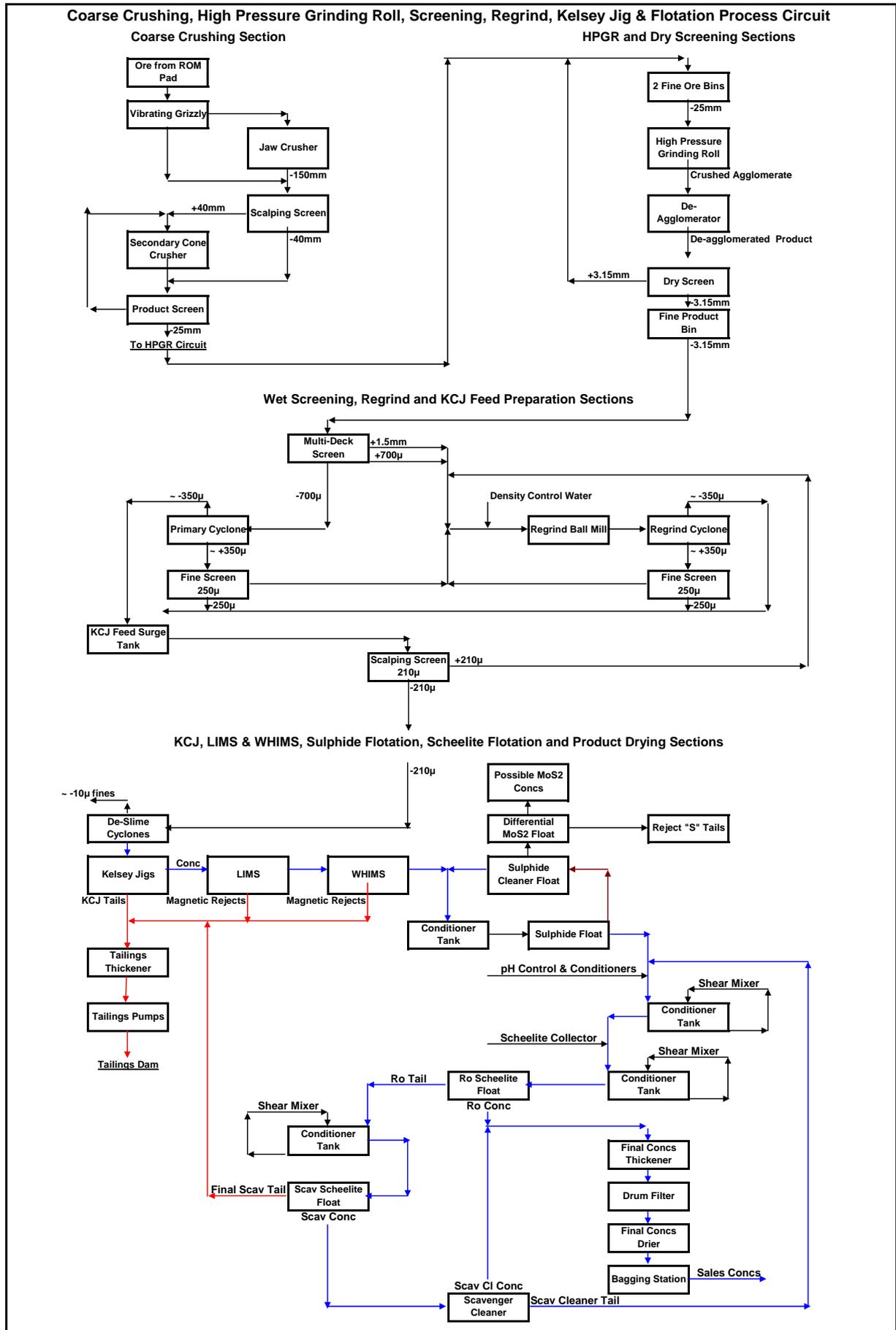
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This work is ongoing but is sufficiently advanced to allow the selection of a preliminary flow sheet incorporating conventional primary and secondary crushing, high pressure grinding rolls for tertiary sizing, Kelsey Jigs for primary coarse scheelite gravity concentration, followed by regrinding and flotation if the finer products as displayed in the flow sheet - **Figure 13.** below, which shows the most recent update (17 September,2006).

This flow sheet and equipment list has provided the basis for the estimation of Capital and Operating costs for the metallurgical portion of the operation.

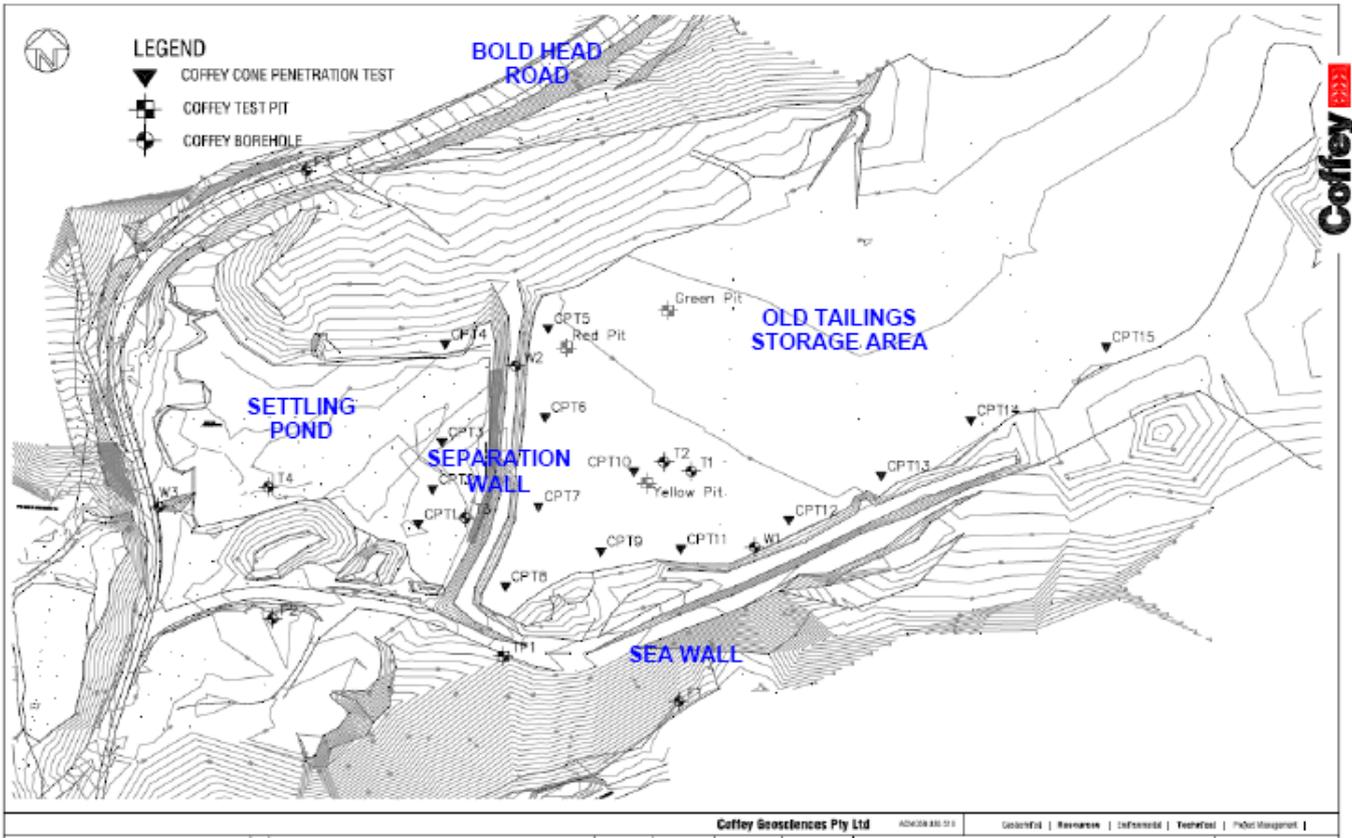
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**Figure 13. Proposed Flow Sheet**

