

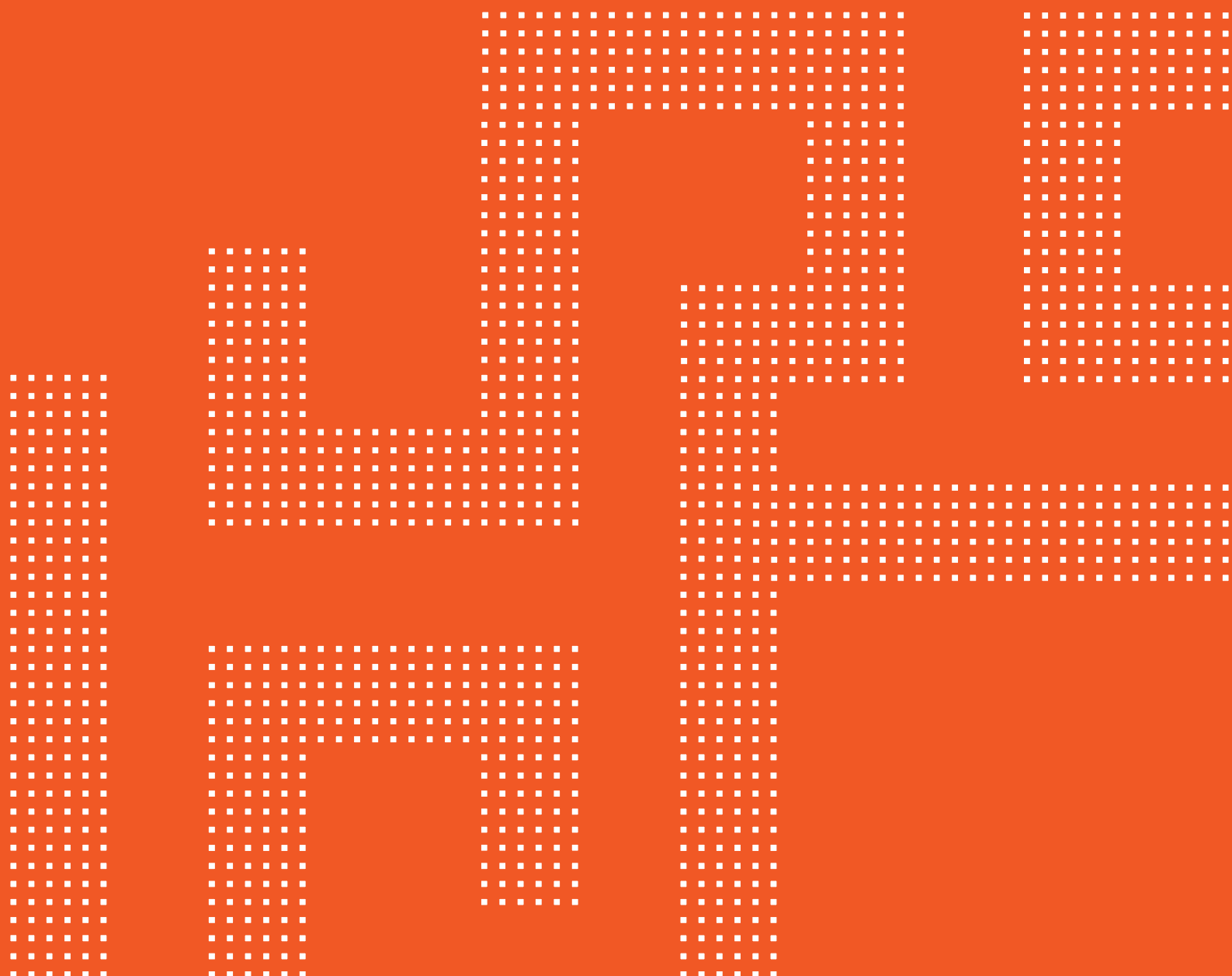
habitat planning

Quarry Closure & Rehabilitation Plan

**Extractive Industry ('Rockwood Quarry') and
Crushing of Recycled Concrete**

208 Winchester Lane, Table Top

August 2019



**Prepared for**

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Attachment A Risk Assessment – Rockwood Quarry

1. Introduction

1.1 Background

This Quarry Closure and Rehabilitation Plan has been prepared to accompany a Designated Development application for an extractive industry, the crushing of concrete and associated works at 208 Winchester Lane, Table Top, which is more commonly known as 'Rockwood Quarry'.

Rockwood Quarry is located on Nine Mile Hill on the western side of Gerogery Road approximately 10km north of Albury (**Figure 1**). The study area for the Quarry Closure and Rehabilitation Plan applies to the entire Rockwood Quarry site, described as Lot 2, DP 1018401 and Lot 3, DP233061 within the site layout details provided in **Figure 2** and more specifically applies to the following areas and activities:

- Rockwood 1 (Pit 1) – located in the eastern portion of the subject land and accessed via a Crown Travelling Stock Reserve;
- Rockwood 3 (Pit 3) – located within the central portion of the site and accessed via Winchester Lane; and
- Biosolid Waste Disposal area – located within the south west portion of the site.

The surrounding area is mixed in nature and adjoins a variety of different land uses. To the north, north-east and north-west are a number of residential lifestyle properties contained within the Himalaya and Claremont rural residential estates. A Crown Travelling Stock Reserve and Gerogery Road adjoin to the east. To the south is general industrial zoned land (NEXUS), Twin Cities Model Aero Club, as well as a large hard rock quarry (Burgess' Quarry). To the west is rural zoned land, as well as the Albury Wodonga Clay Target Club. Further details are provided in **Section 2** of this report.

1.2 Overview of Operations

AP Delaney & Co proposes to continue extracting hard rock granite material and 'buckshot' from the subject land, which will generally involve the following:

- Removal and stockpiling of vegetation;
- Stripping of topsoil;
- Blasting of materials;
- Ripping and removal of the material by excavator and front end loader;
- Crushing and processing of raw materials ready for transport;
- Progressive rehabilitation of worked quarry areas when available.

A total maximum of 100,000m³ of material is proposed to be extracted from the site annually with a total maximum amount of 3,000,000m³ extracted over a 30 year extraction period. Approval is also sought to crush up to 20,000 tonnes of solid recycled concrete waste.

It is also noted that the subject land already has approval to dispose of up to 10,000 tonnes of biosolid waste from the adjoining Norske Skog Paper Mill where wet weather precludes its disposal to nearby farmlands. These approved activities will continue to occur in association with the proposed activities

Existing and proposed infrastructure at the quarry includes: site office/workshop, parking areas, crushing plant and product storage areas. Further details are provided in **Section 3** of this report.

1.3 Purpose & Objectives

The objective of this report is to address the key aspects of quarry closure and rehabilitation so that they will meet the Government, community and company expectations. More specifically, the Quarry Closure and Rehabilitation Plan has been prepared in accordance with the following objectives:

- **Achievement of acceptable post-disturbance land use suitability** – Rehabilitation will aim to create a stable landform with land capability and/or agricultural suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed. This will be achieved by setting clear rehabilitation success criteria and outlining the monitoring requirements that assess whether or not these criteria are being accomplished.
- **Creation of stable post-disturbance landform** – Disturbed land will be rehabilitated to a condition that is self-sustaining, or one where maintenance requirements are consistent with the agreed post-quarry land use.
- **Preservation of downstream water quality** – That post closure surface waters that leave the site are not degraded to a significant extent. Current and future water quality will be maintained at levels that are acceptable for users downstream of the site.

In order to achieve this, it is necessary to coordinate a practical approach that will include, but not be limited to:

- Conducting proven and resilient revegetation techniques that acknowledge altered landform and soil conditions;
- Undertaking effective soil management techniques including stripping, stockpiling, re-spreading and appropriate weed control; and
- Establishing a monitoring program that can that determined whether the rehabilitated areas are moving towards a successful outcome.

1.4 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements (SEARs) for the Project were issued by the NSW Department of Planning & Environment (DPE) on 5 September 2016 and further advice provided by DPE on 16 March 2018. **Table 1** provides a summary of the SEARs related to closure and rehabilitation and indicates where the specific issues have been addressed within this document.

Table 1: Summary of SEARs relevant to Closure and Rehabilitation

Requirements of SEARs	Addressed in Document
Rehabilitation, including:	
▪ A detailed description of the proposed rehabilitation measures that would be undertaken throughout the development and during quarry closure;	Section 4
▪ A detailed rehabilitation strategy, including justification for the proposed final landform and consideration of the objectives of any relevant strategic land use plans or policies; and	Section 2
▪ The measures that would be undertaken to ensure sufficient financial resources are available to implement the proposed rehabilitation strategy.	Section 4.5

1.5 Legislative Requirements

This rehabilitation plan has been prepared in accordance with a number of local, state and federal legislative requirements as outlined in the reference section of this Plan.

1.6 Document Structure

This Quarry Closure and Rehabilitation Plan contains the following sections:

Section 2 – Site Description

- Description of subject land and existing site conditions, licenses and approvals that apply.

Section 3 – Project Description

- Summary and overview of proposed works;
- Details of specific works, operational site details and summary of rehabilitation measures as outlined within this rehabilitation plan.

Section 4 – Rehabilitation Management Plan

- Objectives for the rehabilitation of the quarry;
- Indicative scheduling of extraction and rehabilitation processes;
- Conceptual final landform design, including discussion of the proposed post quarry land use;
- Details on the implementation of an effective revegetation program;
- Details of an effective monitoring programme to assess performance of the rehabilitated areas;
- Risk, health and safety criteria associated with the rehabilitation of the site; and
- Objectives and preliminary success criteria and risk management strategy for the quarry closure.

Section 5 – Final Void Management

- Nature of the final void that will remain following cessation of quarrying operations;
- Details on the final stability and rehabilitation of the void;
- Summaries of actions to address long term void water quality; and
- Post closure safety and final land use options for the void.

Section 6 – Quarry Closure and Decommissioning

- Quarry closure and decommissioning objectives;
- Details on the conceptual quarry closure methodology for Rockwood Quarry;
- Financial and liability issues associated with the closure of the quarry;
- Proposed measures to manage the environmental and social impacts of quarry closure.
- Details regarding ongoing monitoring and rehabilitation reporting.

2. Site & Context Description

2.1 Subject Land

The subject land is described as Lot 2 in Deposited Plan (DP) 1018401 and Lot 3 in DP 233061 within the Albury Local Government Area, Parish of Jindera and County of Goulburn.

The property is addressed as 208 Winchester Lane, Table Top, but is more commonly known as 'Rockwood Quarry'. The subject land is located on Nine Mile Hill on the western side of Gerogery Road approximately 10km north of Albury (see **Figure 1**).

2.2 Existing Conditions

The subject land is 189.33 hectares in size and is generally irregularly shaped. The topography of the land is undulating and in parts quite steep (10-20% slope) as it forms part of Nine Mile Hill. Consequently, there are a number of changes of terrain over the site ranging from 250 metres Australian Height Datum (AHD) in the south-eastern corner of the site, up to 360 metres AHD at the crest of the hill generally located within the centre of the site.

Primary vehicular access to the site is derived from the unsealed Winchester Lane, which intersects with the adjoining sealed Gerogery Road located to the east of the subject land situated at the crest of the hill. A secondary unsealed access point also exists approximately 1.2 kilometres further south towards the Nexus industrial estate via an existing Crown Lands Travelling Stock Reserve (TSR).

The subject land has principally been used for the purposes of an extractive industry, with quarrying activities occurring on-site since the pre-1970s, including use by the former Hume Shire Council. These activities continue today with the current operator and also include the ancillary crushing and recycling of concrete and disposal of biosolid wastes from the adjoining Norske Skog Paper mill. Other activities to occur on-site include the intermittent grazing of cattle and other livestock on those portions of the site not used for quarrying activities.

The land is generally rural in nature and contains a number of extant patches of native vegetation and isolated/scattered paddock trees and unimproved pastures, as well as a number of dams, which are used for the purposes of filtering/treating stormwater run-off generated by the current quarrying activities on-site. Towards the crest of Nine Mile Hill, the landform has a rocky outcrop, which has made the subject land an excellent source of extractive materials and roadbase for construction activities.

A number of easements traverse the property including:

- Right of Carriageway – 20m wide;
- Electricity – 20m wide; and
- Water supply – variable and 4m wide.

It is also noted that within the confines of the overall site boundaries is an existing residential dwelling located at 96 Winchester Lane. This property was previously excised off from the subject land and utilises the existing internal driveway (Winchester Lane). It is noted that the occupants of this dwelling are relatives of the current site operator.

2.2.1 Soil Type

Soil conditions on-site comprise harder diorite granites overlain by 6 – 8 metres of moderately to highly weathered granites, which in turn are overlain by very highly weathered granite gravels and clay. The source rock material has been found to be very hard and durable and ideally suited to making high quality road base and fine crushed rock.

Also present on-site is a topsoil layer nominally 100mm thick that contains a layer of naturally occurring grasses and vegetation.

2.2.2 Flora and Fauna

The subject land contains native vegetation, some of which is contiguous with native vegetation on adjacent properties and road reserves. The entirety of the site has had some modification to the canopy with historical tree removal occurring for timber harvesting or pasture improvement. Higher quality woodland remnants occur on hilltops and rocky rises where the canopy remains relatively intact and the understorey is predominantly native.

Derived grasslands occur on the slopes and valley floors where the canopy has been predominantly removed but the understorey remains native. The eastern portion of the site has been grazed extensively by cattle while the western and northern sections have been excluded from grazing, with the exception of minor native grazing by Eastern Grey Kangaroo. A section of the subject land to the northeast of Pit 3 (being former Pit 2) has been impacted by past quarrying activities and now contains predominantly introduced vegetation.

Native vegetation within the study area consists of Plant Community Type (PCT) 266: *White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion* where the canopy remains and PCT 1000: *Speargrass – Redleg Grass derived grassland on hills in the Jindera to Holbrook region*, southern NSW South Western Slopes bioregion where the canopy has been historically removed

Woodland areas contain a relatively sparse canopy dominated by White Box *Eucalyptus albens* with some Blakely's Red-gum *Eucalyptus blakelyi* and Apple Box *Eucalyptus bridgesiana* present. The mid-storey is sparse to absent but where present includes Kurrajong *Brachychiton populneus* subsp. *populneus* and Hickory Wattle *Acacia implexa*. The groundcover consists predominantly of grazing tolerant native grasses including Red-leg Grass *Bothriochloa macra*, Lobed Wallaby-grass *Rytidosperma auriculata*, Common Wheatgrass *Elymus scaber* var. *scaber* and Umbrella Grass *Digitaria divaricatissima*. A sparse herb layer is present and includes Cranesbill Geranium *Geranium retrorsum*, Rock Isotome *Isotoma axillaris* and Rock Fern *Cheilanthes sieberi* subsp. *sieberi*.

Plant Community Type 266 was found to meet the listing criteria as the Box Gum Woodlands Threatened Ecological Community, listed as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The subject land was also found to contain suitable habitat for the Pink-tailed Worm lizard *Aprasia parapulchella*, listed as Vulnerable under the EPBC Act, and Swift Parrot *Lathamus discolor*, listed as Critically Endangered under the EPBC Act. Sixteen bird species listed under the *Biodiversity Conservation Act 2016* (BC Act) were recorded or predicted to occur within the study area.

2.3 Existing Quarry & Associated Activities

2.3.1 Existing Development Consents

Development Consent No. 73/95, was issued by the former Hume Shire Council on 17 September 1995 for the current quarrying operations. One of the principal conditions of this Development Consent was the inclusion of a condition that limited the life of the approval to 20 years.

Since this time, the original approval has been subsequently modified including; in March 1999 to allow for blasting, crushing and the recycling of concrete, as well as in June 2006, which allowed for an increase in the maximum annual production of crushed rock from 50,000m³ to 75,000m³.

