

TASMANIA MAGNESITE NL
MINING LEASE APPLICATION

ARTHUR RIVER

CONCEPTUAL MINE PLAN

June 2010

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1. ARTHUR RIVER MAGNESITE MINING PROPOSAL

The Arthur River Magnesite project is located approximately 50 km SW from the city of Burnie near the confluence of the Keith and Arthur Rivers (Figure 1).

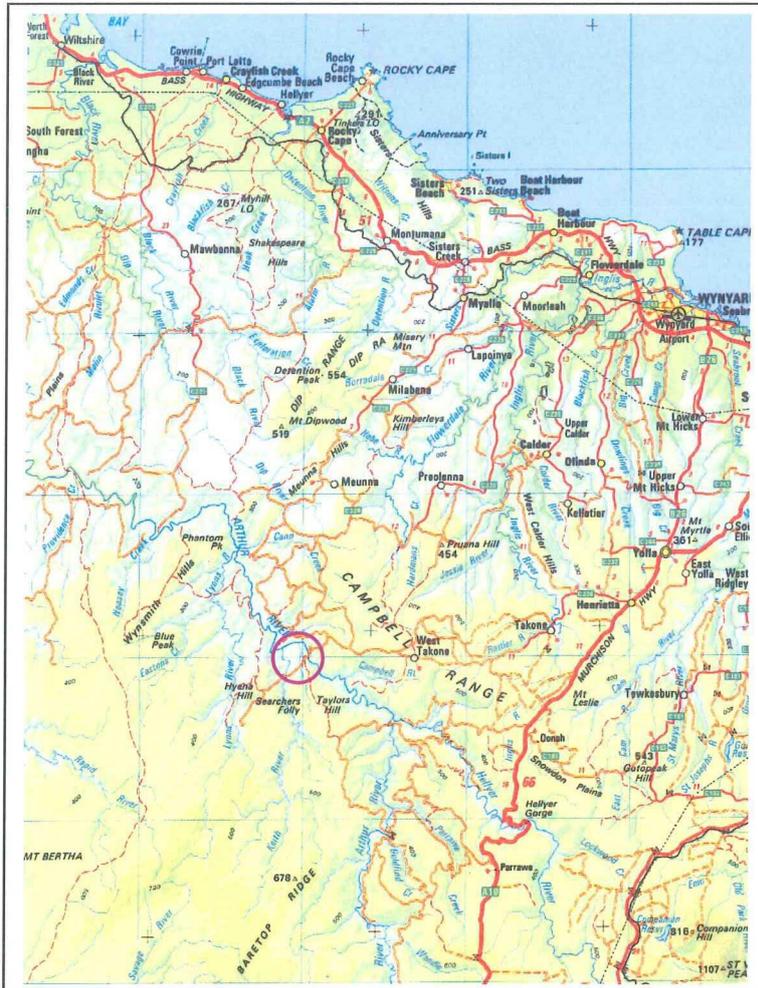


Figure 1: Project location (circled)

The Mining Lease Application (MLA), shown in Figure 2, lies entirely within Retention Licence RL 8718 (RL 18/1987) owned by Tasmania Magnesite NL, a company wholly owned by Beacon Hill Resources Plc, a London Stock Exchange-quoted public company. The portion of RL 8718 outside the MLA will be retained as RL 8718 on a reduced basis.

The land tenure is Crown Land (Property ID: 2531278; LPI: GGH09) and Forestry Tasmania is the managing authority.

A full description of the project is provided in the Project Description document¹, submitted with the Mining Lease application.

¹ Tasmania Magnesite NL (November 2009) *Mining Lease application: Arthur River: Project Description*.