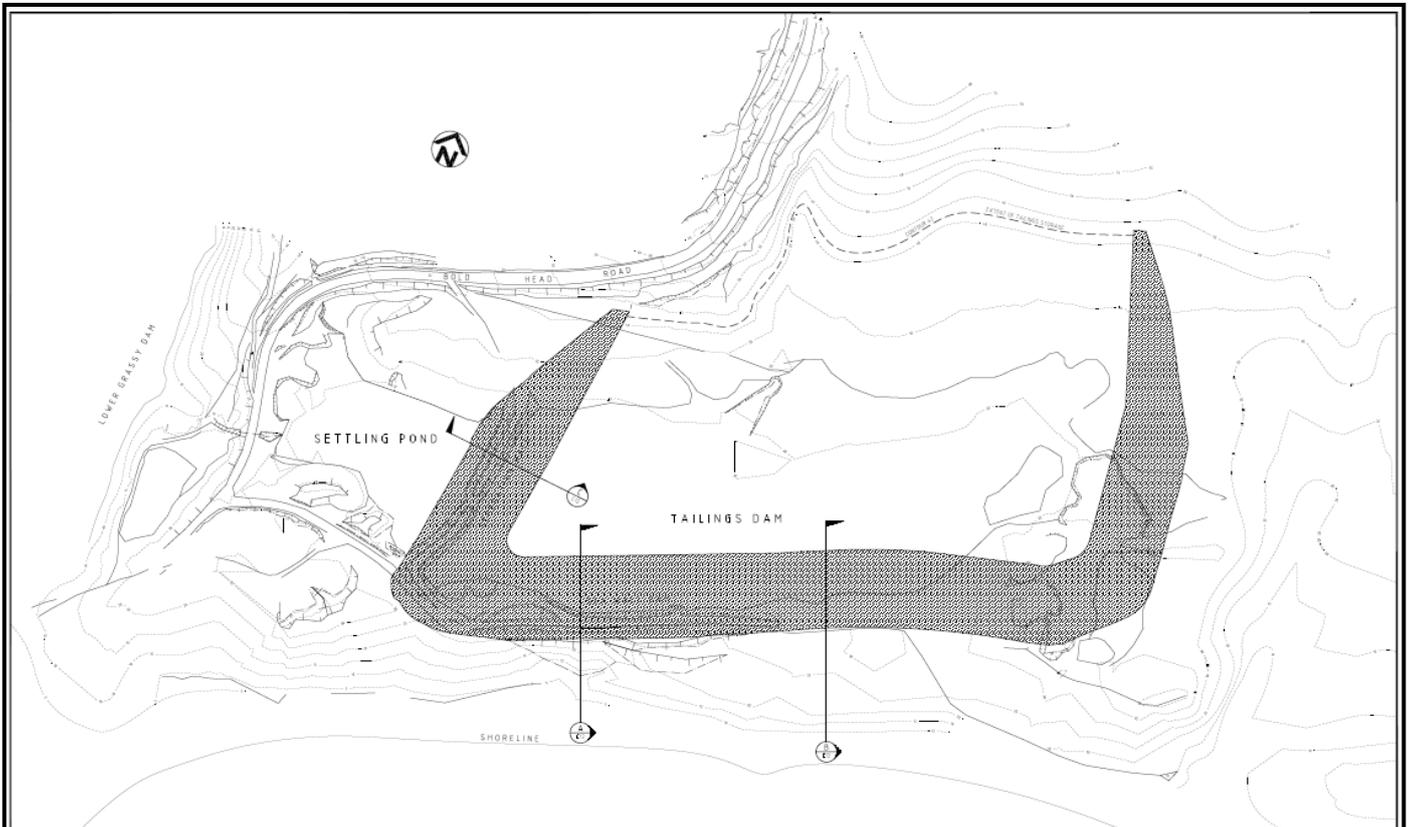




**Figure 15. Layout of Current Tailings Dam Site with Test Sites**



**Figure 16. Tailings Dam Layout**



The dam design is required to meet the standard Tasmanian Water Management (Safety of Dams) Regulations (2002) and relevant Australian National Committee on Large Dams Inc. (ANCOLD) guidelines. The analysis of the dam stability and factors of safety at each stage of its raising indicated that the design will satisfy the ANCOLD hazard criteria.