In November 2016, a further modification was approved to allow for a one (1) year extension of time to allow the landowner to explore different approval options for the site. As an outcome of these investigations, a second one year extension was granted in September 2017 to allow quarrying activities to continue on-site, whilst the landowner prepared a new development application (this submission) compliant with current day legislative and planning requirements. In recognition of the amount of work required to complete some of these investigations, a third one year extension was granted to allow for the completion of the technical investigations.

It is noted that the most recent approval that applies to the subject land is Development Consent No. 10.2008.28631.4 issued on 12 September 2018 by Albury City Council and the revised date that this approval will expire is 17 September 2019.

Development Consent No. 147/92 also applies to the subject land and was issued by the Minister for Planning in relation to the adjoining Norske Skog Paper Mill. As part of this approval, approval was also granted for the disposal of biosolid wastes from the de-inking and wastewater treatments plants from the Norske Skog Paper Mill (classified as 'general solid waste (putrescible)') onto the subject land, which is used as a part of site rehabilitation works. More specifically, this waste disposal occurs in the south west corner of Pit 3 in a retired quarry pit.

The transport and disposal of this waste material is covered by a separate Development Consent (see DA 147/92) and a separate EPA licence and Resource Recovery Order (RRO) and Exemption obtained by Norske Skog from the EPA. This approval is open-ended and remains valid ongoing.

2.3.2 Existing Licenses

Given the scale and nature of the existing activities conducted on-site, the existing quarry is classified under Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act) and is subject to Environment Protection License No. 10069.

In accordance with the requirements of this licence, the scale at which the activity is carried out must not exceed the maximum scale outlined in **Table 2** below:

Table 2: Summary of EPA Licence Requirements

Scheduled Activity	Fee Based Activity	Scale
Crushing, Grinding or Separating	Crushing, grinding or separating	> 30,000 – 1,000,000 tonnes processed
Extractive Activities	Land-based extractive activity	> 50,000 – 1,000,000 tonnes extracted, processed or stored

Scheduled Activity	Fee Based Activity	Scale
Waste Disposal (application to land)	Waste disposal by application to land	Annual capacity

Source: EPA Licence 10069

Condition No. L2.2 of the existing licence allows for the following types of waste and volumes to be stored and/or processed at the premises:

- (a) Biosolid wastes from the de-inking and wastewater treatment plants at Norske Skog Paper Mill (must not exceed 10,000 tonnes in any reporting period); and
- (b) Solid concrete waste from residential, industrial and commercial sites (must not exceed 20,000 tonnes in any reporting period). The quantity of solid concrete wastes includes all waste received, stored and/or processed at the premises for recycling.

A copy of the current EPA Licence and a summary of compliance are contained in the main EIS report.

2.3.3 Existing Quarrying Activities

As outlined above, the existing quarry is currently operated in accordance with the conditions of Development Consent No's 10.2008.28631.4 (formerly 73/95) and 147/92, as well as EPA Licence No. 10069. It is reiterated that the quarry has historically been operated and used as a source of roadbase material and other construction products as part of the landowner's road construction business.

More specifically, the following activities are currently approved and undertaken on-site:

- Excavation of extractive materials from Pits 1 and 3, inclusive of the following works:
 - o Site preparation works (including identification of in-situ materials and removal and stockpiling of topsoil, ground litter and vegetation);
 - o Periodic blasting of in-situ material ready for excavation (Pit 3 only);
 - o Excavation of materials utilising a variety of machinery and equipment such as front end loaders, excavators, graders and the like;
 - o Crushing, processing and screening of materials using conveyor belts and crushing plant (Pit 3 only);
 - o Stockpiling of materials on-site ready for transport;
 - o Transport and haulage of materials off-site via the unsealed Winchester Lane and an unsealed internal road; and
 - o Ongoing restoration/rehabilitation works to ensure a self-sustaining environment when the operation of the quarry is fully completed.
- Crushing and recycling of an annual maximum of 20,000 tonnes of solid concrete waste from residential, industrial and commercial sites (Pit 3 only);
- Disposal of an annual maximum of 10,000 tonnes of bio-solid waste ('general solid waste (putrescible)') from the Norske Skog Paper Mill Waste Water Treatment Plant and Recycled Fibre Plant, which is used as part of ongoing site rehabilitation works (Pit 3 only).

A site plan showing the location of the various quarrying activities currently occurring on site is contained in the main EIS report and reproduced in **Figure 3** below.

2.3.4 Areas of Extraction

Rockwood Quarry is comprised of three separate extraction pits, being Pits 1, 2 and 3. A description of each of these is provided as follows:

- **Pit 1** – accessed from Gerogery Road via a Travelling Stock Reserve on the eastern portion of the subject land. This pit is used as a source of naturally occurring decomposed hill granite gravel known as ‘buckshot’, which is used in site works and road building activities or alternatively is used as an additive in the production of crushed rock at the site operator’s ‘Koowong’ Quarry. No blasting, crushing or processing of materials is undertaken in this pit.
- **Pit 2** – accessed from Winchester Lane and located within the central portions of the subject land. This pit was in the past used as a source of granite gravel during the construction of the Norske Skog Paper Mill. It has since been closed, rehabilitated and returned to grazing land; and
- **Pit 3** – accessed from Winchester Lane and located within the western portions of the subject land. This is the major source of material extracted from the site and comprises hard granite rock to produce fine crushed rock pavement material for road building purposes. Blasting, crushing and processing of materials are undertaken in this pit. Crushing of recycled concrete is also undertaken in this pit, as well as the disposal of bio-solid waste from the Norske Skog Paper Mill.

A site plan showing the location of each of these pits is provided in **Figure 3** below.

Current quarrying operations are undertaken in Pits 1 and 3. Specific details regarding each of these pits are provided below:

Pit 1

Pit 1 is accessed from Gerogery Road via a Travelling Stock Reserve and is located on the eastern portions of the subject land. This pit is used to excavate naturally decomposed granite using a 35 tonne excavator and a front end loader. The material is excavated periodically and placed into stockpiles within the southern portions of this pit, where it is loaded into truck and trailer combinations using a front-end loader.

Material excavated from this pit is used in site works and road building activities or used as an additive in crushed rock production at the operator’s ‘Koowong’ Quarry located on the Riverina Highway. This process takes place intermittently and is transported out of the pit from time to time on an as-needs basis. Some of the naturally occurring granitic gravels are screened to remove larger rocks from the source material to make granitic sand for landscaping purposes. It is noted that the materials excavated from this pit only comprise approximately 5% of the total materials excavated on-site.

No crushing or processing machinery or equipment are contained within this pit, with the only machinery contained within this area comprising several excavators, front end loader, bulldozer, as well as a mulcher used as part of the rehabilitation process. Where materials need to be processed or screened, this is undertaken within Pit 3.

The area has been highly disturbed and ‘benched’ into the crest of the hill with an extraction face of approximately 6-10 metres in height comprising exposed decomposed hill granite. The area has also been disturbed via the construction of internal access tracks, parking areas for machinery and vehicles, as well as the stockpiling of materials during the quarry’s 45 year lifespan.

Rehabilitation works have already commenced within the north eastern portion of this pit in an area that is no longer required for extractive purposes. This area has been backfilled with previously ripped and stockpiled topsoil, as well as clean virgin fill. The land has been stabilised and shaped to provide a final landform, which will be top-dressed and planted with local native species and groundcovers consistent with the rural nature of the land.

A plan showing the existing site conditions is contained in **Figure 4**. An aerial photograph of Pit 1 showing current day arrangements is also provided in **Figure 5**.

Pit 2

Pit 2 is accessed from Winchester Lane and is located on the southern side of this accessway within the central portions of the subject land. As outlined above, Pit 2 was operated as a gravel pit and receival area for bio-solids from circa January 1981 to December 1983 as part of the initial construction of the Norske Skog Paper Mill. Since this time, this pit has been closed, covered, rehabilitated and returned to its natural state, comprising grazing land.

Pit 3

Pit 3 is located in the western portions of the site and is accessed via Winchester Lane. It is the largest of the quarry pits and the main source of extractive materials on-site. It contains the main site office and staff amenities (lunchroom, toilet and septic disposal area), as well as the majority of machinery and plant on-site (front end loaders, bulldozers, various trucks, crusher, screener etc).

Activities conducted in this pit include drilling and blasting of the source granite rock and the crushing and screening of material to produce crushed rock pavement materials. The finished material is then placed into stockpiles for later transport to construction sites where it is used for the construction of road pavements, carparks and building pads.

Periodic blasting is undertaken from time to time in this pit to break down in-situ materials, which allow it to be processed by excavators and front end loaders. Historically, blasting events have occurred approximately every two years by a sub-contractor experienced in drilling and blasting at the direction of the site operator.

Pit 3 is also the location where broken concrete is received from various demolition sites comprising demolished kerb and gutter, footpath slabs, reinforced concrete slabs and concrete footings and foundations. Under the current conditions of the EPA Licence conditions of the site, a maximum of up to 20,000 tonnes of recycled concrete can be received and processed annually.

The concrete is broken down for processing using a 35-tonne excavator and hydraulic jaws and hammers and is then processed through the crushing plant where the material is crushed and screened to produce a fine crushed rock material. Reinforcing steel is separated out from this material during the process using an electromagnet. The steel is then salvaged and put into bins where it is transported off-site for recycling by a third party.

Similar to Pit 1, a number of rehabilitation works have already commenced in the south western portions of the site as part of the staged rehabilitation of the site back to rural grazing land. Such works have included the backfilling of soil and the reshaping and top dressing of land. It is noted that as part of this rehabilitation process, biosolid wastes received from the adjoining Norske Skog Paper Mill resulting from de-inking and wastewater treatment plants are also used to help achieve the final landforms on-site as part of the rehabilitation process. Under the conditions of the current EPA Licence, a maximum of 10,000 tonnes of biosolid waste can be disposed of on-site annually. This biosolid waste acts a 'super phosphate' or fertiliser, which helps improve soil quality, encourages seeding root development, plant growth and regeneration on-site.

2.3.5 Extractive material

Rockwood Quarry is generally comprised of Jindera granite and the quarry extracts two main materials, being hard granite rock and decomposed hill gravel known as 'buckshot'.

Jindera granite typically occurs at the base of the highly weathered granite at a depth of approximately 8 metres. In both the quarried and unquarried areas, the moderately to highly weathered granites are overlain by approximately 2 metres of extremely weathered granite and clayey gravel.

The harder diorite granites are blasted on a 12 metre face and benched into the hillside, whereas the decomposed gravel or granitic sands ('buckshot') are excavated on a 3-4 metre face into the hillside using 30 and 40 tonne excavators.

Hard granite rock is currently excavated from Pit 3 and is then crushed and screened to produce fine crushed rock pavement material for road building purposes. Buckshot materials are currently extracted from Pit 1 and are used in site works and road building activities or alternatively is used as an additive in the production of crushed rock at the site operator's 'Koowong' Quarry located on the Riverina Highway.

Historically, of the total materials excavated on-site, approximately 95% of all materials excavated are hard granite rock from Pit 3, as compared to only 5% of buckshot material sourced from Pit 1. Consequently, the majority of total material excavated on-site is sourced from Pit 3.

2.3.6 Quantities of material

At present, the existing quarry operating on-site has approval to extract up to a maximum of 75,000m³ of material per annum. The extraction of material on-site currently occurs only on an 'as needs' basis to satisfy the current operator's local road construction and earthmoving operations. In the last 10 years, the existing quarry has had an average annual certified extraction rate of 51,000 tonnes (or 23,000m³) as shown in **Table 3**, which is well below the current (75,000m³) maximum annual extraction rate that the quarry has approval for.

Table 3: Rockwood Quarry – Annual Extraction Rates

Year	Fine Crushed Rock	Recycled Fine Crushed Rock	Beaching	Buckshot	Total (tonnes)	Total (m ³)
2008	22,612	23,643	740	8,330	55,325	24,896
2009	54,770	9,960	954	5,705	71,738	32,282
2010	40,114	13,874	1,477	5,307	60,772	27,347
2011	30,878	9,672	868	4,091	45,509	20,479
2012	23,468	5,152	2,123	6,008	36,751	16,538
2013	37,203	5,240	732	5,746	48,921	22,014
2014	25,052	6,095	907	4,386	36,440	16,398
2015	23,593	14,404	1,168	4,386	43,122	19,405
2016	31,338	8,636	1,130	3,957	46,401	20,880
2017	51,363	12,612	1,447	3,961	69,383	31,222

Source: AP Delaney & Co records, 2008-2017

2.3.7 Hours of operation and workforce

Condition No. 9 of Development Consent No. 10.2008.28631.4 and condition No. L5 of EPA Licence 10069 stipulates the following days and hours of operation:

- *Extraction – 7am to 6pm Monday to Saturday; and*
- *Loading – 7am to 6pm Monday to Saturday; and*

No haulage of product away from the quarry site is permitted on Sundays or Public Holidays.

Notwithstanding the above, given the quarry is not a commercially operating quarry, but rather used to support the current site operator's road construction business, the existing quarry does not operate on a continuous full-time basis. Based on historical maximum extraction rates (750m³ extracted per day), the quarry only operates on average approximately 3 days per month or approximately 30 days per year.

When in operation, the quarry has a minimum of three (3) staff present on-site for safety reasons.

2.3.8 Stockpiles

Rockwood Quarry utilises a number of stockpiles for the storage of materials, which are later transported off-site. Pit 1 currently contains two stockpiles of material, whilst Pit 3 contains four stockpiles of materials and a concrete storage area (stockpile).

These stockpiles generally range in size from 100m³ to 5,000m³ and are approximately 15 metres in height depending on the amount of material that is stockpiled at any given period. These stockpiles will gradually (or rapidly) depending on demand be reduced and once almost exhausted, will trigger a need for further extraction and stockpiling for use.

The two stockpiles contained within Pit 1 are generally comprised of naturally occurring (unscreened) granite gravel and screened granite gravel whilst the stockpiles contained within Pit 3 are generally comprised of Class 2 Fine Crushed Rock (FCR) and processed recycled crushed concrete. An additional concrete storage area (stockpile) is also contained within Pit 3, which is used to store concrete waste materials that are waiting to be separated and processed.

The periodic stockpiling of material is considered necessary to allow for the most efficient operation of the site and avoids the need to continually extract small quantities of materials on a regular basis, which is considered inefficient and uneconomic.

These stockpiles have been located and positioned so as to not be seen from surrounding or adjoining lands. In particular, the stockpiles contained within Pit 1 are screened and located within a bowl and are not visible from surrounding lands. Similarly, the stockpiles contained within Pit 3 are well setback from the boundaries of the site, are screened from adjoining residents by existing ridgelines and have been located and positioned behind existing remnant vegetation and landscape screenings, which allow these stockpiles to blend into the natural landscape and terrain of the land.

These stockpiles have also been stabilised and located so as to not cause issues of sedimentation loss, erosion or run-off and are watered down during high wind periods and production to avoid the issue of dust generation, as well as any other environmental harm as detailed within this report.

2.3.9 Equipment

The following machinery and equipment are used in the current quarrying operations on-site and is typical of other extractive industries and includes:

- front end loaders;
- excavators;
- graders;
- tractors;
- bulldozer;
- various trucks;
- employee vehicles;
- crushing plant;
- screening plant;
- water cart; and
- mulcher.

It is noted that when Rockwood Quarry is not in operation, some of this equipment is relocated to other working quarries in the same ownership as the site operator.

In addition to the equipment outlined above, the subject land also contains a small separate site office with associated staff amenities (lunchroom and toilet). A septic disposal area is located to the south of the site office between the existing crushing plant contained in Pit 3.

2.3.10 Blasting and Crushing of Recycled Concrete

As outlined above, in March 1999 the former Hume Shire Council granted a modification to the original development consent which allowed for the blasting of in-situ extractive materials and the crushing of recycled concrete on-site.