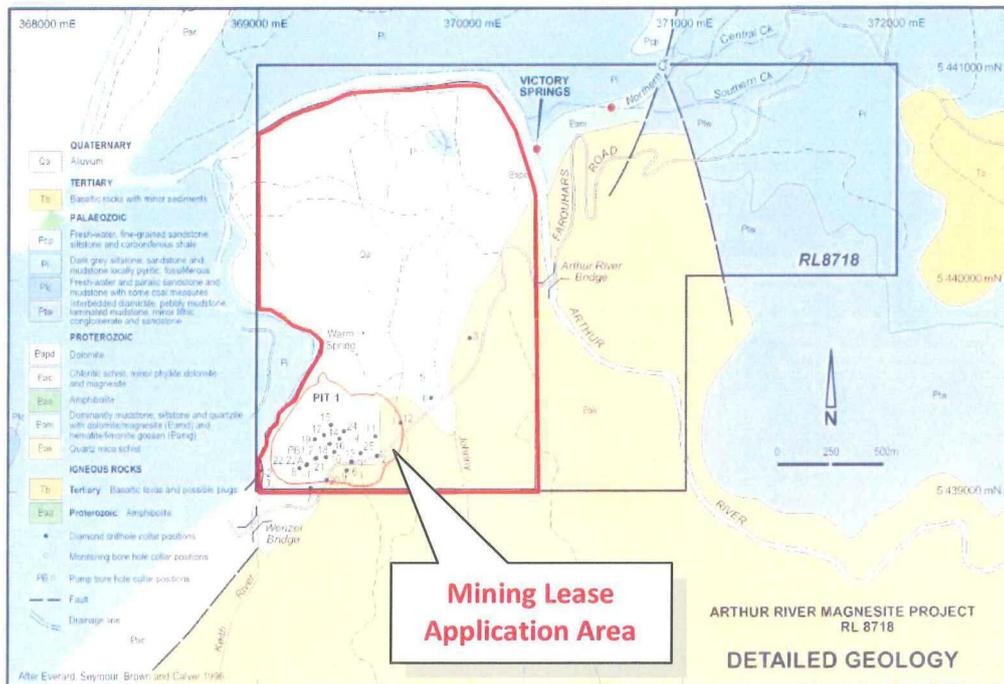


Figure 2: Project geology and Mining Lease application area

2. MINING LEASE APPLICATION

Tasmania Magnesite submitted a Mining Lease application to Mineral Resources Tasmania (MRT) on 25 November 2009. That application has been advertised and largely processed but MRT have requested additional information on the mine plan to allow the processing to be completed.

This document provides that additional information.

This document describes the conceptual mine plan for the purposes of the Mining Lease application. It does not attempt or purport to describe the details of how potential environmental impacts will be managed. Environmental management will be described in the project's Development Proposal and Environmental Management Plan (DPEMP) and a likely referral under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*, both of which will be the subject of separate assessment and approval.

3. ADAPTIVE APPROACH TO MINING

The project area has a long history of forestry operations and exploratory drilling.

The site's vegetation is regrowth forest from a clearing operation conducted in the 1980's and flora and fauna surveys have confirmed that there are no threatened flora species on the site, apart from the giant freshwater crayfish (*Astacopsis gouldi*). This species is common in the Keith River, a lease area boundary, and Johnny's

Tas Devil!

Creek, which runs through the lease area. *Astacopsis gouldi* is listed as threatened under both State and Commonwealth legislation.

Mining activities would need to protect the crayfish, either by protecting the habitat in the first instance or, if that was not practicable, by relocating the crayfish populations.

The wider area surrounding the lease site contains significant karst features, such as exposed pillars, that are well regarded in geoconservation terms. There are no significant karst features on the lease area itself but the mining methodology and approach should seek to protect the karst features in the surrounding area from indirect effects, such as ground vibration and changes to their groundwater regime.

By its nature, karst makes for a complicated groundwater regime. Exploratory drilling can provide indicative information about groundwater behaviour within the ore body but drilling alone cannot resolve all uncertainties. The scope of the residual uncertainties and their management will only become properly understood as the resource is opened up through mining.

The groundwater uncertainties also present a risk to the mining itself. It is possible that mining may open up flow pathways that are currently blocked or narrow, leading to a risk of flooding of the pit.

For these reasons, the approach adopted by Tasmania Magnesite is to implement an *adaptive mine plan*, which will ensure that groundwater and other uncertainties are exposed and resolved in a progressive, controlled manner.

The adaptive mining approach will also allow for more detailed metallurgical work and trial shipments for market testing and validation. Ongoing mining and marketing can then be efficiently tailored to site constraints and market requirements, thereby maximising benefits while minimising project, environmental management and closure risks.

The initial pit described in this document will be located in the area to the western side of Johnnys Creek where there is a substantial body of existing exploration drilling data. This pit may subsequently be expanded and/or a second pit on that side of Johnnys Creek may be opened up. Additional exploration drilling is being planned for an area on the eastern side of Johnnys Creek, and a pit could in due course be opened up in that eastern area also.

By its adaptive nature, the mine plan will necessarily evolve as findings come to hand. Any significant changes will be developed in consultation with MRT prior to their implementation.

4. MINING METHODS

Because of the uncertainties noted above, Tasmanian Magnesite proposes an initial single pit trial mining operation centred on a small section of the defined Arthur River magnesite resource to extract 50,000 wmt of magnesite ore. Extracted magnesite will be used for bulk metallurgical test work and small-parcel trial shipments to potential long-term offtake partners for assessment of commercial suitability.

Topsoil will be pre-stripped from the pit, waste rock/overburden dump and water settlement pond areas and then stockpiled for future rehabilitation purposes.

Waste material is exclusively comprised of Quaternary alluvium, which covers the majority of the Arthur River magnesite deposit. Extracted waste will be stockpiled in a designated waste dump area as indicated in Figure 3, some 1,200 m from the proposed pit. Although this is a considerable haul distance, the dump location has been set in anticipation of longer term mining, beyond the period of the initial pit.

The initial pit has been designed to avoid both hanging wall and footwall units, which typically exhibit disseminated pyrite.

The proposed pit design indicates the extraction of 79,000 wmt of alluvial waste rock and overburden and 50,000 wmt of magnesite grading 42.4% MgO as shown in Table 1.