### **1.8.1.1 Organisation and Manning**

The process plant is scheduled to operate 24 hour per day and seven days per week at 75 tonnes per hour with an availability of 92% for an annual throughput of 600,000 tonnes per year. The crushing plant will have a capacity of 250 tonnes per hour and operate 6 days per week as required but is currently planned to operate 10 hours per day at 6 days per week effectively during daylight hours to minimise disturbance to Grassy residents. Generally other areas – laboratory, stores, and maintenance staff will work 5 days per week with coverage on weekends as required.

The planned plant manning is estimated at a total of 31 and is outlined in **Table 17** below.

**Table 17. Process Area Manning Chart**

<b>Position</b>	<b>Number</b>
Superintendent	1
Assistant Superintendent	1
Metallurgist	1
Metallurgical Clerk/Accountant	1
Senior Chemist	1
Assayer	1
Laboratory Technician	1
Sample Preparers	2
Shift Foremen	3
Shift Operators	10
Day Operators	2
Electrical Foreman	1
Electrician	1
Maintenance Planner/Foreman	1
Mechanical Tradesmen	3
Storeman	1
<b>TOTAL</b>	<b>31</b>

## **1.9 SITE AND INFRASTRUCTURE**

### **1.9.1 Accommodation**

KIS have reviewed manning levels and accommodation available based on the preliminary assumption that the mine workforce will consist of one third current residents on King Island, one third new residents and one third who will travel to and from the island to work. This has been compared with the existing housing inventory to assess requirements for the mine development and operations. During ongoing

operation, KIS will encourage personnel to take-up existing accommodation. Current data resulting from the survey shows that there are 74 beds available in general motel and unit rental accommodation, 31 possible further rooms and units and 6 houses available for sale/rent. In addition there are 105 blocks available for possible development, subject to council approval including a number of vacant lots in Grassy Township. A number of proposals have been received for the development of suitable housing in the area and KIS has acquired land for nine developed lots in Grassy for this purpose

KIS does not intend to develop new housing as part of the project, but will provide support and encourage others who wish to develop suitable accommodation in Grassy and other areas of King Island through appropriate arrangements such as long-term (10-year) financial agreements.

The current assessment is that given the expression of interest and availability of other lots in Grassy Township, there will be sufficient housing and accommodation for the needs of the mining operation

At present it is estimated that accommodation will be required for a maximum of 106 construction personnel during the mine development. Temporary accommodation will be provided for this purpose as required. e.g. transportable ATCO style units.

### **1.9.2 Mine Site Land Purchase**

KIS will have to acquire the land that the proposed mining site lies on. The two blocks of land involved belong to the King Island Council who have expressed willingness to sell it. A professional valuation report commissioned by KIC shows a valuation of \$500,000 to \$700,000.

### **1.9.3 Water Resources**

The annual volume of Process Water required is estimated at 600,000 kilolitres per annum. The primary source of new process water to the plant will be from the Lower Grassy Dam which is replenished by rainfall and runoff from agricultural land above it in the Grassy River catchment. Some of this runoff is intercepted by the Upper Grassy Dam which supplies domestic water to the Grassy Township, and will supply domestic water needs of the mine site. Water from pit dewatering operations and storm water runoff from the site will also be collected and used for process water and a significant percentage of the plant requirements will be supplied by the recovery of the decant water from the tailings dam.

A detailed water balance calculation using rainfall records from nearby communities shows that there will be adequate water available for the mine operation.

### **1.9.4 Power Supply**

Currently the projected consumption for the mine is 14,000 MWhrs/year with an average 8 hour demand of 2.8 MW, and 15 minute maximum demand of 4.25 MWh. Connected load will be 5.1 MW. Discussions with the Tasmanian power supply authorities (Hydro Tasmania) have shown little interest on their part in providing the required power through the public power system. The provisions of the Tasmanian

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Electricity Code would normally oblige specific Government Business Enterprises (GBE's) such as Aurora or Hydro to supply power on prescribed terms to all comers, under the Community Service Obligation (CSO) but this does not extend to providing services or a subsidised electricity price to KIS

The needs of the current island population are supplied by a 4.9 MW four unit diesel power station supplemented by a number of wind powered generator units. Except possibly at some times during the night, there would not be sufficient surplus capacity in this plant to operate both the mine and the King Island demand. It is therefore proposed to supply power to the mine site with a 6.4 MW stand alone four unit packaged diesel power plant located near the mine site and port area. Consideration will be given to connecting a link to the public power system for insurance purposes and possible access to lower cost wind generated power when available. Current plans call for the purchase and operation of the plant by KIS but consideration may be given to a build-own-operate (BOO) agreement with an outside contractor, possible Hydro Tasmania. Details can be found in Appendix 8 – Operating Cost Estimate

**1.9.5 Fuel Storage and Supply**

Total diesel fuel consumption for the KIS site is expected to be approximately 8 million litres (ML) per annum. Of this approximately half is used for mining, 45% for power generation and the balance for surface transportation, concentrate drying and other applications. This forecast compares with the current total annual liquid fuel consumption on the island of approximately 5ML, of which approximately 60% is used by the power station operated by Hydro Tasmania near Currie.

Annual Consumption of diesel fuel by KIS is shown in Table18 below.

**Table 18. Fuel Consumption Estimate**

<b>Area</b>	<b>Area Annual Consumption</b>	<b>Total Annual Consumption</b>
<b>Power generation</b>		<b>3,673,484</b>
<b>Mining</b>		<b>3,990,631</b>
Drills	150,000	
Loaders	1,671,408	
Excavators	200,000	
Haul trucks	1,939,223	
Service & maintenance vehicle	30,000	
Lube & fuel truck	20,000	
<b>Mill</b>		<b>371,429</b>
Concentrate dryer	371,429	
<b>Surface</b>		<b>133,000</b>
Crane	5,000	
Utility vehicles	40,000	
Trucks	50,000	
Tanker	30,000	
Portable welders	6,000	
Portable compressor	2,000	
<b>Total annual consumption</b>	<b>litres</b>	<b>8,168,544</b>

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All fuel supplies are at present brought to the island in Isotainers (chemical transport tanks built into a 20 ft container module) which are filled at Burnie, transported weekly on the only regular freight service to the island, and transferred into bulk storage facilities at Grassy. Fuel is purchased at the Tasmanian Terminal Gate Price (TGP) at Burnie and sold into customer's storage by the distributor/wholesaler, King Island Ports Corporation (KIPC).