Accordingly, the existing quarry crushes and stockpiles recycled concrete on-site within Pit 3 as outlined in the enclosed site plan. In accordance with Condition L2 of EPA Licence 10069, the quarry can only receive, store and process a maximum of 20,000 tonnes of solid concrete waste from residential, industrial and commercial sites during any reporting period.

A summary of the annual extraction and crushing rates of the quarry is outlined in **Table 3** above.

Similarly, Condition No's L4 and L5 of the EPA Licence contain specific conditions in relation to blasting. More specifically, condition L5.1 limits blasting activities to 10am-3pm Mondays to Fridays.

Given that the existing quarry is only used to supply materials for the existing operators' road construction business, blasting has occurred infrequently approximately every two years as outlined in **Table 4** below. On average, approximately 21,000m³ of extractive material is blasted during each blast period, which typically satisfies the demand for extractive materials for a two year period when combined with existing available in-situ materials.

Blasting is only undertaken in Pit 3, which comprises the hard rock granite and all blasting undertaken on-site is done by a sub-contractor experienced in drilling and blasting at the direction of the site operator.

Table 4: Rockwood Quarry – Blasting Records

Date of Blast	Volume Bank Cubic Metre (BCM)
28 May 1999	10,427
26 May 2000	20,000
5 October 2001	20,000
23 March 2004	27,500
21 April 2006	12,325
4 April 2008	32,883
10 December 2009	21,850
28 January 2010	12,680
7 February 2013	36,200
1 September 2015	16,450
11 May 2017	20,619
	230,944

Source: AP Delaney & Co records, 1999-2017

2.3.11 Road Haulage and Transport

As part of the ongoing operation of the site as a quarry, extractive materials which have been processed are transported off-site for use in local road construction projects. In addition, recycled concrete from local construction and demolition projects are also transported to the site for crushing and re-purposing.

Primary vehicular access to the site is derived from the unsealed Winchester Lane, which intersects with the adjoining sealed Gerogery Road located to the east and is used to access Pit 3. A secondary unsealed access road also exists approximately 1.2 kilometres further south towards the Nexus industrial estate via an existing Travelling Stock Reserve (TSR) that is used to access Pit 1.

Although the existing quarry has approval to extract up to a maximum of 75,000m³ of materials per annum, based on historical extraction rates, the quarry has operated well below this maximum capacity. As a consequence, the average number of truck movements per day between 2008 and 2016 (based on a truck and trailer combination carrying 33 tonnes of material operating 312 days per annum and 8 hours per day) was only 4.81 truck movements per day.

As both roads are unsealed and are shared by a number of different road users, a 40km/hr speed limits exists along this roadway for safety reasons, as well as to minimise opportunities for the generation of dust. A radio system is used by transport drivers for safety reasons and during periods of hot, dry weather, the access road is watered down via an existing water cart on-site. In addition, the site operator has planted a number of dense landscape screening trees along this roadway to further limit issues of dust, as well as to respond to a number of previous concerns raised by adjoining residents.

It is noted that the quarry has operated for the past 45 years without any road/traffic safety incidents.

2.3.12 Waste Disposal

In addition to current quarrying activities conducted on-site, the subject land also has approval for the disposal of wastes from the de-inking and wastewater treatments plants from the adjoining Norske Skog Paper Mill (classified as 'general solid waste (putrescible)'). In accordance with the EPA licence

conditions that currently apply to the subject land, a maximum of 10,000 tonnes of waste material is permitted to be disposed of on-site in any reporting period.

At present, the wastes are transported to the subject land and disposed of in a waste disposal area located in the south west corner of Pit 3 in a retired quarry pit (see **Figure 3**). Materials are transported via truck and trailer and placed at the edge of the tipping face on the eastern side of the waste disposal area, where they are then pushed into the pit via a front end loader.

The disposal of this waste only occurs intermittently when weather precludes the transportation and disposal of this material to other farmlands and paddocks located within a 20 kilometre radius of Norske Skog. The composition of this waste material contains a number of nutrients including phosphorous, carbon and lime, which are used in land application processes that help improve the quality of soils. The transport and disposal of this waste material is covered by a separate Development Consent (see DA 147/92) and a separate EPA licence and Resource Recovery Order (RRO) and Exemption obtained by Norske Skog from the EPA.

Under the conditions of this approval, a number of cut-off drains and a leachate dam were required to be constructed to protect natural drainage lines on-site, as well as the preparation of a hydrogeological study and groundwater monitoring program to ensure that the groundwater does not become contaminated. The applicant was also required to install 12 piezometers (6 deep and 6 shallow) around the site to monitor the groundwater, as well as undertake annual reporting and independent environmental audits.

It is noted that of the total 57,900 tonnes of waste that was generated and disposed of in 2017 by Norske Skog, only 3,903 tonnes of it was disposed of to Rockwood Quarry. It is reiterated that the disposal of this waste on-site is used as part of the rehabilitation of an exhausted quarry pit via both the filling and reshaping of land and its application on soils. Any run-off that is generated from this waste disposal area is collected in a leachate dam located on the western side of the disposal area and is then applied to vacant farmland located to the north west of the disposal area during summer. The application of this leachate on the soil acts as a 'super-phosphate' or fertiliser, which helps improve soil quality, encourage seeding root development, plant growth and regeneration on-site.

Since the initial disposal of this waste in 1983, there have been no recorded environmental incidents, namely through environmental contamination, health or amenity impacts such as odour. It is noted that the waste material does not create any adverse impacts with regards to odour with only low levels of odour limited to when this material is disturbed during disposal on-site.

Due to the low levels of waste disposed of on-site, the quality and type of waste, its large separation distance to surrounding neighbours and the continued ongoing monitoring and reporting regimes, there have been no complaints received with regards to odour from surrounding neighbours since waste disposal operations commenced on-site.

To date, the proponent has dutifully complied with the conditions of the existing Development Consent and EPA Licence and exemptions that apply to the disposal of this waste with both annual reporting and independent audits confirming that the development has operated within its approved limits and has not caused any environmental harm.

Unlike the approval for the quarry, the approval for the disposal of bio-solid waste on-site is open ended and remains valid ongoing. Therefore, no further approvals are required for these activities.

2.3.13 Rehabilitation

Rehabilitation works are periodically undertaken and are staged commensurate with when an area becomes exhausted or is no longer required. More specifically, rehabilitation works have occurred in the northern portion of Pit 1 and the south western portion of Pit 3 in areas that are no longer required for extractive industry purposes.

These rehabilitation works have generally comprised the removal of all surface and ground infrastructure, the backfilling of previously excavated and stockpiled topsoil, importation of clean virgin fill and the stabilisation and levelling of batters to inform the final landform. Furthermore, these areas have been revegetated with local indigenous plant species, including ground covers, understorey and overstorey species.

As outlined above, former Pit 2 has already been closed and rehabilitated back to its natural state, being rural farmland. Accordingly, this closed pit provides an example of the final landform that will be achieved on-site within the remaining operating pits.

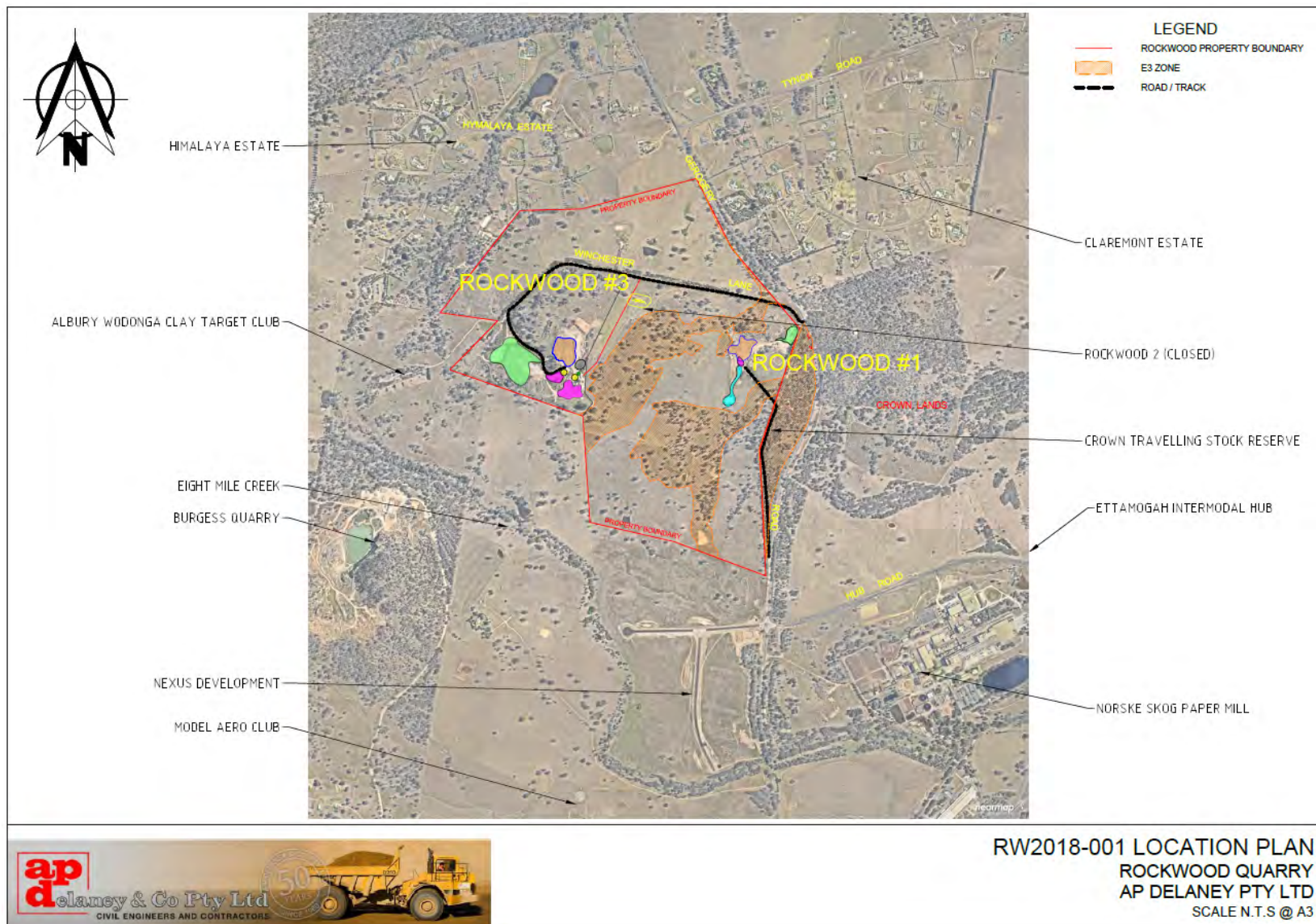


Figure 1 Locality Plan of the subject land (red outline) within the context of the surrounding properties



Figure 2 Aerial photograph of the subject land (red outline) and surrounding properties*

*Note: the subject land does not include No. 96 Winchester Lane, Table Top

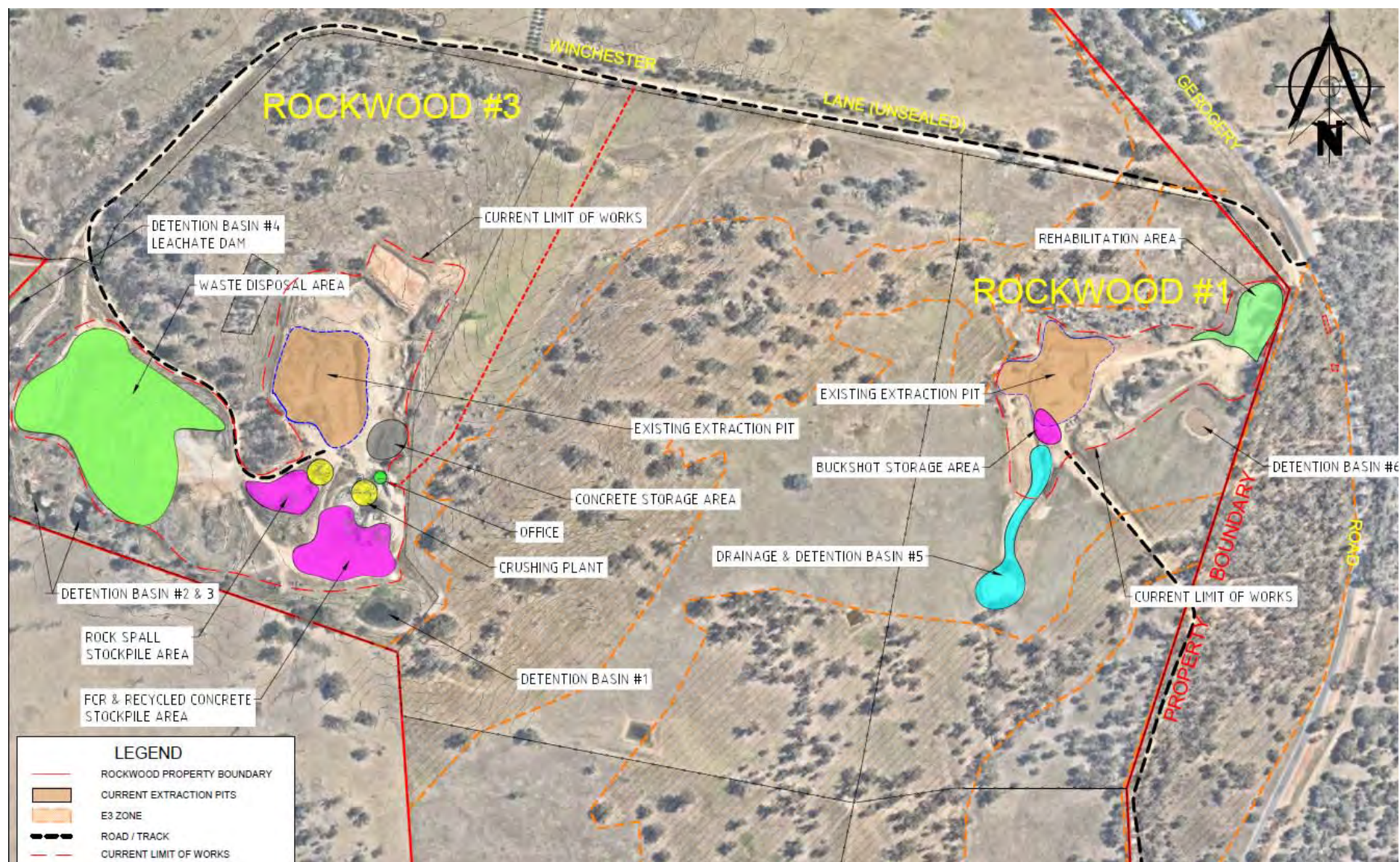


Figure 3 Site Plan (Existing) showing the location of existing Quarry Pits and site activities