Table 1: Initial pit - summary of waste and ore per 5 m bench

Bench RL		Ore			Waste		Total	
from	to	bcm	t	MgO%	bcm	t	bcm	t
155	150	-	-	-	-	-	-	-
150	145	-	-	-	24,443	48,955	24,443	48,955
145	140	5,703	14,828	42.1	13,486	28,578	19,189	43,406
140	135	3,574	35,293	42.5	576	1,498	14,150	36,791
		19,277	50,121	42.4	38,505	79,031	57,782	129,152

Mining methodology will be a simple free-dig, excavate and haul operation and is not expected to require the use of explosives. Excavation will be carried out using a 60 tonne 3.5 m³ bucket excavator and 30 tonne articulated dump trucks.

No blasting?

Excavation of the benches will proceed in 5 to 10 m wide blocks, each separated by an intervening pier of undisturbed rock. This is part of the adaptive mining approach. If groundwater problems arise as blocks are removed, the intervening undisturbed blocks will prevent piping connections of extended length from being created.

Responses to groundwater infiltration, such as grouting measures, will then be implemented on a block by block basis. Only when any such problems are dealt with would excavation of the intervening block commence.

Check
chemical
characteristics
of grout.
insert?

As the underlying karst system is progressively exposed by this block mining method, groundwater monitoring and karst examination will be conducted to build an integrated understanding of groundwater behaviour of the karst system so as to inform the preparation of the long term mine plan. This will be supported by groundwater models already prepared for the site, which will be expanded to incorporate both the pit findings and the findings of additional exploratory drilling that will be undertaken on the eastern side of Johnny's Creek.

The potential impacts of mining and any associated changes to the groundwater regime on the karst system of the wider surrounding areas will also be able to be determined, and any necessary protective measures developed.

Ore will be hauled to a ROM pad adjacent to the pit and stockpiled in preparation for beneficiation.

Haul road and site access roads will be maintained by grader.

A conceptual pit and infrastructure layout for the mine is shown in Figure 3, with a 3D view shown in Figure 4. Pit and dump cross sections are provided in Figure 5 and Figure 6 respectively.

The location of the pit and infrastructure has been selected to ensure a buffer of at least 50 m is retained between these disturbance areas and both the Keith River and Johnny's Creek. These buffers provide more than adequate protection for the habitat of the giant freshwater crayfish (*Astacopsis gouldi*).

→ Provided sediment control is effective.

5. MINE INFRASTRUCTURE

The mine will have basic infrastructure including parking and a general purpose workshop, office, and ablution block. All buildings will be transportable.

Power will be supplied by a diesel generator of sufficient capacity to satisfy the estimated peak load demand of 80 KVA and will be fed from diesel alternator set by a cable to a low voltage motor control centre in a substation building adjacent to the generator shed, which will be an open-sided, flat roofed steel structure.

Mine dewatering pumps will be trailer mounted mobile units powered by diesel engines. By separating the power requirements of the pumps from the rest of the mine's infrastructure, the need for unnecessary oversizing of the diesel generator will be obviated, along with the need to connect an electrical supply from the surface substation to the pit floor. Point source noise will also be reduced.