Diesel storage on the island at present approximates four week's average consumption for the power station, reflecting a long-term assessment of the risk of disruption of to the supply chain.

This feasibility study is based upon (a) the use of diesel for both mobile equipment and stationary applications, (b) the installation of new bulk diesel storage by KIS with a capacity of approximately 4 weeks' usage, (c) purchase by KIS from KIPC through the existing logistics chain and (d) supply of fuel to the power station operator and mining contractor.

For the purposes of the study KIPC provided KIS with an estimate cost per litre (cpl) for the handling of the shipping and supply to KIS's storage

**Table 19. Fuel Supply Handling Costs**

	<i>cpL – Hydro Tas</i> (¢)	<i>cpL – KIS</i> (¢)
Isotainer lease	0.5	0.5
Road transport (3 legs)	2.1	1.4
Sea freight	10.6	10.6
General port costs	1.6	1.6
O&M for bulk depot	0.5	
Wharfage	1.1	1.1
Financing of capital costs	4.1	
Profit	5.0	5.0
<b>Total margin....</b>	<b>25.5¢</b>	<b>20.2¢</b>

The cost to KIS is therefore expected to be within the range 15¢ to 20¢ above the Devonport or Burnie TGP.

Assuming a Burnie TGP of \$1.24 and the 20¢ cpL KIPC margin estimated above, the invoiced cost to KIS would be \$1.44 or, after rebate and exclusive of GST, \$0.95 per litre.

## **1.9.6 Transport and Shipping**

### **1.9.6.1 Sea Freight**

Most of King Island Scheelite's freight in and out of King Island will be shipped through the Grassy Port facilities. The existing transport arrangement is constructed round the MV Sea Road Mersey a 4000 tonne general freight vessel operated by Patrick Shipping. The vessel does three round trips Melbourne to Devonport per week, on one of which the vessel spends Sunday at Grassy. This is the only regular sea freight service to King Island. The vessel is equipped for Roll On-Roll Off (RORO) operation and can handle containerized and bulk freight. It is not equipped

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with tanks to accommodate fuel shipments .While there is some concern about the impact of the takeover of Patrick by Toll Corp it is assumed, for the purposes of the Feasibility Study, that this service or similar will be continued during the mine operation.

The port facilities at Grassy are the only ones on the island capable of handling a 5000 tonne ship. Most of the freight delivered to the Island comes in through this facility. The port is set up with a single wharf which provides for unloading by RORO techniques as well as conventional crane and bulk unloading facilities. It is equipped with a building for transit storage of shipments in an out. There are no fuel storage facilities associated with the Port but the transit storage buildings on the site accommodates incoming freight and materials pending removal from the site.

It is enclosed by a breakwater but is not considered a safe facility for larger vessels to enter and depart in bad weather conditions, resulting in some cancellations of the regularly scheduled visits. Because of draft and size restrictions in the current port, it will probably be necessary to bring in larger pieces of equipment on barges and discharge them directly on the coast adjacent to the current Dolphin open pit.

**Figure 17. Sea Road Mersey unloading at Grassy Port Dock**



### **1.9.6.2 Air Transport**

The King Island Council owns and operates a commercial airport on King Island near Currie. There are currently three commercial airlines flying to the Island, King Island Airlines, Regional Express (REX) and TASAIR.

The larger airline Regional Express (REX) flies in twice daily to and from Melbourne.

King Island Airlines schedules two return flights per day to King Island out of the Moorabbin Airport (Melbourne) and provides daily freight services. KIA is able to handle bulk freight, with the capacity to carry goods up to 6 metres in length and significant weight in their Chieftain or Embraer aircraft.

TASAIR runs a comprehensive airline service between Hobart and Burnie (Wynyard) that connects on to King Island with two flights daily weekdays between King Island and the towns of Burnie and Devonport in Tasmania.

The airport has limited capacity for larger planes and is subject to weather caused delays on occasion.

### **1.9.6.3 Product Shipping**

The mine will produce a dried scheelite concentrate that will be shipped in Bulka bags in open top containers to Melbourne via the Sea Road Mersey for transfer to the customers transport systems, most probably international shipping off shore out of Melbourne. Annual Concentrate production is estimated to be  $\approx$  5,000 tonnes

## **1.10 ENVIRONMENTAL MANAGEMENT PLAN**

King Island Scheelite have carried out detailed studies on the various environmental areas that might be impacted or affected by the proposed mining operation. From these studies a detailed Environmental Management plan has been prepared for the site to identify significant environmental issues and develop management processes to minimise the environmental impacts of the operations. Details can be found in Appendix 1 – Environment which comprises the Development Proposal and Environment Management Plan (DPEMP) and associated Appendices which was prepared to support the development applications for the mine. These cover the following areas in significant detail which are too detailed to be listed in this Project Overview

The following major headings cover the scope of the document and demonstrate the detail covered:

- 1. Existing Environment**
  - Geology
  - Topography
  - Soils
  
- 2. Soil Diseases**
  - Management Measures
  
- 3. Water Management**
  - Storm Water
  - Water Courses
  - Current Water Quality
  - Flood Potential
  - Ground Water
  - Marine Water
  - Process Water Requirements
  - Domestic Water Requirements

**4. Construction Issues**

**5. Water Management Issues**

- General
- Storm Water
- Ground Water
- Marine Water
- Mine and Process Waste Water
- Domestic Waste Water

**6. Water Supply**

- Process Water Supply
- Domestic Water Supply

**7. Water Management Measures**

- Storm Water
- Ground Water
- Process Waste Water
- Domestic Waste Water
- Water Supply
- Monitoring Requirements

**8. Marine Fauna and Flora Issues**

- Existing Environment
- Potential Impacts
- Management Measures

**9. Coastal Processes**

- Existing Environment
- Potential Impacts
- Management Measures

**10. Flora**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Measures

**11. Fauna**

- Existing Environment
- Introduced, Species, Weeds and Diseases
- Potential Impacts
- Management Measures
- Monitoring Measures

**12. Aboriginal and Cultural Heritage**

**13. Meteorology and Air Quality**

- Meteorology
- Air Quality
- Potential Impacts

- Management Measures

**14. Noise and Vibration**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Requirements

**15. Solid Waste**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Requirements

**16. Overburden and Tailings**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Requirements

**17. Hazardous Materials**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Requirements

**18. Hazards and Risks**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Requirements

**19. Visual Considerations**

- Existing Environment, Interactions and Settings
- Method of Assessment
- Potential Impacts
- Visibility and Significance
- Management Measures
- Monitoring Requirements

**20. Traffic**

- Existing Environment
- Potential Impacts
- Management Measures
- Monitoring Requirements

Interested parties should revert to the original section or appropriate detailed Appendices to the Environmental Management Plant included in the DPEMP Document in **Appendix 1 – Environment**.