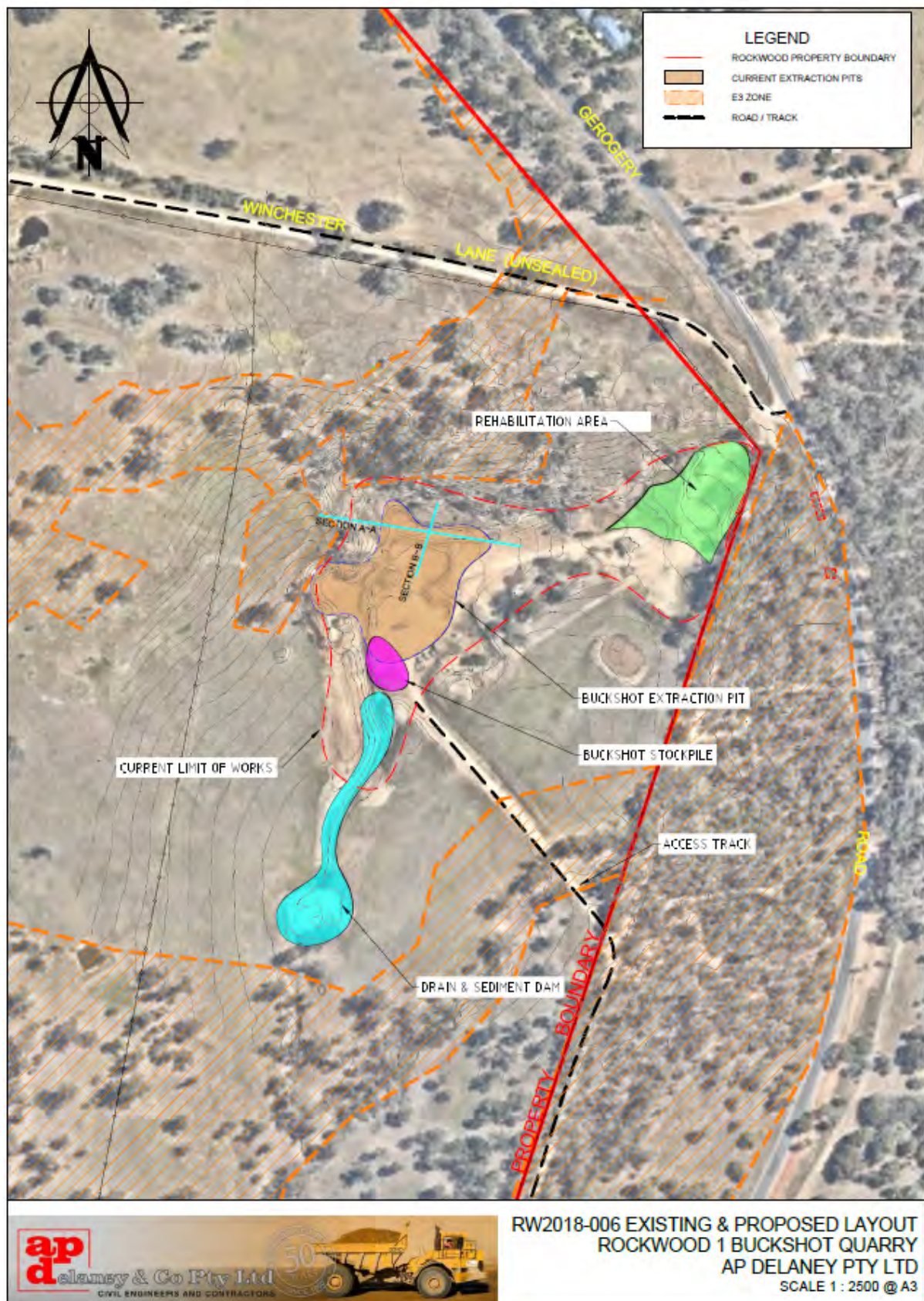


Figure 4 Site Plan (existing) of Pit 1 showing existing activities

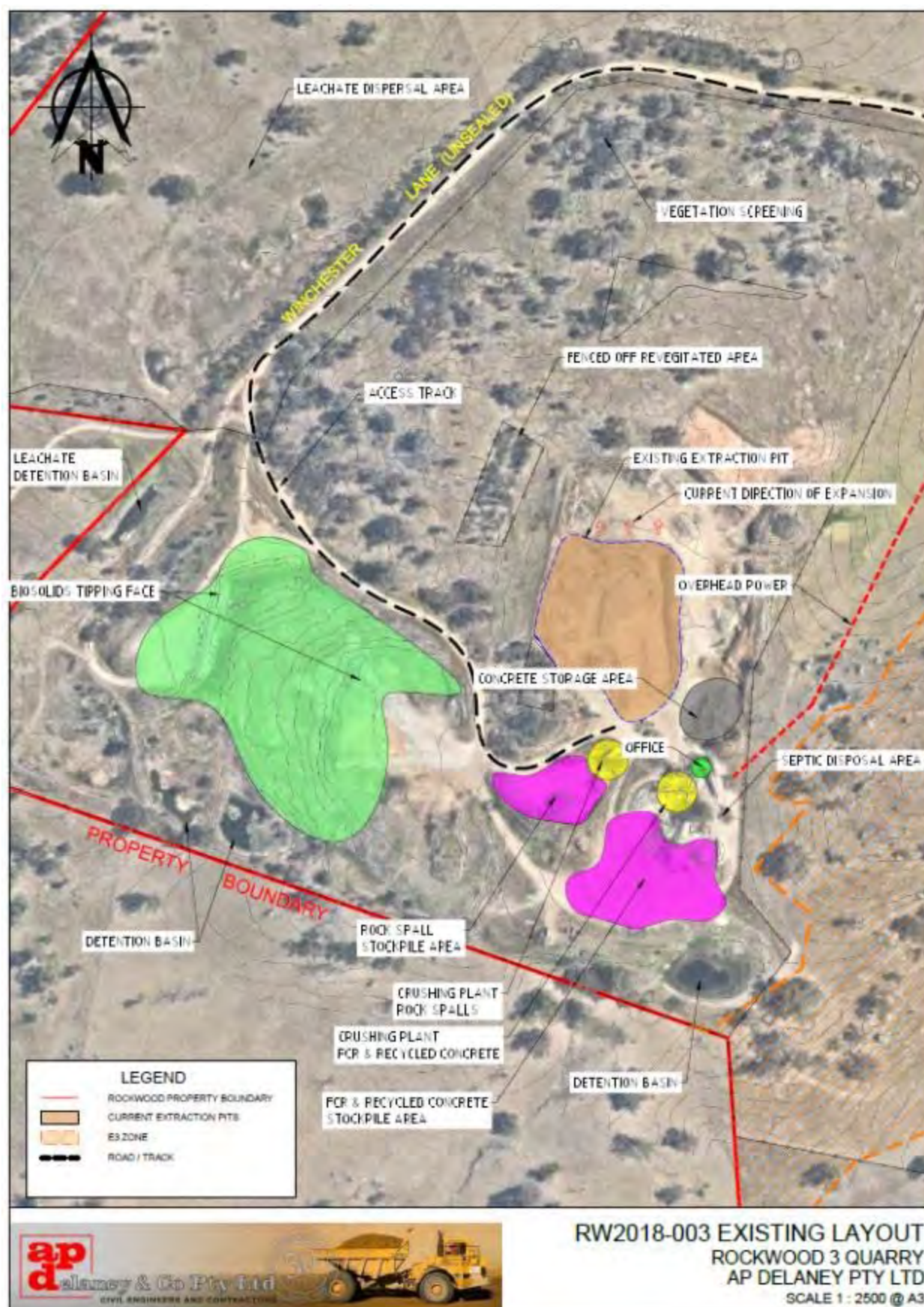


Figure 5 Site Plan (existing) of Pit 3 showing existing activities



Figure 6 Aerial Photograph of Pit 3 showing existing activities

3. Project Description

3.1 Project Summary

The proposed development seeks approval for an extractive industry, the crushing of recycled concrete and associated works on land currently used for the purposes of an extractive industry ('Rockwood Quarry'). The current application has been prepared as the current approval is due to expire on 17 September 2019. Accordingly, a subsequent Development Application (and associated EIS) has been prepared to allow for the ongoing use of this land as a quarry.

More specifically, this application seeks approval to undertake the following:

- Approval for an extractive industry within existing approved Pits 1 and 3 for a 30-year period, inclusive of the following works:
 - o Site preparation works (including identification of in-situ materials and removal and stockpiling of topsoil, ground litter and vegetation);
 - o Periodic blasting of in-situ material ready for excavation;
 - o Excavation of materials utilising a variety of machinery and equipment such as front-end loaders, excavators, graders and the like;
 - o Processing and screening of materials;
 - o Stockpiling of materials on-site ready for transport;
 - o Transport and haulage of materials off-site via Winchester Lane; and
 - o Rehabilitation and revegetation work to ensure a self-sustaining environment when the operation of the quarry is fully completed.
- Approval for a maximum annual extraction of crushed rock of 100,000m³ per annum to cater for the long-term needs of the quarry (Note: the existing quarry has approval for 75,000m³);
- Expansion of existing Pit 3 in a north easterly direction (12.67 hectares) consistent with a previous approval issued for the site;
- Crushing and recycling of an annual maximum of 20,000 tonnes of solid concrete waste from residential, industrial and commercial sites (Pit 3 only);
- Earth embankment/reshaping works along Gerogery Road to improve current sight lines for vehicles exiting Winchester Lane;
- Removal of 19 trees with the proposed Pit 3 area;
- Removal of 1.25 hectares of vegetation that meets the listing criteria as the Box Gum Woodlands threatened ecological community and 2.4 hectares of native vegetation (grasslands) zoned E3 Environmental Management within the proposed Pit 3 area;
- Removal and/or pruning of several trees within the adjoining Gerogery Road, road reserve (by the relevant road authority), which are currently obscuring views from this intersection; and
- Rehabilitation, revegetation and maintenance of RU2 Rural Landscape zoned land in accordance with the requirements of a Vegetation Management Plan to ensure that the proposed activities will not have an overall adverse environmental impact.

It is noted that separate approval for the transport and disposal of liquid wastes from the adjoining Norske Skog Paper Mill is not required in this instance, as it is already operating under a separate approval (see development consent 147/92).

3.2 Description of Works

The proposed development involves the use of the land as an extractive industry consistent with the current use of this land ('Rockwood Quarry'). The current application has been prepared as the current approval is due to expire on 17 September 2019.

More specifically, this application seeks approval for the ongoing extraction of materials from the existing approved Pits 1 and 3 for a period of 30 years with a maximum annual production of crushed rock of 100,000m³ per annum. The application also seeks approve to expand Pit 3 in a north easterly direction consistent with a previous approval issued for the site.

It is noted that the subject application does not seek to alter the boundaries of the currently approved extraction area nor change any existing operating procedures or methods currently used on-site, but rather seeks to reapply to undertake these activities as the current approval is due to expire. The purpose of the application is to continue quarrying activities on-site for the supply of crushed rock material for the current site operator's local road construction and earthmoving business consistent with what has been occurring on the subject land for the past 45 years.

Whilst it is acknowledged that the maximum annual production of crushed rock is proposed to increase from 75,000m³ to 100,000m³ per annum, based on historic extraction rates, it is unlikely that the current level of extraction will substantially increase in the interim as a result of this application. The reason for the proposed increase is to ensure that the existing quarrying operations can satisfy any increased or peak demands for excavated materials in the Albury Wodonga region into the future without the need to formally modify any approvals for the site.

It is reiterated that the proposed use of the land is not for a commercial quarry as it does not supply materials to the general public or other users in the construction industry, but rather is limited to the current site operators' road construction business requirements.

Notwithstanding the above, the associated EIS has been prepared based on an assumed maximum annual extraction rate of 100,000m³ being achieved, which demonstrates the 'worst case scenario'. The maximum extraction rate also provides greater flexibility should the site operator decide to begin supplying materials to the general public or increase current output.

Based on previous investigations (bore holes) of in-situ resource materials available on-site, there is enough material within the quarry to satisfy local demand for over 50 years with in-situ granite material available to a depth of 130 metres. Over time, the site will be gradually rehabilitated in accordance with this plan as areas become exhausted of materials. At the completion of quarrying activities, the site will be fully rehabilitated in the form of grassed paddocks and revegetated areas, giving the site a similar appearance to its surrounding lands and the previously rehabilitated Pit 2.

The development is also seeking approval to process and crush up to an annual maximum of 20,000 tonnes of solid concrete waste from residential, industrial and commercial sites within Pit 3. This activity is currently undertaken on-site and the intention is that this activity will continue into the future in accordance with current day requirements. Accordingly, an amended EPA Licence will also need to be obtained for the continuation of this activity, as well as the ongoing operation of the site as a quarry.

As a consequence of the proposed works and following the completion of a traffic impact assessment, it has also been identified that a number of earth embankment works will need to be undertaken to the Gerogery Road road reserve on the northern side of Winchester Lane, so as to achieve relevant sight distance requirements.

Furthermore, a number of trees and native grasses will need to be removed as part of the proposed expansion area of Pit 3. In addition, several trees (re-growth), have also been identified as requiring removal and/or pruning by the relevant road authority within the adjoining Travelling Stock Reserve located to the south of the Winchester Lane intersection, so as to also achieve the relevant sight distances to the south.

In recognition of the native vegetation removal works associated with the proposed extractive industry, an area of approximately 15 hectares of RU2 Rural Landscape zoned land will be revegetated and protected ongoing to ensure that the development does not have a long term adverse environmental impact. These works will be undertaken in accordance with a Vegetation Management Plan (VMP) that has been prepared for the site (see **Attachment I** of the EIS).

Further details regarding individual components of the works are discussed in the following sections.

A site plan showing the proposed areas of extraction are reproduced in **Figure 7** below.

3.3 Area of Extraction

The application seeks approval to continue extracting materials from within Pits 1 & 3 of Rockwood Quarry, which already currently exist on-site.

In addition, the development also seeks approval to expand the existing Pit 3 in a generally north east direction. This expansion area will have dimensions of approximately 450 metres x 300 metres with a total area of 126,700m² or 12.67 hectares.

Quarrying activities conducted within this pit are proposed to be undertaken to a depth of RL 323-329 and will be benched/stepped down to the proposed quarry pit floor with an overall depth of excavation of 30 metres below current ground level. Accordingly, the total available volume of raw materials will be approximately 4,050,000m³, which is well in excess of the total amount of resources required as part of this application (3,000,000m³ at maximum extraction).

Notwithstanding the above, it is noted that the boundaries of this previously approved expansion area have been revised following the completion of a Biodiversity Assessment and Aboriginal Cultural Heritage Assessment for the site, so as to avoid areas containing Threatened Ecological Communities, comprising Grassy Box Gum Woodlands and native grasses, as well as an area of intangible heritage significance.

It is clarified that the subject application does not seek approval to expand the current boundaries or development footprint of Pit 1. This is due to the amount of resources that are currently still available within this existing quarry pit, as well as the comparatively lower levels of extraction undertaken from this pit. The intention is that this quarry pit will maintain its current development footprint but will be excavated directly downwards an additional 6 metres in depth.

A plan showing the area and staging of proposed works is included in **Figure 8** below.

3.4 Quantities of Materials

At present, the existing quarry on-site has approval to extract up to a maximum of 75,000m³ of material per annum. The subject proposal seeks approval to extract up to a total maximum of 100,000m³ per annum.

As outlined above, the area of extraction will not increase from that previously approved as there is still approximately more than 50 years worth of material in-situ that can be extracted on-site.

The extraction of material occurs on an 'as needs' basis to satisfy the current operator's local road construction and earthmoving operations. In the last 10 years, the existing quarry has had an average annual certified extraction rate of 51,000 tonnes (or 23,000m³) as shown in **Table 2**, which is well below the current (75,000m³) and proposed (100,000m³) maximum annual extract rate.

Whilst it is acknowledged that current extraction rates are well below the proposed 100,000m³ per annum sought by this application, an increase in the annual production rate has been sought to ensure that existing quarrying operations can satisfy any annual increases or peak future demands for excavated materials in the Albury Wodonga region without the need to formally modify the approval.

Accordingly, in order to identify the full extent of all potential impacts, an EIS has been prepared on the basis of an annual maximum extraction rate of 100,000m³ being achieved each year, which is considered to be the 'worst case scenario'.

Based on a proposed lifespan of 30 years, this would equate to the total extraction of 3,000,000m³ worth of materials that could be excavated over the life of the quarry.

3.5 Hours of Operation & Workforce

The proposed hours and days of operation for the development will remain the same as the current development consent and EPA License 10069 that applies to the site as outlined in Section 2.3.8.