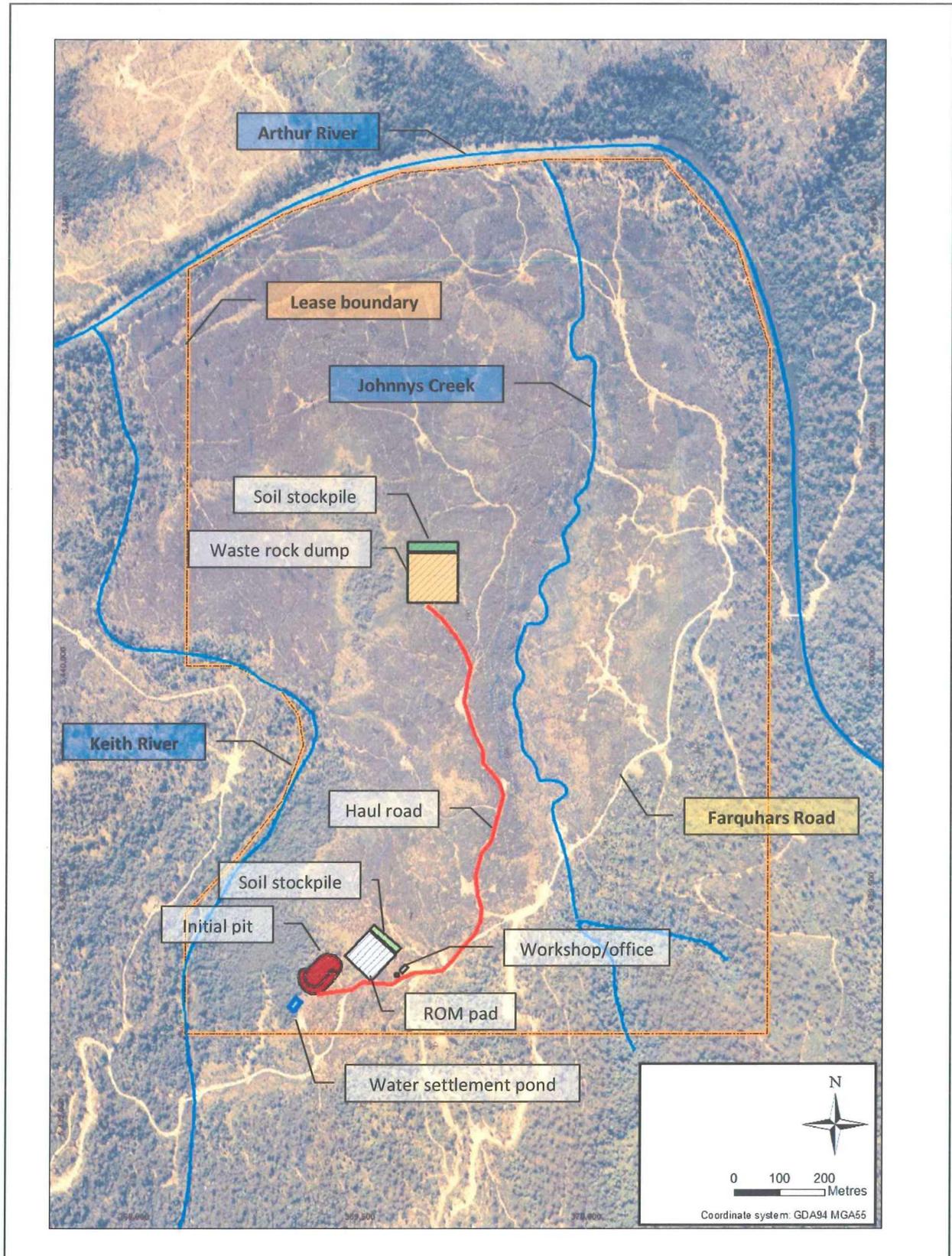


Figure 3: Conceptual initial pit and infrastructure layout (to show underlying features and tracks, the aerial photo used is 1984, taken after logging)