## **1.11 COMMUNITY RELATIONS**

King Island Scheelite is committed to maintaining a proactive Community Relations program during the operation of the mine. To provide a basis for this, KIS have carried out an extensive program of consultation with the King Island communities affected by the mine development, the local King Island authorities and with the Tasmanian government as part of the licensing and permitting process for this project. This has included close liaison with the King Island Council, a number of community meeting during the licensing process and a commitment to the community to continue a modest program of community involvement during operations to support local activities and various projects that would be beneficial for the local people and their workforce. This program will be developed as the mine goes into development and operation and will in part respond to concerns raised by the CCC from time to time.

## **1.12 LICENSING AND PERMITTING**

### **1.12.1 Mining Lease**

A mining lease is required to operate the mine and will be issued by MRT upon approval of the Environmental Management plan and development proposal by the King Island Council. A Mining Lease Application has been filed and is in progress, waiting upon approval by the King Island Council. Currently the Environmental Management Plan is under review by the DPIWE and if approved will be submitted to the King Island Council for their final approval of the Development application. Upon approval the MRT will then issue a Mining Lease and KIS will then be able to proceed with the development of the project. Currently no serious impediment to the approval process has arisen, and approval could be received in September 2006. However there is an appeals process which if invoked may cause a delay of several months depending on the issues raised. It is not expected that this process will result in the rejection of the project or the application of any restrictions that would affect the viability of the project

### **1.12.2 Other Permits and Approvals**

Permits required include:

- Environment Protection (Sea Dumping) Act 1981
- Dangerous Goods Act 1988
- Dangerous Goods (General) Regulations 1998

Approvals required include:

- Environmental Management and Pollution Control Act 1994 (and associated Policies and Regulations)
- Forest Practices Act 2000
- Land Use Planning and Approvals Act 1993
- Mineral Resources Development Act 1995

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These are normal permits and will require appropriate approvals be obtained and compliance measures be put in place. These requirements are listed in Table 20 below.

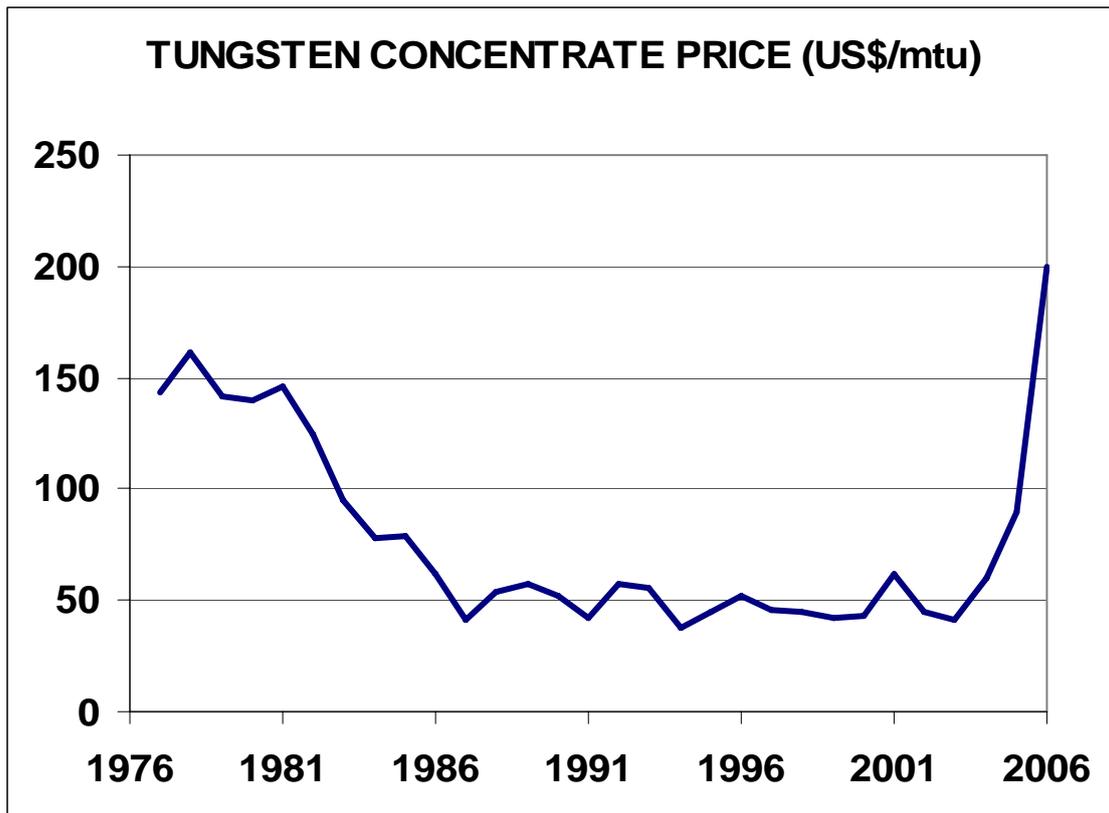
**Table 20. Licensing and Permitting Requirements**