As outlined above, the current quarry does not operate on a continuous full-time basis and has historically only operated on average approximately 3 days per month or approximately 30 days per year based on a maximum daily extraction rate of 750m³ and an annual extraction rate of approximately 22,500m³ per annum.

Based on an increased maximum annual extraction rate of 100,000m³ and assuming maximum extraction is achieved each year, the quarry will operate approximately 133 days per year or 11 days per month. This figure is based on retaining the maximum daily extraction rate that is currently achieved given that the site operator does not intend on utilising more equipment, machinery or workers on-site. Notwithstanding, should the daily maximum extraction rate increase beyond current rates, the number of days that the quarry will operate will be reduced.

Similar to current procedures, a minimum of three (3) workers will be present for safety reasons and it is expected that this will continue into the future based on current extraction procedures.

3.6 Equipment

The number and type of machinery will not increase above current day operations as the proposed development will maintain the same daily extraction rate/output but will operate more days of the year (i.e. same production output undertaken across more days). Accordingly, the development will utilise the same machinery and equipment as outlined in Section 2.3.9 of this report.

Similar to current day operations, when Rockwood Quarry is not in operation, some of this equipment will be relocated to other working quarries in the same ownership of the site operator. It is also noted that there will be no change to the existing site office or septic disposal area as the level of workforce on-site will not increase, but rather will be undertaken across a greater number of days.

3.7 Stockpiles

The proposed development will maintain the existing stockpile areas on-site, comprising two stockpiles in Pit 1 (naturally occurring unscreened granite) and four stockpiles in Pit 3 (Class 2 Fine Crushed Rock (FCR) and processed recycled crushed concrete), as well as an additional concrete storage area (stockpile) also contained in Pit 3.

The size of these stockpiles will remain the same as current day operations and will generally range in size from 100m³ to 5,000m³ and are approximately 15 metres in height depending on the amount of material that is stockpiled at any given period. These stockpiles will gradually or rapidly (depending on demand) be reduced and once almost exhausted, will trigger a need for further extraction and stockpiling for use.

As outlined above, the development does not propose to increase the number of stockpiles on-site, but rather will exhaust and replenish these stockpiles more often assuming maximum extraction and days of operation.

The stockpiles will retain their current footprint and have been previously located and positioned so as not to be seen from surrounding or adjoining lands. These stockpiles will continue to be stabilised and located so as to not to cause issues of sedimentation, erosion or run-off, as well as any other environmental harm as detailed within this report.

3.8 Development Schedule

The process by which materials are won and processed may be separated into three development stages – site preparation, extraction and processing and road haulage and transport.

3.8.1 Site Preparation

The site preparation stage begins with the identification of in-situ materials via the drilling of test bores within the proposed area of expansion. Upon confirmation of the presence of extractive materials, water and soil control measures will be implemented via the installation of sediment basins, spoon drains and silt traps. A diversion bank will be constructed up slope of the intended excavation area and will be maintained to prevent erosion and the deterioration of water quality. This will be used to direct water away from the area of disturbance towards clean water gullies or natural depressions that will be stored down slope for re-use in the re-vegetation process.

Areas of vegetation to be retained will be identified via markers and fenced off from the area of works with the remaining vegetation to be cleared from within the surveyed area using a dozer for grasses, undergrowth and tree stumps and a chainsaw for trees and larger branches. Prior to works commencing, these trees will be inspected for native wildlife and if necessary, removed and relocated. The vegetation debris will then be stockpiled down slope along the length of the proposed extraction area, which will then be later used as part of the rehabilitation stage. Larger trees or hollow bearing logs will also be retained and placed within adjoining environmental lands to provide ongoing habitat for local fauna species.

Ripping and stockpiling of topsoil will be undertaken using excavators and will be staged in accordance with demand. This material will then be either used in current day rehabilitation works or stockpiled as part of future rehabilitation works. Water management control mechanisms will be put in place to ensure all surface water runoff is controlled and directed away from these temporary stockpile areas to sedimentation traps, with all discharges from these traps occurring in accordance with Councils' requirements.

The above site preparation works will be undertaken in stages so as to ensure that the area of disturbance is minimised, but the required amount of materials can still be excavated.

3.8.2 Extraction and Processing

The extraction process will follow existing quarrying operations. Periodic blasting (within Pit 3) will be undertaken as a means of separating and breaking up the materials on-site ready for excavation. Blasting will occur infrequently and is expected to occur annually or every two years based on current and predicted extraction rates. All blasting events will be undertaken in accordance with relevant EPA Noise guidelines and WorkCover requirements. Further details regarding blasting are outlined in Section 3.9.

Separated and blasted in-situ materials will then be excavated using a 35 tonne excavator and a front end loader where it will then be placed into dump trucks. Oversized materials will be stockpiled within the quarry pit, where they will be further broken down using a hydraulic jack hammer, which will allow the materials to be processed in the crusher. In situ materials will then be directly transported via dump truck where they will then be tipped into the crusher.

Extraction will continue until the final contour is achieved. A 'retreat method' of material extraction will be implemented to allow effective, progressive rehabilitation of an area and minimise further disturbance to rehabilitated sites. Extraction will continue to the north, east and north-east as identified in the proposed staging plan for the site.

Following loading into the crusher, in-situ materials will then be crushed and screened via three separate conveyor belts that will screen and separate the material into different sizes and further crush oversized materials until a consistent product size is achieved ('sieve method'). These conveyor belts and crushing machines will be fitted with irrigation sprays to reduce potential impacts of dust and all crushing and processing operations will be monitored by a site operator located within the control room attached to the plant.

Several rotating magnets will also be attached to the conveyor belts, which will be used to remove any residue or scrap metal contained within the crushed material (particularly reinforcing from recycled crushed concrete). These metal wastes will then be stockpiled and loaded into containers where they will be later transferred to a metal recycler once they are full.

Following crushing and screening, finished processed materials will then be transferred via conveyor belt and placed into stockpiles measuring 10-15 metres tall. A ring sprayer will be attached to the end of the conveyor belt to wet down final processed and stockpiled materials, which will be stored on-site awaiting transport off site.

3.8.3 Road Haulage and Transport

Following crushing and processing of extracted materials, processed materials will be transported off-site for use in local road construction projects via truck and trailer combinations. Primary vehicular access to the site and quarry pits (namely Pit 3) will be derived from the existing unsealed Winchester Lane, which intersects with the adjoining sealed Gerogery Road located to the east.

A secondary unsealed access road also exists approximately 1.2 kilometres further south towards the Nexus industrial estate via a Travelling Stock Reserve (TSR) that will be used to access Pit 1.

In addition, to the transporting of quarrying materials off-site, a number of truck and trailer combinations will also access the site to dispose of biosolid waste from the adjoining Norske Skog Paper Mill, as well as the disposal of concrete waste from local construction sites.

A Traffic Impact Assessment has been prepared in support of the proposed development to determine the likely traffic volumes and level of service that will be achieved, as well as an assessment of existing sight distances based on a 'worst case scenario'.

As a result of this study, it was identified that a number of improvement and upgrade works are required to achieve relevant sight distances at the intersection of Winchester Lane and Gerogery Road. More specifically, a number of earth embankment works will need to be undertaken to the Gerogery Road road reserve on the northern side of Winchester Lane, so as to achieve relevant sight distance requirements.

Furthermore, a number of trees (re-growth) have also been identified as requiring removal and/or pruning by the relevant road authority within an adjoining Crown Travelling Stock Reserve located to the south of the Winchester Lane intersection, so as to also achieve the relevant sight distances to the south. This is a pre-existing situation and a separate request has been made to the road authority to address this issue, as it affects not only the subject land, but several other landowners and user groups who utilise Winchester Lane.

3.9 Blasting and Crushing of Recycled Concrete

The development seeks approval to undertake periodic blasting within Pit 3 to break down in-situ materials, which will allow it to be more easily processed by excavators and front end loaders. Blasting will occur within the existing and proposed quarry expansion area of Pit 3 and will be undertaken by a sub-contractor experienced in drilling and blasting at the direction of the site operator.

Historically, blasting events have occurred approximately every two years, although this is expected to increase as a result of the proposed development and is likely to occur annually. The amount of material that is blasted during each blast event is also expected to increase so as to limit the frequency of blasting events that will be required.

Work health and safety requirements, including exclusion zones, will be established prior to blasting occurring and any blasting event will be conducted in accordance with relevant EPA License conditions, which currently limit the days and hours of work to 10am-3pm Mondays to Fridays.

No blasting works are proposed within Pit 1.

Approval is also sought to crush and recycle an annual maximum of 20,000 tonnes of solid concrete waste from residential, industrial and commercial sites within Pit 3, consistent with current day operations and a current EPA license that applies to the site. As a consequence of the proposed works, a revised EPA license will need to be obtained.

More specifically, the development will involve the receipt and stockpiling of broken concrete from various demolition sites comprising demolished kerb and gutter, footpath slabs, reinforced concrete slabs and concrete footings and foundations.

Concrete waste will be transported to the site via truck and trailer and stockpiled within the central portions of Pit 3 located to the north of the existing site office. Following stockpiling, the concrete will then be broken down for processing using a 35-tonne excavator and hydraulic jaws and hammers and will then be processed through the crushing plant where the material is crushed and screened to produce a fine crushed rock material.

Reinforcing steel will be separated out from this material during crushing and screening using a rotating electromagnet affixed to the conveyor belts. The steel will then be salvaged and placed into bins where it will be transported off-site for recycling by a third party.

No crushing or processing of recycled concrete is proposed within Pit 1.

3.10 Rehabilitation and Revegetation

As part of the quarrying activities conducted on-site, ongoing and staged rehabilitation works will occur on-site to produce an area which is stable, self-sustaining, conforms to the character of the local and regional environment, and is safe. The final land use proposed for the site is grassed rural paddocks and revegetation areas similar to that which currently exists on site.

Development works will be staged to limit the extent of site disturbance achieved at any given period of time, as well as to allow for the ongoing and staged rehabilitation of the site. More specifically, rehabilitation works will involve the gradual decommissioning of all surface infrastructure, remediation of any land contamination and the backfilling and filling of the land with stockpiled topsoil or clean virgin fill that will then be compacted and reshaped to the final landform.

Upon final landform the area will be re-vegetated and top-dressed with a variety of local native trees, shrubs and grasses and fencing and exclusion areas will be established to limit disturbance by cattle to revegetation offset areas.

In addition, and in recognition of the native vegetation removal works associated with the proposed extractive industry, an area of approximately 15 hectares of RU2 Rural Landscape zoned land will be revegetated and maintained ongoing to ensure that the development does not have a long term adverse environmental impact. These works will be undertaken in the interim and will be undertaken in accordance with a Vegetation Management Plan (VMP) that has been prepared for the site (see **Attachment I** of the EIS).

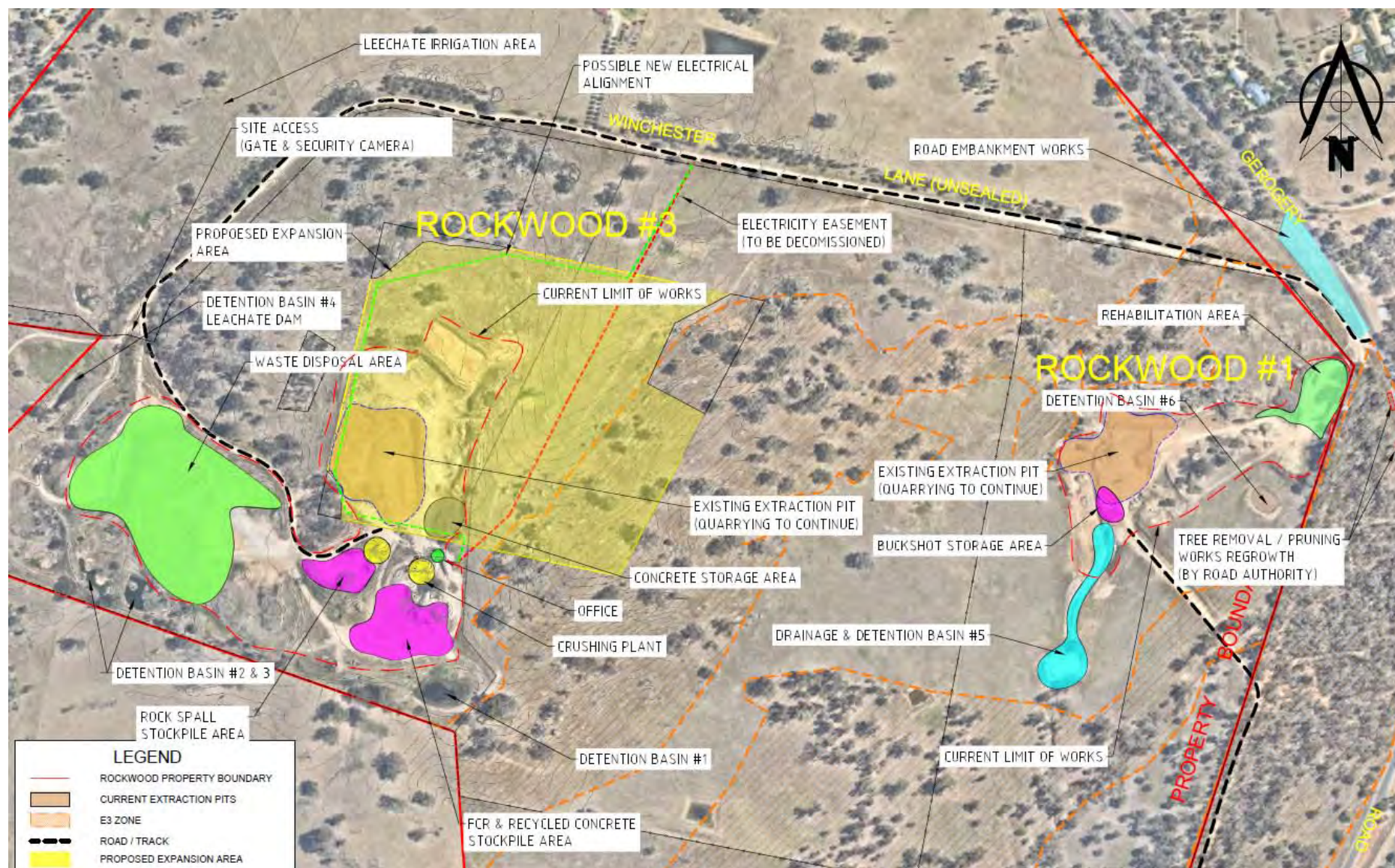


Figure 7 Site Plan (Proposed) showing the location of Quarry Pits and site activities



Figure 8 Proposed Extraction Staging Plan – Pit 3

4. Rehabilitation Management Plan

4.1 Rehabilitation Objectives

The objectives of this rehabilitation plan are to:

- Undertake ongoing and staged rehabilitation works to limit the area of disturbance at any given time;
- Establish a sustainable native ecosystem, commensurate with adjacent land use types;
- Provide a safe and stable landform compatible with the intended final use;
- Re-establish habitat for local flora and fauna;
- Comply with relevant regulatory requirements and attain regulatory consensus on the successful closure and rehabilitation of the Project area;
- Reduce the need for long term monitoring and maintenance by achieving effective rehabilitation;
- Complete the closure, decommissioning and rehabilitation works as quickly and cost effectively as possible whilst achieving primary objectives;
- Provide a sustainable plant/groundcover through rehabilitation of disturbed areas;
- Outline a final landform and land use for the ongoing use of the site;
- Ensure that the design periods and factors of safety for all site works take into account extreme events and other natural processes such as erosion.
- Produce a final “walk away” landform that is geotechnically stable that blends aesthetically into the surrounding landforms, yet as far as possible does not limit possible future land uses; and
- Minimise visual impact of the operation during the operational phase as well as post-quarrying.

A plan showing the location of proposed rehabilitation works has been included as **Figure 9** below.