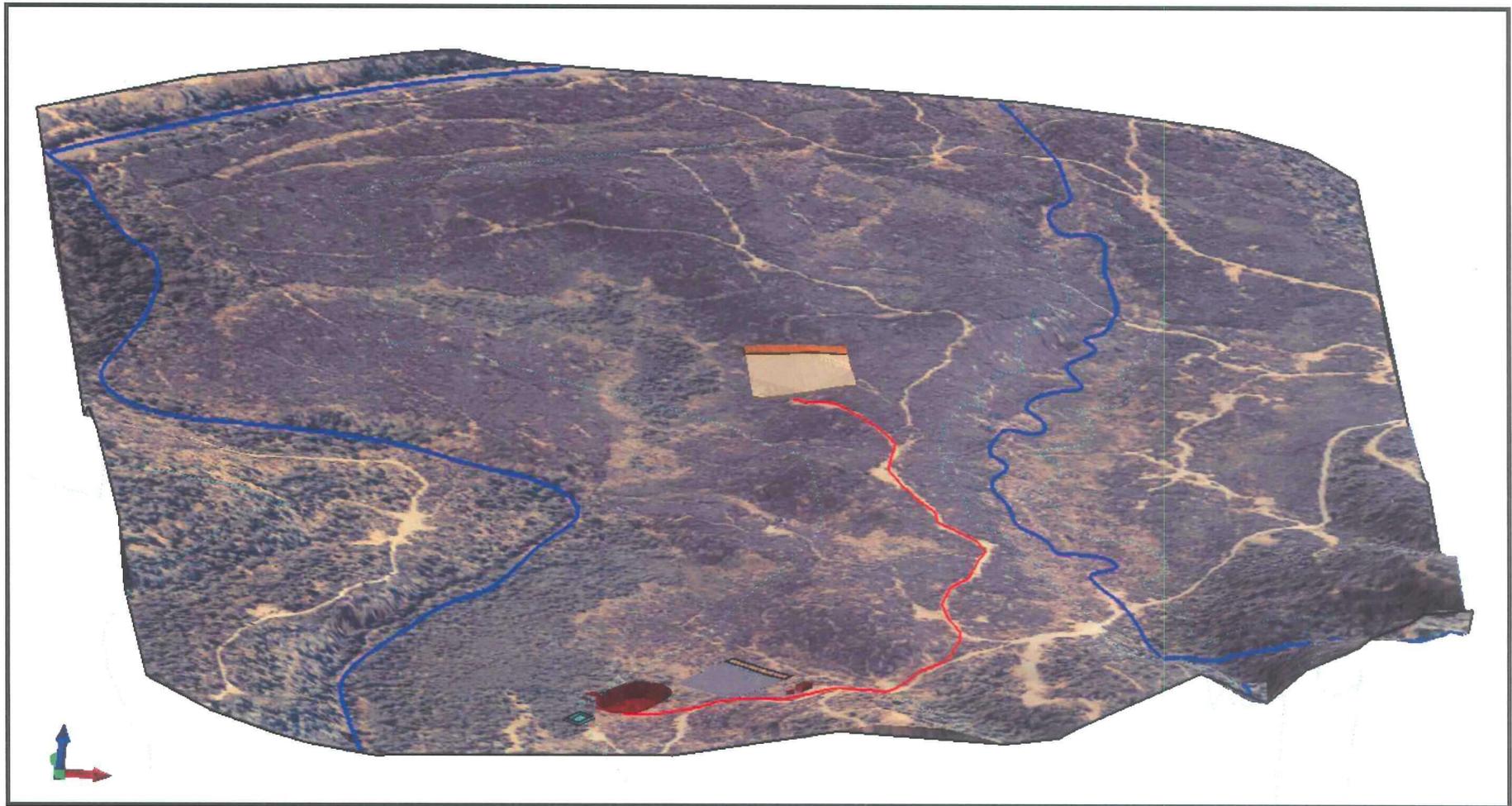


Figure 4: 3D view of conceptual pit and infrastructure layout (refer to previous figure for nomenclature)