<b>Legislation</b>	<b>Approval</b>	<b>Permit</b>	<b>Compliance</b>
<b><i>Commonwealth</i></b>			
Best Practice Environmental Management in Mining			✓
Environment Protection and Biodiversity Conservation Act 1999			✓
Environment Protection (Sea Dumping) Act 1981		✓	
National Pollutant Inventory (NPI)			✓
Relevant National Environment Protection Measures			✓
<b><i>State</i></b>			
Aboriginal Relics Act 1975			✓
Crown Lands Act 1976 (Public Benefits)			✓
Dangerous Goods Act 1988		✓	✓
Dangerous Goods (General) Regulations 1998		✓	✓
Environmental Management and Pollution Control Act 1994 (and associated Policies and Regulations)	✓		
Environment Protection Policy for Air Quality 2004			✓
(Draft) Environment Protection Policy (Noise) 2002			✓
Fire Service Act 1979			✓
Fire Service (Miscellaneous) Regulations 1979			✓
Forest Practices Act 2000	✓		
Historic Cultural Heritage Act 1995			✓
Land Use Planning and Approvals Act 1993	✓		
Mineral Resources Development Act 1995	✓		
Resource Management and Planning Appeal Tribunal Act 1993 and associated amendments			
State Coastal Policy 1996			✓
State Policies and Projects Act 1993			✓
State Policy on Water Quality Management 1997			✓
State Protected Environmental Values 1999			✓
Tasmanian Solid Waste Management Policy 1994			✓
Threatened Species Protection Act 1995			✓
Water Management Act 1999 and associated regulations			✓
Weed Management Act 1999			✓
Workplace Health and Safety Act 1995 and associated Regulations			✓

### **1.13      MARKETING**

Between 1990 and 2005, the average annual price of tungsten has fluctuated between US\$30 and US\$70/mtu (as shown in figure), compared to prices as high as US\$150/mtu in the mid 1970s. The main reason for the low prices in the last 15 years has been attributed to the plentiful supply of tungsten from China, together with disposals of material from stockpiles. The 30 year price history is shown in Figure 18 below (Roskill “Economics of Tungsten”).

**Figure 18. Price History**



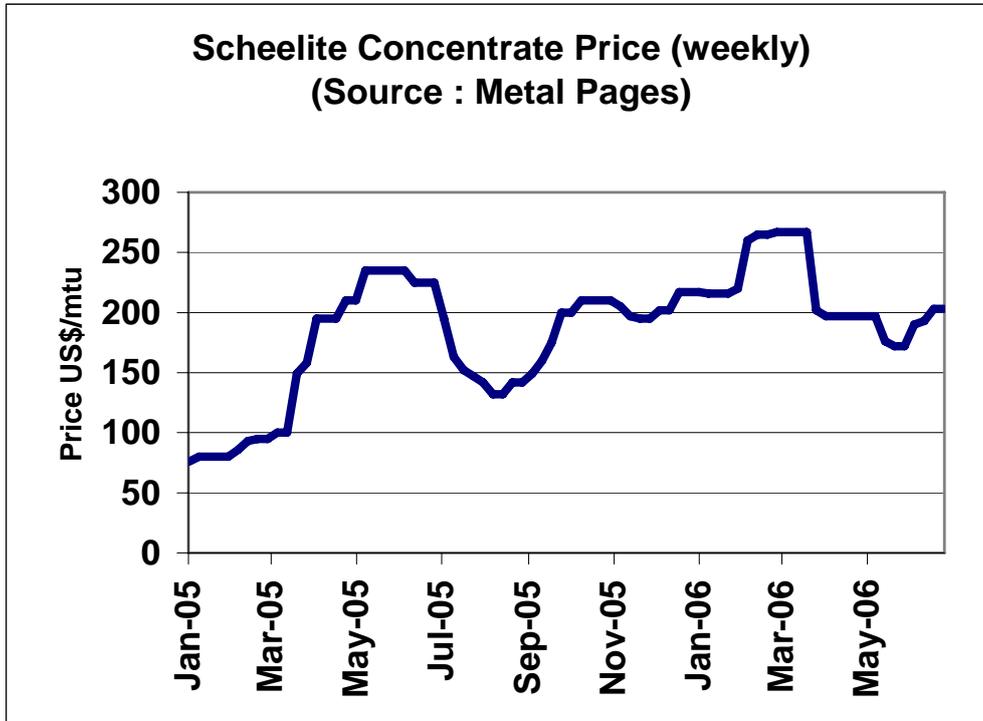
It was concluded in this report that future prices will be dictated by the Supply Side of the business with the following factors influencing the price:

- the large Russian stockpile appears to be exhausted,
- releases from the US strategic stockpile are strictly regulated,
- Although China accounts for 80% of global mine production it no longer exports concentrate,
- the quality of its concentrates has declined as the best wolframite reserves have been exhausted.
- Mine production fell from a peak of 55,000 tonnes of contained W in 1990 to an estimated 36,000 tonnes in 1999 rebounding to approximately 46,000 tonnes in 2003.
- The current gap between mine supply and demand is variously estimated to be as high as 20%.

Based on the Metal Pages concentrate price weekly quotation, the current

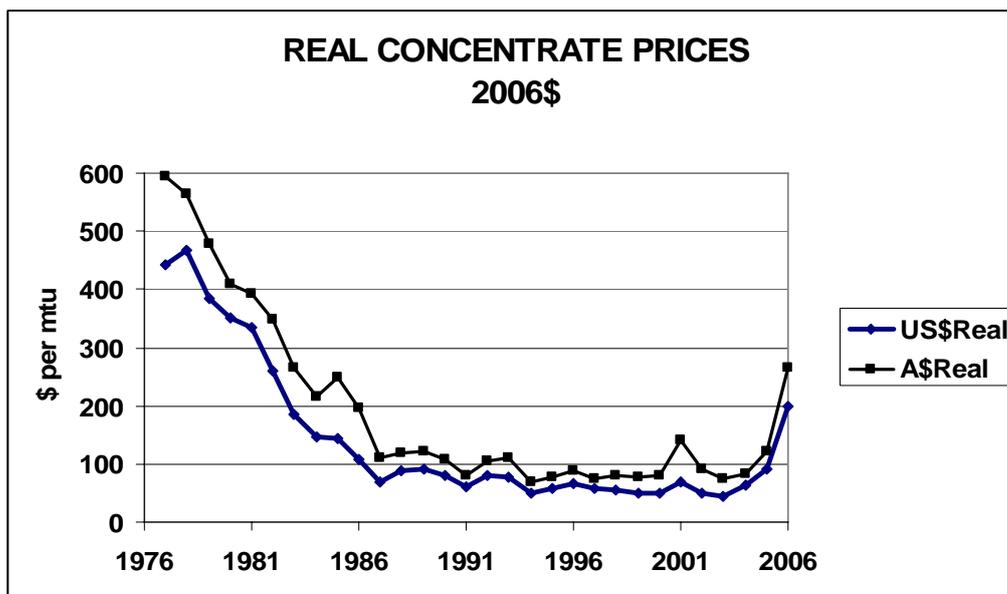
concentrate price is approximately US\$200 per mtu and has been in the range +/- 33% of this for the last year as shown in the following Figure 19. Over the last year maximum weekly price was US\$267 and minimum was US\$132 per mtu.