4.2 Conceptual Final Landform and Land Use

4.2.1 General Site

At the completion of all extraction works on-site, AP Delaney & Co proposes to rehabilitate all quarried areas back to pre-development conditions, being rural paddocks and grasslands consistent with a number of adjoining lands, including the previously rehabilitated Rockwood 2 (Pit 2).

In addition, approximately 15 hectares of the subject land will be revegetated and set aside for environmental protection purposes to compensate/offset for the loss of native vegetation needing to be removed as part of the expansion of Pit 3.

Such rehabilitation works will be staged commensurate with extraction works.

Given the proximity of the subject land to adjoining industrial developments and larger extractive industries, the land is not suitable for rural residential purposes due to the potential land use conflicts that this would create. Similarly, due to the proximity of adjoining rural residential properties, as well as the topography of the land, the majority of this land is also not suitable for industrial activities.

The current zoning of the land also prevents the land from being used for either of these purposes.

Accordingly, post quarrying areas of the site (quarry pits) will be rehabilitated back to rural paddocks and grasslands, consistent with other remaining undeveloped portions of the site. This includes the leachate irrigation area in the north-west portion of the property. It is expected that these lands will be used for broadacre grazing/agricultural purposes due to the limited agricultural capability of this land and its proximity to adjoining heavy industrial and rural residential dwellings. Vegetation will comprise pastoral grasslands, shrubs and where relevant trees and over storey vegetation as outlined in this rehabilitation plan.

In essence, the subject land will serve as a transition or buffer between adjoining industrial lands to the south and rural residential dwellings to the north.

Approximately 45 hectares of the subject land (1/4 of the site) is zoned E3 Environmental Management as it contains areas of high-quality biodiversity and vegetation. As the proposed quarrying works involve the removal of 2.42 hectares of this vegetation, the development proposes to establish two offset/revegetation areas of approximately 15 hectares on land currently zoned RU2 Rural Landscape, which will connect two existing large areas of vegetation.

This land is located outside of the area of works and will be set aside and protected ongoing for environmental protection purposes in accordance with the recommendations of a Vegetation Management Plan prepared for the site. Revegetation works will occur in the interim, which will allow time for this vegetation to become established before the existing vegetation in Pit 3 needs to be removed as part of stages 4 of 5 of works (some 15-20 years away). Upon revegetation, this area will be fenced off to prevent stock access and allow species time to get established.

It is also noted however that the southern portion of the subject land adjacent to Gerogery Road has been identified in the Albury Industrial Hub Master Plan for future industrial purposes. Notwithstanding the recommendations of this Master Plan, development of this portion of the site for potential industrial purposes will need to be further investigated to determine whether it is appropriate for this use.

At the conclusion of quarrying works, all stockpiles, buildings and infrastructure will be removed and rehabilitated with the exception of the unsealed Winchester Lane, which will be retained following post quarrying closure as it is a public road that services an existing dwelling at 96 Winchester Lane, as well as the Albury Wodonga Clay Target Club.

A plan showing the proposed future uses of the site has been included as **Figure 10**.

4.2.2 Quarry Pits and Waste Disposal Area

Specific details regarding proposed rehabilitation works and future land use and topography will vary across the three activity areas as follows:

- **Rockwood 1 (Pit 1)**

Quarrying activities are proposed to continue within this quarry pit and will maintain its current development footprint but will be excavated directly downwards an additional 6 metres in depth.

At present, AP Delaney and Co currently extract approximately 2,000m³ of material from this quarry pit. Based on proposed quarrying rates, (being 5% of the total excavation works), this will potentially increase the annual extraction rate within this pit to 5,000m³ per annum. In total, this will equate to a further 50,000m³ of material being excavated from this quarry pit over the coming years.

Rehabilitation works have already commenced within the north east corner of this pit, which is now exhausted and these works will continue to be undertaken in a south westerly direction once other portions of this quarry pit become exhausted, including the current pit area.

Similar to existing site rehabilitation activities in this quarry pit and given the relatively small footprint of this quarry pit, it is proposed that this pit will be backfilled close to current day levels and reshaped consistent with the surrounding topography of the land. This would involve the importation of approximately 40,000m³ of backfill material.

Works will involve the backfilling of this land with vegetative mulch, clean virgin soil (Virgin Extracted Natural Material) and overburden that has been stockpiled as part of quarrying activities conducted on-site. Further details regarding the source of fill materials and the typical soil strata profile is outlined in Section 4.3.1 of this report.

These backfilled areas will be stabilised and reshaped consistent with the existing topography of the land. The area will then be top dressed and revegetated (via tube stock) with local native species. Revegetation is to occur over a number of years, with approximately 60% of the planting to take place in year 1 with the remaining 40% to be undertaken the following year. Further details regarding revegetation works and specific plant species are outlined in Section 4.3.4 of this report.

As outlined in Section 4.2.1, the intention is to rehabilitate this former quarry pit back to rural grasslands and paddocks.

A cross section showing the proposed final landform of this area is provided in **Figure 11**.

- **Rockwood 3 (Pit 3)**

Pit 3 provides the main source of material for the current quarry operator with quarrying activities within this pit proposed to continue for an additional 30 years (minimum). Expansion of this pit will initially occur in a northerly direction (stages 1-3) before heading in an easterly and north-easterly direction (stages 4-6).

An overall maximum depth of excavation of 30 metres below current ground level is proposed and the works will be benched/stepped down to the proposed quarry pit floor to a depth of RL 323-329, being approximately 6 metres below the current quarry pit floor of pit 3.

This expansion area will have dimensions of approximately 450 metres x 300 metres with a total area of 126,700m³ or 12.67 hectares. Assuming that a total even depth of excavation of 30 metres across the entire expansion area is achieved, this equates to a total available volume of raw materials of approximately 3,801,000m³, which is well in excess of the total amount of resources required as part of this application (3,000,000m³ at maximum extraction).

Investigations were undertaken via the drilling of a number of bores across the subject land at varying depths as part of the preparation of a hydrogeological assessment report for the disposal of biosolid waste on-site. The location of these bores was dug to the south west of Pit 3 in the existing waste disposal area, as well as in the south west corner of Pit 3 located adjacent to the current area of works. These bores were drilled at varying depths, with four (4) shallow bores drilled to a depth of 10 metres, one (1) drilled to a depth of 20 metres and two (2) bores drilled to a depth of 103 metres and 130 metres, respectively.

The lithological logs of the two deep bores confirm that the subject land is underlain by variably weathered granites to a depth of 130 metres. This variation occurs across the site and at depth. The only exception is the uniform thickness of about 2 metres of gravelly clay found at the surface in both the quarried and non-quarried areas.

For the purposes of this rehabilitation plan, a total of 3,000,000m³ of material could be excavated across the entire site assuming maximum excavation is achieved each year for the life of the quarry. The majority of this material will be excavated from Pit 3, with the exception of approximately 50,000m³ of buckshot material proposed to be excavated from Pit 1, being approximately 5% of the total excavated material.

Quarry operations are proposed to have an additional lifespan of 30 years, during which time the quarry plan and excavation areas and depths may be revised or altered (scaled down) depending on operational circumstances. Nonetheless, the current rehabilitation methodology has been based on the current extraction proposal and assuming a maximum extraction is achieved. This plan will be reviewed where needed, to capture any quarry plan changes.

Given the size of the proposed expansion area and as a way of minimising environmental disturbance, the excavation works will be undertaken in six (6) stages with initial quarrying activities to occur in a northerly direction prior to moving east and then north-east.

Consequently, rehabilitation works are also proposed to occur in a staged manner once portions of the quarry pit become exhausted. More specifically, rehabilitation within the quarry pit will commence once stages 1-3 of excavation works has been completed. In the interim, rehabilitation works will be limited to offset planting works undertaken elsewhere on-site.

A hold point for excavation works will be established prior to works commencing on stage 4 to ensure that appropriate measures are in place to commence rehabilitation stages 1-3. Similarly, stages 4-7 of the rehabilitation works will not be able to commence until these stages have been fully excavated and completed. Where possible and appropriate, rehabilitation works will occur on the edges outside of active quarrying activities.

Stage 7 will form the final stage of rehabilitation works and will primarily involve the removal of all site infrastructure and buildings, as well as final land shaping and top dressing.

An indicative development schedule of excavation and rehabilitation works is outlined below:

Table 5: Indicative Schedule of Excavation and Rehabilitation Works

Excavation Works*	Time Period	Rehabilitation Works	Time period
Stage 1	0-5	Offset planting works	0-5
Stage 2	5-10	Ongoing rehabilitation works (Pit 1 and Biosolid Waste)	0-30
Stage 3	10-15		
Stage 4 (<i>hold point</i>)	15-20	Stage 1	15-20
Stage 5	20-25	Stage 2	20-25
Stage 6	25-30	Stage 3	25-30
		Stage 4	30+
		Stage 5	30+
		Stage 6	30+
		Stage 7	30+

* Note: These excavation rates are based on an assumed maximum threshold of 100,000m³ being achieved each year for the life of the quarry. Where these extraction rates do not achieve this maximum limit, the timings of excavation and rehabilitation works will need to be adjusted.

Rehabilitation works will include the partial backfilling of excavated areas with vegetative mulch, clean virgin soil and overburden that has been stockpiled as part of quarrying activities conducted on-site. It is noted that given the final size of this void, this area will not be completely backfilled to current day levels, but rather will be reshaped and stabilised with a 4:1 batter consistent with the topography of the land.

More specifically, based on a maximum extraction rate being achieved each year, this would equate in the removal of approximately 2,850,000m³ of material being removed from the site. Given the size of this void it is not feasible or practical to backfill this area back to current day levels. Should this area be completely backfilled, concern would also be raised in relation to the long-term stability of the site and the quality of fill that would need to be imported.

In response, several cross sections have been prepared showing the final landform and topography of this area, which generally seeks to achieve a 4:1 batter. In total, these indicative cross sections would require the importation of up to approximately 570,000m³ over the life of the quarry and post-quarrying works in order to achieve the proposed finished surface level.

This fill material will be sourced by the quarry operator as part of their ongoing civil construction projects and where required, will be supplemented with additional fill sources. More specifically, backfill material will comprise vegetative mulch, clean virgin soil (Virgin Extracted Natural Material) and overburden that has been stockpiled as part of quarrying activities conducted on-site. Further details regarding the source of fill materials and the typical soil strata profile is outlined in Section 4.3.1 of this report.

Given the amount of material to be excavated from Pit 3 and the fact that no rehabilitation works will be able to occur within this pit until stages 1-3 of excavation works have been completed, it will be necessary to stockpile backfill material in the interim. To avoid double-handling of this material and to avoid potential conflicts with quarrying operations, it is proposed that this material is stockpiled along the eastern edge of extraction stages 1-3. Backfill materials will also be stored on top of the biosolid waste disposal pad as per current site operations for use in this area and adjoining Pit 3 as it is located outside of the area of works.

Upon backfilling, these areas will be stabilised and reshaped consistent with the existing topography of the land and as per the attached cross section plan shown in **Figures 14-15**.

The area will be top dressed and revegetated (via tube stock) with local native species. Revegetation is to occur over a number of years, with approximately 60% of the planting to take place in year 1 with the remaining 40% to be undertaken the following year. Further details regarding revegetation works and specific plant species are outlined in Section 4.3.4 of this report.

As outlined in Section 4.2.1, the intention is to rehabilitate this former quarry pit back to rural grasslands and paddocks given the limited range of other alternative land uses that would be appropriate for the site. The intention of the rehabilitation plan is to also avoid leaving a 'large hole in the ground' that is unsightly and a potential safety risk to future landowners or users.

Other associated works to be undertaken within this pit as part of the overall staging of works will include the need to relocate several existing site facilities and infrastructure. More specifically, prior to commencement of the stage 4 extraction area, recycled concrete stockpiles and storage areas will be relocated to the stage 1 extraction area as it will still remain in close proximity to the crushing plant and avoids other potential conflicts on-site.

In addition, the existing overhead electricity line will also be shifted prior to commencement of the stage 4 extraction area to the west within the stage 1-3 extraction areas. It is also noted that the business operator is investigating opportunities to achieve a self-sufficient energy supply on-site via the use of solar panels (subject to separate approval), which may avoid the need to have to realign this infrastructure.

- **Waste Disposal Area**

Although this area is already approved and operating under a separate approval (open ended), consideration needs to be given to the rehabilitation of the existing waste disposal area in accordance with other rehabilitation activities proposed on-site.

No excavation works currently occur, or are proposed to occur, within this area and the area purely serves as an area to dispose of biosolid wastes from the nearby Norske Skog Paper Mill.

The intention is to backfill this area and reshape it consistent with the existing topography of the land in accordance with a proposed cross section provided at **Figure 16**. In order to achieve this finished landform, this will require the importation of 150,000m³ of biosolid and backfill (soil) material.

As part of these rehabilitation works, leachate dam No. 2 will be decommissioned and the area will be backfilled with biosolid waste, vegetation and clean virgin soil as outlined above. The area will be stabilised and capped with virgin/clean fill and overburden that is currently stockpiled adjacent to this area and the land will be reshaped consistent with the existing topography.

The area will then be top dressed, revegetated via tubestock with local native species, including a number of groundcovers to avoid ongoing erosion or stability concerns. Existing overflow holding and leachate dams will be retained as stock dams and drainage lines will be redirected around this area. The existing monitoring bores will be retained and used where necessary to confirm any ground contamination or water table level changes.