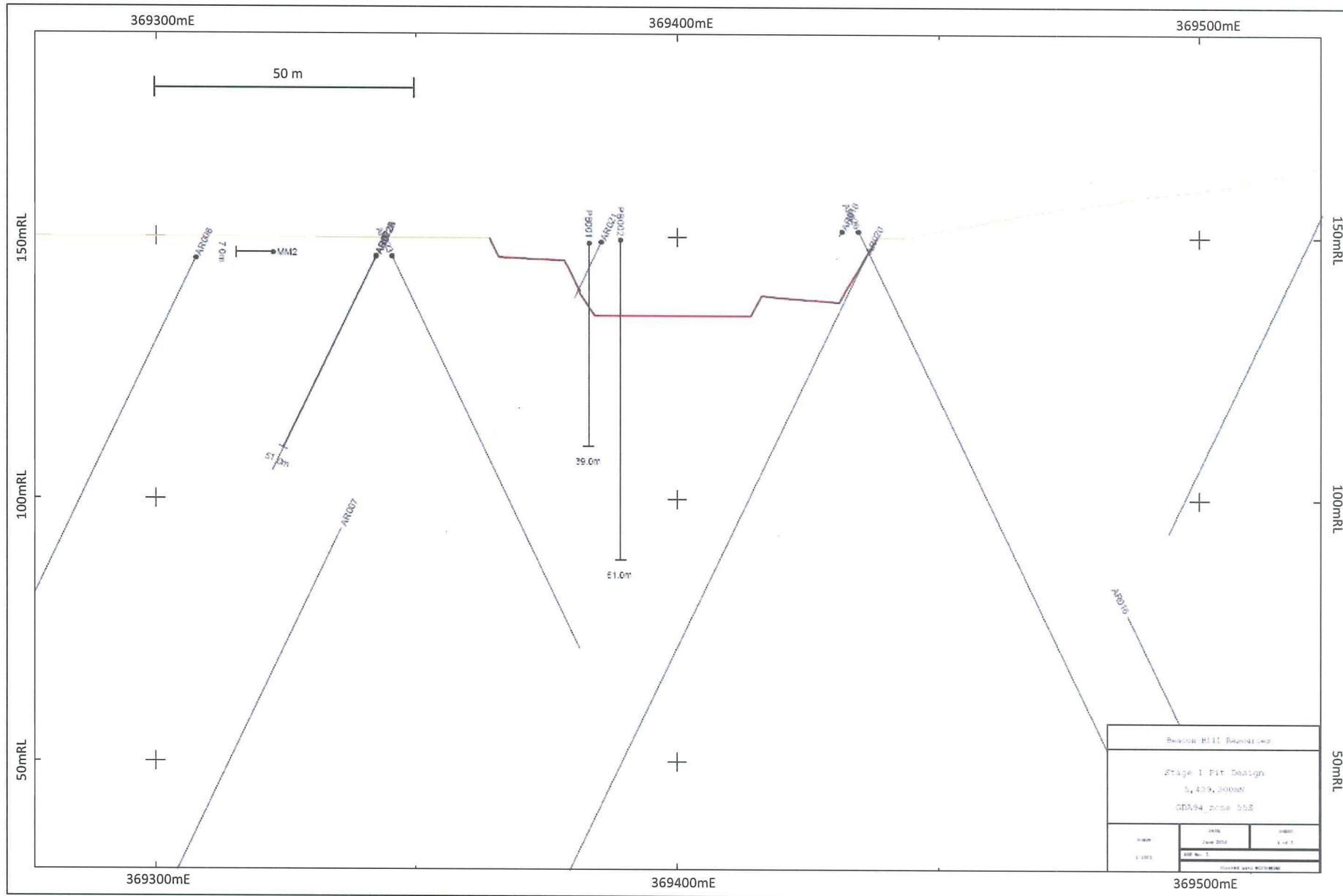


Figure 5: Cross section of initial pit

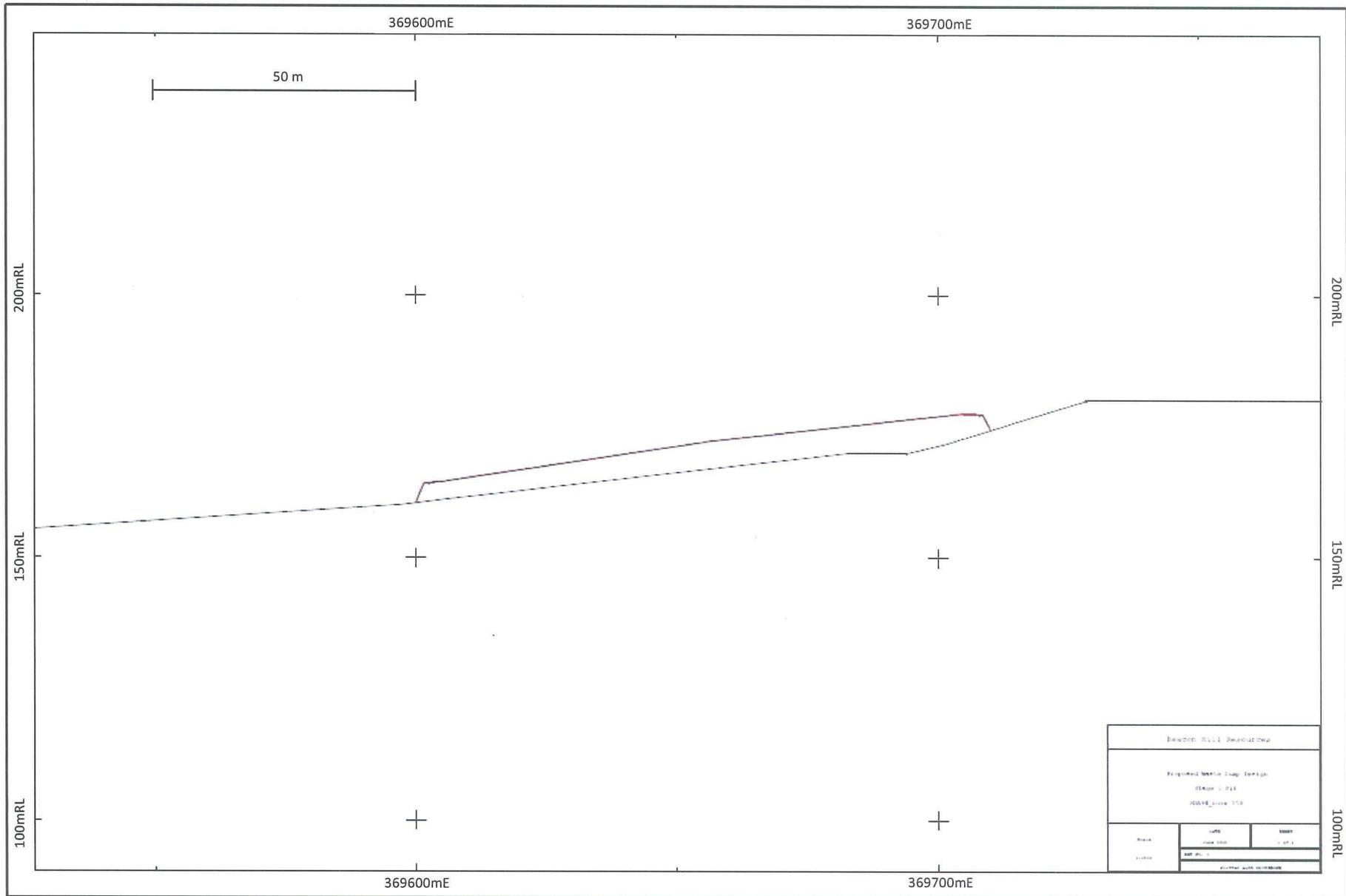


Figure 6: Cross section of initial waste rock dump

The main compound will include storage for chemicals, paints and fuel oils in appropriately designed bunded areas.

Potable water will be sourced from the Arthur River and filtered using activated carbon and direct ozone treatment or disinfectant.

Sewage will be collected for treatment in an on-site Aerated Wastewater Treatment System (AWTP) or similar. Treated effluent will be collected and transported off site to a waste treatment and disposal facility. ✓

*improvement
on previous
proposal*

A number of stockpiles will be maintained on site, namely:

- The ROM pad for extracted magnesite with capacity to store 20,000 bcm of ore
- Crushed material stockpiles adjacent to the ROM pad
- Topsoil stockpiles
- The waste rock dump.

Topsoil will be recovered during the construction of the open pit, the waste dump areas and the access roads and will be stockpiled for future rehabilitation works.

The expected footprint disturbance areas under this mine plan (for the initial pit and its associated infrastructure) are shown in Table 2.

Table 2: Expected areas of ground disturbance

Component	Area (m ²)
Pit	5,453
Waste rock dump	12,100
Top soil stockpiles	3,360
Haul road	6,015
Mobile plant	166
ROM pad	6,313
Settlement pond(s)	600
Office & workshop	61
Total	34,068

6. STORMWATER AND SITE DRAINAGE

Pit edges will be protected from water ingress by a spoon drain. The spoon drain will be lined and will discharge into a water settling pond constructed adjacent to the pit.