**Figure 19. Scheelite Concentrate Pricing(18 months)**



Real prices in 2006\$ in both US\$ and A\$ are shown in Figure 20. below.

**. Figure 20. 30 year Tungsten Concentrate Prices 2006 \$**



In the financial evaluation concentrate pricing for the base case was set at US\$150 per mtu, with evaluation also carried out at price levels from US\$100 to US\$250 per mtu.

## **1.14**      **EXPANDED CASE**

The “Expanded Case” is a hypothetical upside case, based on similar parameters to the Base Case. It assumes that, after a reasonable initial period to evaluate the performance of the process plant, KIS would establish the feasibility of extending the pit to a depth of RL-248 (Cut backs 1-5), again with the mining rate increased to 700,000 tonnes per annum from the ore reserves and additionally providing a call factor of 5% to reflect expected additional tonnages recovered around the old mine workings in accordance with experience at other mines in Australia

Parameters for this case would therefore be:

- Based on the US\$150 Whittle pit shell to RL248,
- No limit to overall maximum waste rock production. Overall mining rate increased to accommodate the higher strip ratio and ensure continuous ore feed to the mill
- Processing plant throughput - 600,000 tpa,
- Selective Mining resulting in rejection as waste of 15 – 10 % of material currently included in the current reserves in B and C Lenses with consequent increase in grade of ore fed to the mill,
- Application of a 10% call factor for recovery or additional ores in the old stoping areas
- Increase in overall mining rate to accommodate the effects of the increased treatment rate and selective mining impacts, and
- Application of a 0.5%WO<sub>3</sub> cut off grade for feed to the mill with stockpiling of the 0.2 to 0.49% WO<sub>3</sub> material for later processing when insufficient production of the higher grade material is available to maintain full mill throughput rate.

At present work is ongoing to confirm the potential feasibility of the Expanded Case option both in a physical and financial sense. The Expanded Case would illustrate the upside potential that these optimized options would produce as the assumptions are confirmed as mining progresses. Work continued on these items would include:

- Re-evaluation of the geotechnical design parameters to reflect the increased depth of the pit
- Statistical assessment of the distribution of ore and waste lenses within B and C lenses to assess the benefit of selective mining
- Review of ore occurrences in the pgh. combined with selective confirmatory drilling to bring some/all of this material into resource/reserve status
- Any approvals required for the increased activities including such items as the increased mining rates (noise, dust, additional personnel)
- Approvals for the disposal of the increased amounts of waste materials (rejected ore) from selective mining; and

- Approvals for the expansion of the pit to accommodate the final RL-245 profile
- Confirmation that a suitable cut off wall is still feasible in the deeper water and sand profile resulting from the extended pit perimeter.
- Receipt of the necessary approvals to accommodate the extended life of the operation and the additional waste materials produced therefrom.

### **1.14.1 Expanded Case – Supporting Information**

The following information in support of the potential Upside Cases for the King Island Scheelite Open Pit operation has been provided by Ray Soper based on his experience and anecdotal information from a number of gold operations in Western Australia where open pit mining methods have been used to recover resources remaining from former underground mining operations in similar conditions to those at King Island Scheelite.

Likewise Selective Mining is used extensively in the Western Australian gold mines to reject internal waste from ore in complex orebodies and to recover smaller lenses of ore that would not have been identified in the wider spaced drilling around the major ore lenses

### **1.14.2 Call Factor**

A frequent experience when new open pit mines are developed over old underground mines is that the tonnage of recovered metal is actually significantly more than predicted in resource estimates. There are other occasions when, for one reason or another, the recovered metal is less than predicted in resource estimates.

Mines usually seek to reconcile recovered metal with predicted metal for defined mining blocks to develop “mine call factors” that are used to adjust future production forecasts.

AngloGold Ashanti, on their website define the mine call factor as follows:

***“Mine call factor***

***The ratio, expressed as a percentage, of the total quantity of recovered and unrecovered mineral product after processing with the amount estimated in the ore based on sampling.”***

The mine call factor for any particular mine is developed over a period once production commences using disciplined reconciliation techniques such as those described in the Snowden paper “**Beyond Reconciliation - A Proactive Approach to Using Mining Data**” by C Morley. This paper can be found at <http://snowdenau.com/Files/BeyondReconciliation.pdf>.

Bill Holly has reported that common experience in WA gold mines is that the amount

of gold recovered when open pit mines are developed on old underground mines is usually more than predicted by resource estimation techniques. He says that mine call factors of around 20% are common.

There are reasons to expect that there will be differences between scheelite predicted and scheelite recovered at the Dolphin Pit. Some of these differences may be negative, particularly where more ore has been removed by stoping than was recorded in mine production control plans. On the other hand, differences may be positive, reflecting the recovery of scheelite that was not included in the resource estimate for some reason.

One of the great advantages of scheelite mining is that scheelite fluoresces under UV light, and is thus clearly visible when UV lamps are used at night. This offers grade control geologists a simple and direct method of visually recognising ore. They can mark up ore bands with paint to guide recovery of the ore material in mining operations the next day.

#### **1.14.2.1 Mineralisation in Horizons Other than B-Lens and C-Lens**

The AMC Resource Estimate primarily considers scheelite that occurs in B-Lens or C-Lens. However, there is evidence that scheelite does occur in other horizons as shown by the following quotes:

“Although three main ore lenses are defined – the A, B and C lenses, current production is from the C-Lens (Dolphin Underground; A-Lens was mainly the Open Cut”. From: ‘A Geological Outline of the Dolphin Mine Area’ Undated, but probably late 1980s.