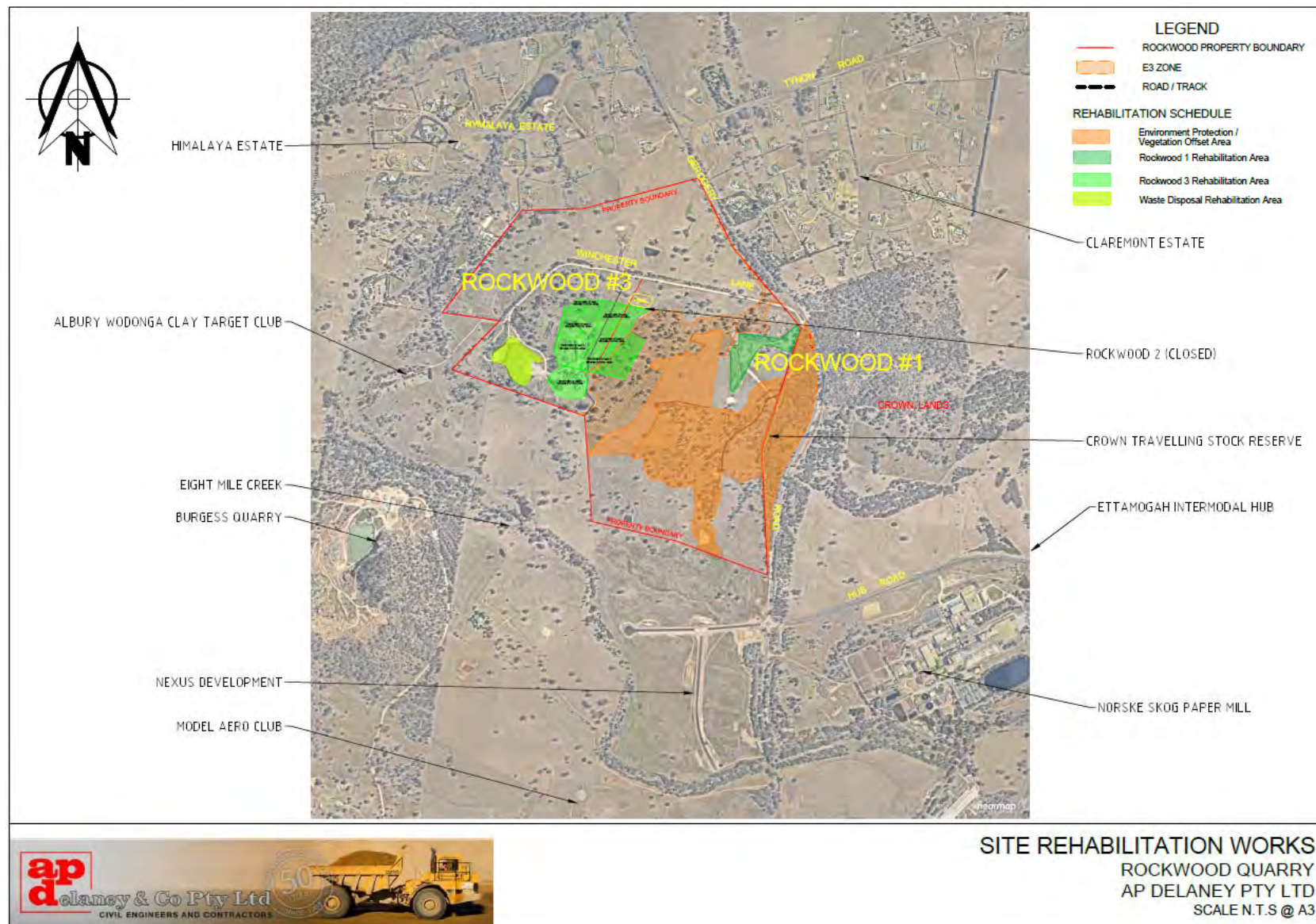


Figure 9 Rehabilitation Site Works Plan

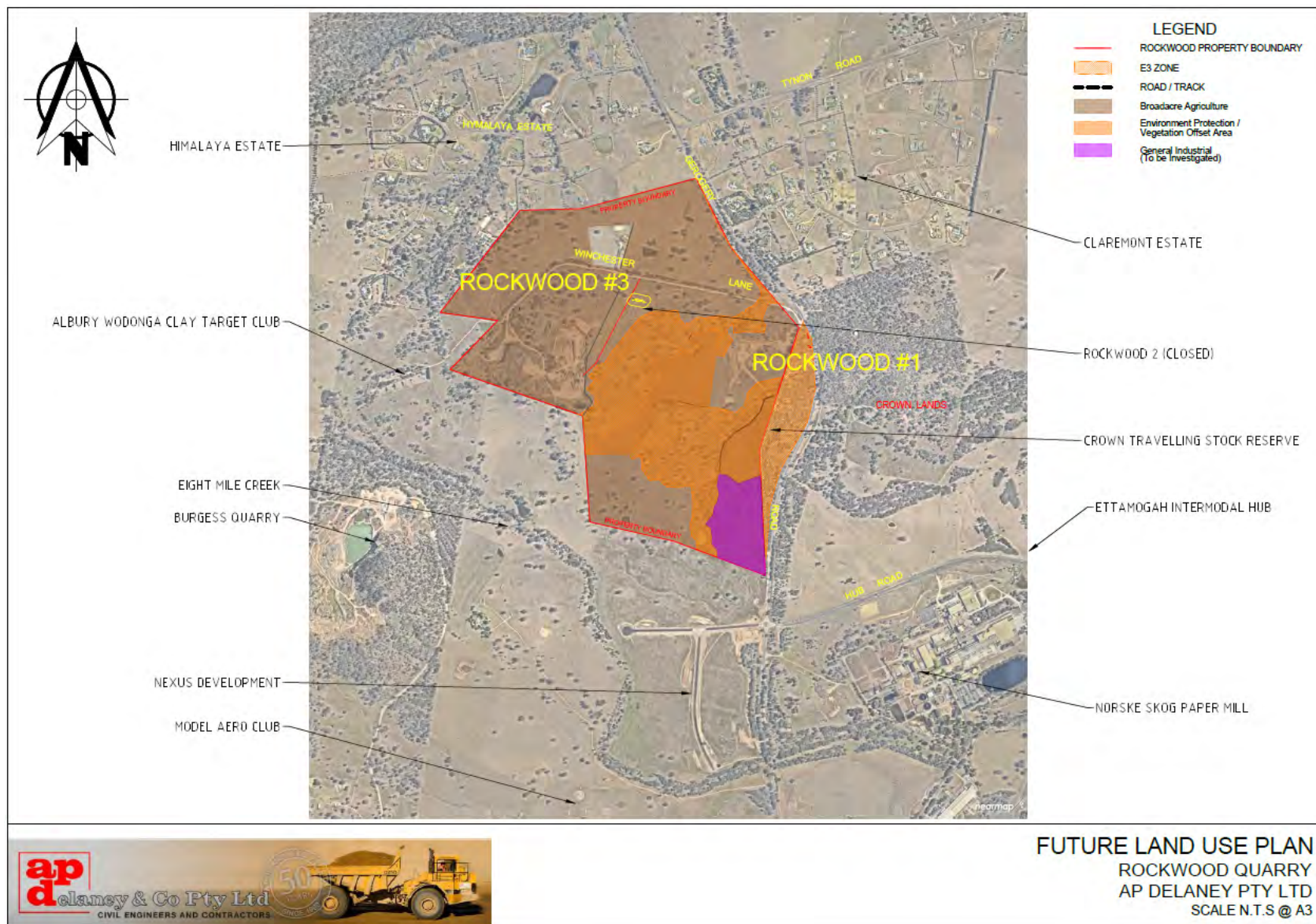
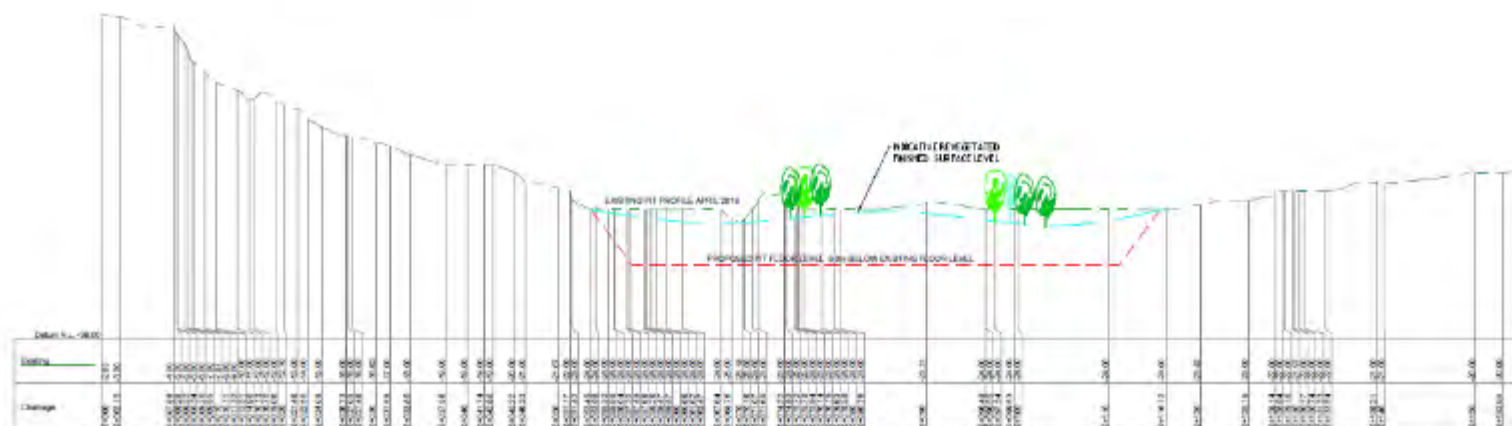
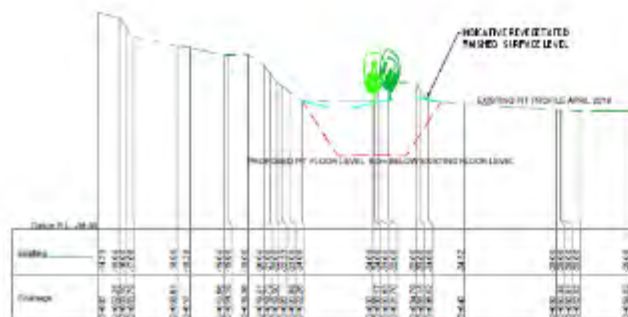


Figure 10 Future Land Use Plan



RW2018-012 CROSS SECTIONS
ROCKWOOD QUARRY
AP DELANEY PTY LTD
SCALE (NTS) @ A3



Figure 12 Rockwood 3 Site Area

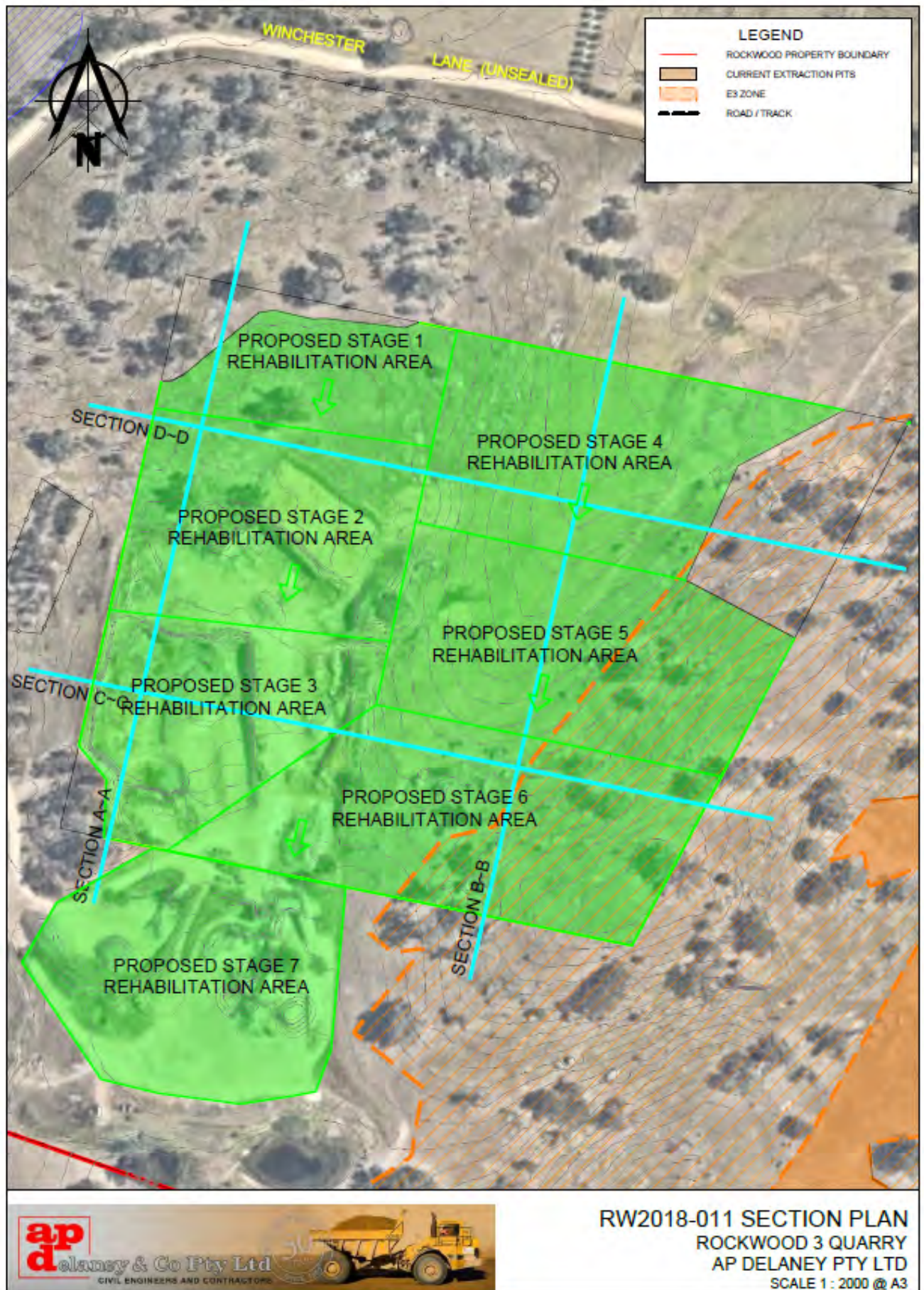
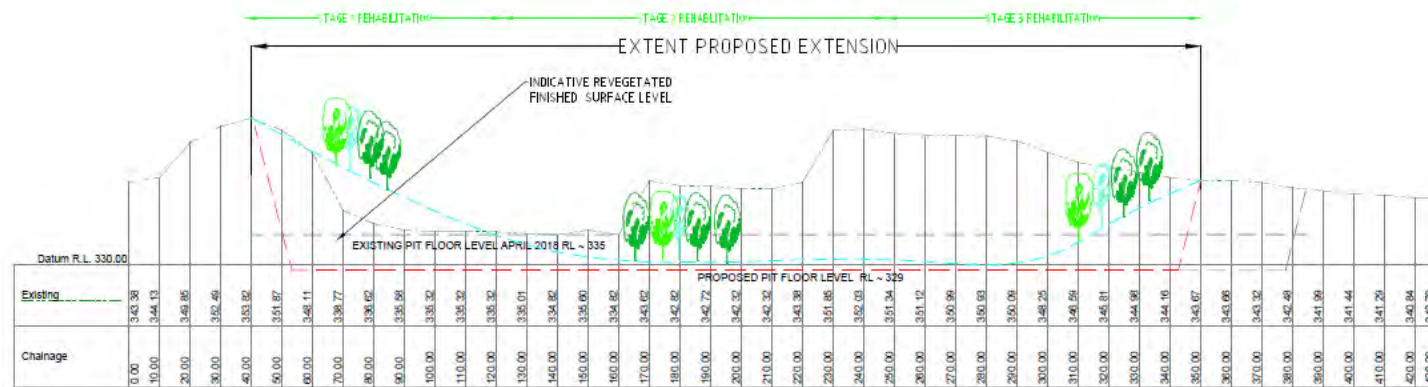
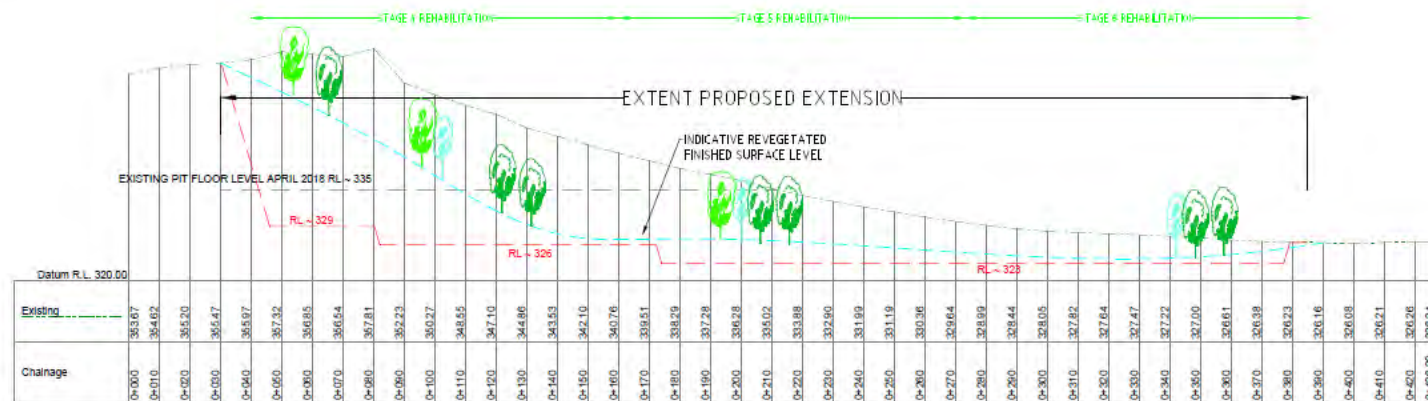