*nature of
lining?*

This settling pond (or a second, subject to engineering design) will also be used to treat ROM pad run-off, and a small settling pond may also be needed to treat run-off from the waste rock dump.

7. MINE DEWATERING

As the proposed pit floor is some 20 m above the measured water table, groundwater ingress into the pit is likely to be minimal. Water inflows are more likely to be associated with rainfall and seasonal storm events. Mine dewatering will be managed by an in-pit mobile pump powered by an independent diesel generator. A backup pump will be stationed on site so that pumping capacity will be sufficient to cope with normal in-pit groundwater ingress as well as seasonal and abnormal storm water runoff events.

A sump will be constructed and maintained within the pit as the excavation progresses downward, from which all water ingress will be collected and pumped to a water settling pond.

Preliminary studies indicate that pit waste water should be discharged to a settlement pond designed to collect suspended solids that will inevitably be entrained. Studies estimate that mine drainage will require a minimum 6 hour retention period to effectively allow for settlement of suspended particulates. The estimated pond size will be approximately 500 m², with an average depth of 1 m. Final dimensions are subject to detailed design.

The settlement pond will have a series of internal spillways to dissipate energy, with any discharge being channelled to either the Keith River or Johnny's Creek (subject to detailed design and approval) through vegetated natural drainage lines. These study parameters will be reviewed and updated as required through the mine feasibility / DPEMP process.

8. SITE PROCESSING

Site processing will be kept to a minimum and will be undertaken by mobile crush and screen plant. Processing will consist of a simple vibrating grizzly to extract oversize (+750 mm) material feeding into a jaw crusher and screen plant capable of producing +150 mm, +12 to +150 mm and -12 mm sized ore.

Processed ore will report to four stockpiles:

- +750 mm coarse rejects
- +150 < 750 mm coarse fraction
- +12mm < 150 mm middlings
- -12 mm fines.

Unless electrical power is brought to the site, the mobile crushing plant will be diesel powered.

Due to the high rainfall of the area and the wet nature of ore feed, the need for dust suppression is expected to be limited. However, to allow for periods of dry weather, a water-based dust suppression sprinkler system will be installed.

9. METALLURGICAL EVALUATION

An important benefit of the initial mining is that it will generate sufficient material to undertake a range of beneficiation test work processes necessary to establish the most efficient and effective processing method required to produce a marketable DSO (direct shipping ore) product and assess downstream, value-add processing options.

Proposed metallurgical test work is designed to assess the amenability of Arthur River magnesite for the production of:

- Steel sinter flux
- Fettling (low) grade magnesia refractory
- Caustic calcined magnesia
- Dead burned magnesia
- Electro fused magnesia
- Use of calcined product to upgrade to Monolithic and/or environmental industry specifications.

Historical metallurgical test work by previous explorers indicates that Arthur River magnesite may not readily upgrade to meet Regular or High Grade Refractory DSO magnesite specifications due to elevated silica and iron contents. Based on preliminary data, the potential exists to upgrade Arthur River magnesite to Monolithic (Gunnable) Refractory specifications via deadburning and subsequent beneficiation of the deadburned magnesia.

Additionally, scope exists by various methodologies to upgrade magnesite through the removal of dolomite, which could form a saleable product (“dolostone”) for use as fertilizer in magnesium-deficient soils. Beneficiation methods to be tested are presented in Table 3. The location of any future beneficiation plant will be dependent on the testing results and an economic evaluation of options.

A flow sheet of proposed test work is included as Figure 7.

Table 3: Proposed ROM beneficiation testwork – steel sinter flux specifications

Beneficiation method	Target reject material	Analyte	Comments
Optical sorting	Dolomite	CaO	<ul style="list-style-type: none"> Reduce CaO via optical sorting coarse fractions down to 30-40 mm size
Screening	Dolomite and silica	CaO & SiO ₂	<ul style="list-style-type: none"> Crushing and screening at 5 mm top size to remove veinlets of finer dolomite and silica
Scrubbing	Dolomite and silica	CaO & SiO ₂	<ul style="list-style-type: none"> Alternative wet processing to coarse dry screening to remove veinlets of finer dolomite and silica
Heavy media separation (HMS)	Dolomite and silica	CaO & SiO ₂	<ul style="list-style-type: none"> Applicable down to 0.5 mm size Potential to beneficiate via HMS at finer sizes, eg. 5 mm – 1 mm size range via heavy media cyclones Assess beneficiation of -1 mm/+45 µm fraction via spirals
Gravity separation	Dolomite and silica	CaO & SiO ₂	<ul style="list-style-type: none"> Alternative to HMS Lower cost than HMS Lower efficiency than HMS Likely not applicable to lump ore Potentially applicable to fines -1 mm/+45 µm

10. HAULAGE OF CRUSHED ROCK TO BURNIE PORT

For trial parcel DSO marketing purposes, selected ore will be loaded onto B-double trucks and transported by road from the mine to the port of Burnie (see the Project Description for the conceptual route). The use of bulk bags may be required to minimise load spillage, dust dispersion and to ease handling. Shed storage may also be required and will be investigated as part of the DPEMP process.