“The Pgh (pyroxene-garnet hornfels) orebody which overlies the Upper C-Lens has no accurate data due to the lack of information and erratic nature of mineralisation. However, up to 10% of the annual ore production from the Dolphin Mine comprises Pgh ‘dilution’. Of the 1988/89 Ore Extraction of 130,000 tonnes at 1.243% WO<sub>3</sub>, some 16,000 tonnes at 1.20% WO<sub>3</sub> comprised ex-resource Pgh and Lower C-Lens ore.” From P2 of a memo headed “Ore Resource”, presumably by Alan Fudge.

“The metasomatic replacement of marble was a volume for volume process, and each 1,000,000 tons of marble was converted to average grade ore by introduction of about 370,000 tons of SiO<sub>2</sub>, 250,000 tons of Fe<sub>2</sub>O<sub>3</sub>, 55,000 tons of Al<sub>2</sub>O<sub>3</sub>, 30,000 tons of H<sub>2</sub>O, and 13,000 tonnes of WO<sub>3</sub>, with removal of 350,000 tonnes of CO<sub>2</sub> and 82,000 tons of CaO (Edwards Baker and Callow, 1956).

Only four beds, B, C, E and F [so far as we can determine B = B-lens, C = Upper C-lens, E = Lower C-lens, and F = Banded Footwall Beds] contain appreciable marble. The grade of ore reflects these differences. Beds B and F, with only 10% marble, became ore averaging less than 0.2% WO<sub>3</sub> where mineralised. The upper part of bed C, which was almost completely marble became ore of plus 1% WO<sub>3</sub> grade, and the lower part with less marble became lower grade ore. Bed E, with about 50% marble, became ore of approximately 0.5% WO<sub>3</sub>.

The Top Orebody Bed, C, and the Bottom Orebody Bed, E, contain all of the economic ore, except for portions of the base of Bed B and the calcareous horizon of Bed A with scheelite bearing veins in cross fractures.

The Top Orebody lenses out westwards. It is generally between 20 and 38 ft thick averaging 25 ft. Complete drill hole intersections contain up to 3.7% WO<sub>3</sub>, with an average grade of 0.84% WO<sub>3</sub>. The Top Orebody is high grade for a strike length at sea level of 1500 ft west of No 3 Fault. It does not occur above 100 ft above sea level and thins down dip. The deepest drill hole intersection is 230 ft below sea level.

The Bottom Orebody Bed is from 15 to 110 ft thick, and averages 90 ft. It is almost completely mineralised at sea level from No 3 Fault westwards for a strike length of at least 2400 ft, where it is truncated by the granite contact. Up dip from sea level small to very large blocks of unreplaced marble are enclosed in ore, and the most northerly drill holes failed to locate economic quantities of ore in the bed. Complete replacement extends down dip from sea level to the deepest drill hole intersection at 300 ft below sea level.

Ore reserves at 27<sup>th</sup> October 1962 were 1,895,000 tons averaging 0.52% WO<sub>3</sub> down to 110 ft below sea level. There is an additional 900,000 tons of ore indicated to a depth of 300 ft below sea level.”

‘Scheelite Deposit of King Island’ by C L Knight and P B Nye, revised for the second edition by staff of King Island Scheelite (1947) Ltd.

#### **1.14.2.2**      **Isolated Drill-Holes**

There may be isolated drill holes that intercepted mineralisation, but because there are no other nearby holes, that material may not have been included in the resource estimate.

In the event, this material will be recognised during mining, and can therefore be directed to the appropriate ore stockpile.

#### **1.14.2.3**      **Undiscovered Zones**

Open pit mining allows the identification and recovery of mineralised zones that were not detected in drilling. This may be because they are somewhat smaller than the drill spacing, or it could be because fault offsets have caused the drilling to miss the mineralised zone. These zones will be recognised in the mining operation.

#### **1.14.2.4**      **Mineralised Waste Material**

It is evident from our site investigations that at least some of the material discarded by previous miners as waste is actually mineralised. Lindsay Newnham has commented that drilling through the overlying waste material revealed that around 10% of the material carries ore grade WO<sub>3</sub>.

#### **1.14.2.5**      **Establishing a Mine Call Factor**

The above discussion seeks to establish the fact that there will be additional ore presenting to the mill from several different sources that are not currently contained in the resource estimates, especially if selective mining is used.

It is of course not possible to quantify the amount of such ore-grade material that might be located. However, it is evident that the tonnage of ore recovered should exceed the resource estimate. That is, there should be a positive Mine Call Factor.

Properly the Mine Call Factor should be established through reconciliation during the course of mining operations, and it should probably not be assumed for the Equity Base Case. However, it is appropriate to include sensitivities to reflect possible Mine Call Factors up to 20%.

#### **1.14.2.6**      **Economic Impact of the Mine Call Factor**

If a positive Mine Call Factor is established, it could have a significant beneficial impact on the economics of the project. In effect, it would mean that some of the material currently classified as waste will in fact be ore. This will reduce the strip ratio, and increase the tonnage of ore produced in each annual mining program, thus reducing the overall costs of mining per tonne of ore milled.

#### **1.14.3**      **Selective Mining**

The 3D block model of the deposit is oriented east/west with blocks sized 20m east/west, 10m north/south, and 6m vertically. However, the mineralised zones drape the anticline dipping to the south-east, and there is therefore an imperfect fit between the resource blocks and the mineralisation. This raises two issues.

**Dilution:** Since blocks don't closely match the ore-boundaries, there are many blocks that include significant tonnages of waste material. If the ore can be selectively mined, this waste material can be rejected. This would reduce the tonnage of "ore" in that block, but increase the grade. The tonnage of contained WO<sub>3</sub> will remain the same as the resource estimate.

**Ore Loss:** There are many blocks containing some ore that are rejected to waste by the block model. If selective mining is used, the mineralised material can be recovered. The tonnage of contained WO<sub>3</sub> recovered will increase that stated in the resource estimate.

Overall then, selective mining of the whole ore beds, if it can be done, will result in less dilution, and recovery of more WO<sub>3</sub> than is currently stated in the ore resource numbers.

This aspect of selective mining is quite separate from the selective mining of ore within the beds, and rejection of inter-bed waste.

It should be noted that selective mining will result in the rejection of Waste material currently included and accounted for in the reserves for each orebody. The application of selective mining will result in the production of the same amount of metal in the original reserve block assessment but spread over a lower tonnage of material. The outcome will be a lower tonnage of correspondingly higher grade ore presented to the mill for treatment.