11. REHABILITATION

Depending on the pace of the metallurgical testing program and market evaluation, the initial pit is likely to be extracted over a period of several months. If the work is successful and no insurmountable issues with groundwater infiltration arise, the mine plan will be revised in consultation with MRT and excavation will then continue under that revision. Rehabilitation of the pit at the end of its life will then be in accordance with the rehabilitation provisions to be described in the DPEMP.

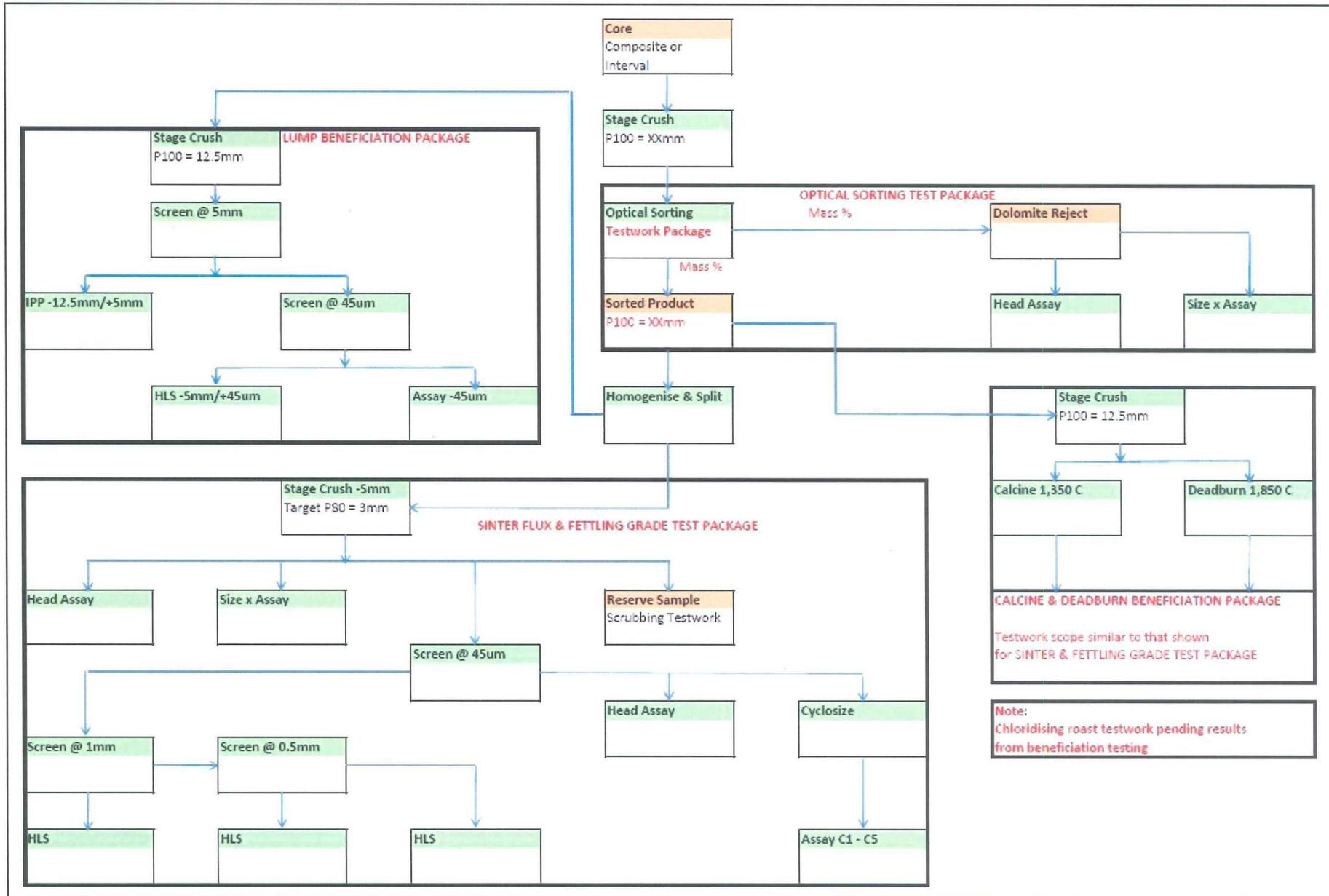


Figure 7: Flow sheet of proposed test work

If problems arise it may be necessary to cease excavation for a period until those difficulties are resolved. In these circumstances, the pit will be kept open on a care and maintenance basis, pending the recommencement of mining. During the hiatus, the main management requirement is likely to be dewatering but some earthworks may also be necessary to ensure slope stability while the pit remains inactive.

If such problems cannot be resolved, the pit will be closed and rehabilitated under the DPEMP prescriptions.

12. MINE PLAN DEVELOPMENT AND ENVIRONMENTAL APPROVALS

Following the approval of the mining lease application, Tasmania Magnesite NL will undertake site engineering surveys and develop a more detailed plan for the initial pit and rock dump.

A DPEMP and EPBC referral will also be prepared for submission respectively to the Tasmanian EPA and the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA), seeking environmental approval for the project.