Figure 13 Rockwood 3 – Proposed Rehabilitation Staging



RW2018-012 CROSS SECTIONS
 ROCKWOOD QUARRY
 AP DELANEY PTY LTD
 SCALE (NTS) @ A3

Figure 14 Rockwood 3 – Cross Section A-A & B-B: Final Landform

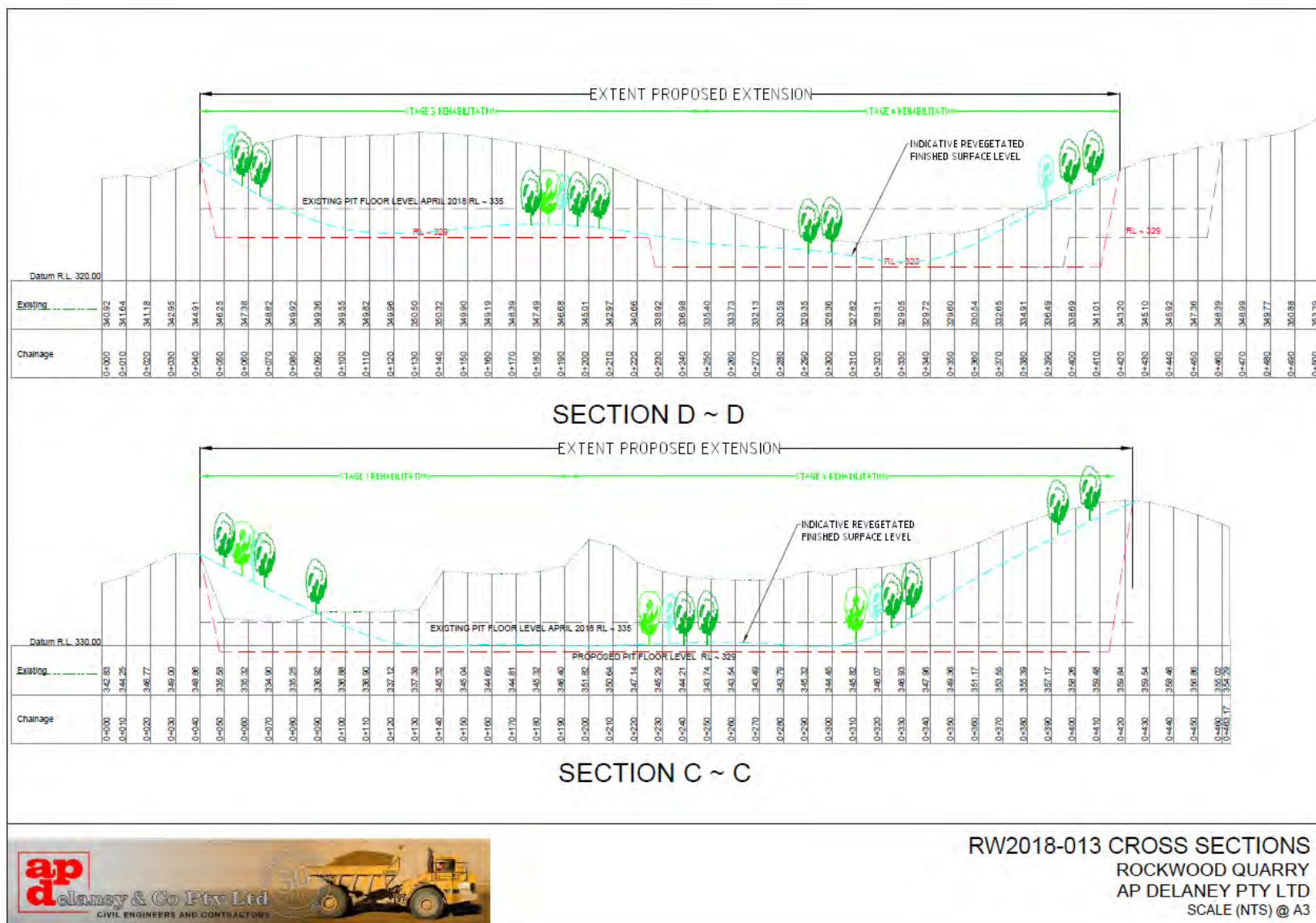


Figure 15 Rockwood 3 – Cross Section C-C & D-D: Final Landform

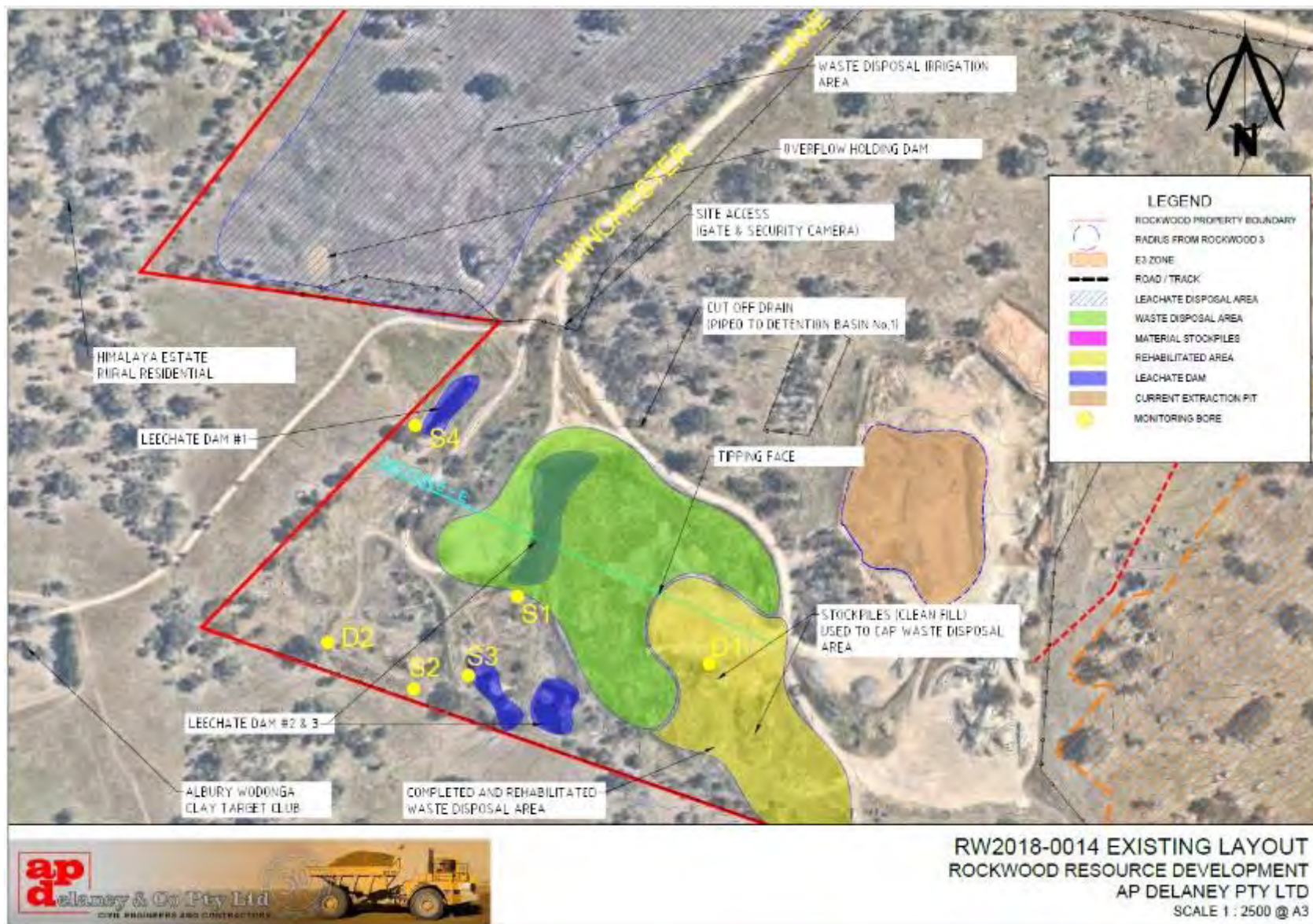
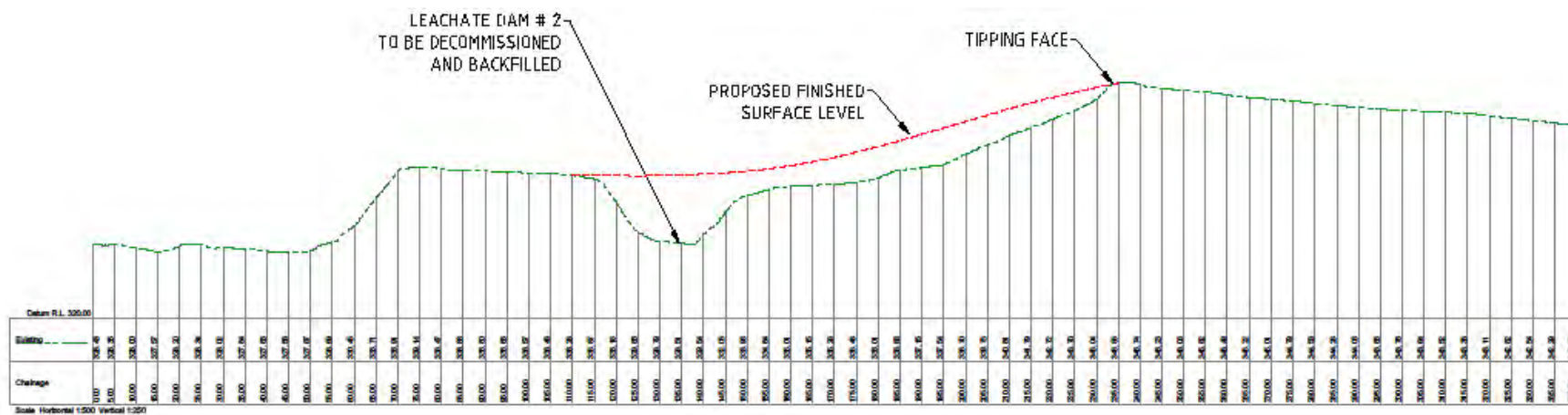


Figure 16 Waste Disposal Area



SECTION E ~ E



RW2018-015 CROSS SECTIONS E ~E
 ROCKWOOD QUARRY
 AP DELANEY PTY LTD
 SCALE (NTS) @ A3

Figure 17 Waste Disposal Area – Cross Section E-E: Final Landform

4.3 Rehabilitation and Revegetation

The subject land contains native vegetation, some of which is contiguous with native vegetation on adjacent properties and road reserves. The entirety of the site has had some modification to the canopy with historical tree removal occurring for timber harvesting or pasture improvement. Higher quality woodland remnants occur on hilltops and rocky rises where the canopy remains relatively intact and the understorey is predominantly native.

Rehabilitation of the site will be undertaken in a staged process once portions of the quarry are exhausted. The revegetation program will re-establish native trees/shrubs/ground covers and will stabilise and reshape exposed areas.

Rehabilitated areas will be deep ripped to actively promote infiltration of water, which will enhance soil moisture requirements for direct tree seeding (where proposed) and minimise surface run-off. Revegetation will also visually screen disturbed areas and will re-establish habitat for native fauna, particularly in those areas that currently contain native vegetation or adjoin existing environmental areas.

4.3.1 Water Management

The use and operation of the site as a quarry and biosolids receival site has the potential to alter existing water conditions. In response, these matters are addressed in the accompanying EIS, which confirm that the use of the site as a quarry is not expected to adversely affect matters regarding stormwater.

Consideration of water management works during rehabilitation also need to be considered and are discussed within this report below.

More specifically, quarrying and associated rehabilitation works will be undertaken in a staged manner to ensure that areas of disturbance (and associated water pollution concerns) are minimised. Given the location of extraction and rehabilitation works, the development will not alter existing drainage lines, nor do they require the re-establishment of any drainage lines.

Similarly, rehabilitation and decommissioning works do not require the filling in of any dams (with the exception of leachate dam 2 in the waste disposal area) as they are located outside of the area of works. These water bodies will be retained for stock, siltation retention and water filtration purposes.

Given the historical use of the site as a quarry and as part of the ongoing rehabilitation works, several of these dams, namely detention basin 1 located immediately to the south of the main crushing plant will be cleaned out and de-silted as required. Furthermore, all dams will be inspected to ensure that they are structurally sound and are not leaking. Where necessary, they will be restabilised/repaired. This will ensure that the site continues to naturally filter stormwater run-off before it enters Eight Mile Creek to the south.

Matters regarding potential contamination within the biosolid leachate dams will also be addressed and will be undertaken in accordance with the conditions of a separate approval. Existing monitoring bores will be retained post quarrying/waste disposal works to allow for ongoing water monitoring and water quality testing.

In addition to the above, existing spillways, cut off drains and diversion banks currently located around quarrying and associated activities will be retained to ensure that excessive run-off does not enter recently rehabilitated areas, which could lead to erosion, scouring and pollution.

4.3.2 Soil Profile and Backfill Material

The development will involve the importation of a variety of fill materials, which will be used to backfill excavated areas of the site.

As outlined in Section 4.2.2 of this report, the development will require the importation of a total of approximately 760,000m³ of fill material across the three rehabilitation areas. The fill material will be sourced by the quarry operator as part of their ongoing civil construction projects and will be supplemented with additional fill sources. These additional sources will comprise biosolid waste (Pit 1), vegetative mulch, clean virgin soil (Virgin Extracted Natural Material) and overburden that has been stockpiled as part of quarrying activities conducted on-site.

A summary of the proposed extraction and fill rates, as well as proposed fill sources are outlined in **Tables 6** and **7** below.

Table 6: Summary of Extraction and Fill Rates

	Waste Disposal Area	Pit 1	Pit 3	Total
Extraction	N/A	50,000m ³ *	2,850,000m ³ *	2,900,000m ³ *
Fill	150,000m ³	40,000m ³	570,000m ³	760,000m ³

* **Note:** These excavation rates are based on an assumed maximum threshold of 100,000m³ being achieved each year for the life of the quarry. Where these extraction rates do not achieve this maximum limit, the timings of excavation and rehabilitation works will need to be adjusted.

Table 7: Schedule of Fill Sources

Fill Sources	Biosolid Disposal Area	Pit 1	Pit 3	Total
Biosolid Waste	@ 4,500m ³ p.a x 30 years = 135,000m ³	N/A	N/A	135,000m ³
Overburden	N/A	@ 0.3m x 7,600m ² = 2,280m ³	@ 0.3m x 126,700m ² = 38,010	40,290m ³
Vegetative mulch (Norske Skog log sweepings)*	N/A	@ 1,200m ³ p.a x 5 years = 6,000m ³	@ 1,200m ³ p.a x 25 years = 30,000m ³	36,000m ³
Clean Fill	15,000m ³	31,720m ³	501,990m ³	548,710m ³
Total	150,000m³	40,000m³	570,000m³	760,000m³

* **Note:** Rockwood quarry receives up to 1,200m³ of vegetative mulch/log sweepings from the adjoining Norske Skog Paper Mill per annum. Given the need to ensure an appropriate soil profile and due to the size of the void in pit 3, the majority of this material will be disposed of in this quarry pit.

It is important to note that the primary business of the quarry operator is as an earthmoving and construction company. As a consequence, the business generates its own fill material from civil construction projects, namely greenfield subdivisions. Based on historical records, AP Delaney and Co generates between 15,000-20,000m³ of clean fill material per annum as part of normal business operations. This would equate to a total amount of fill being generated of between 450,000m³ to 600,000m³ over a 30 year period.

As a consequence, the 'airspace' produced by quarrying activities is a valuable resource for the business operator, which they can use to dispose of excess material produced by construction activities. In essence, the backfilling of the site will not only serve rehabilitation purposes but will also help the current business operator to dispose of excess clean fill material.

All fill to be imported on-site will be in accordance with the NSW EPA Waste Classification Guideline ensuring that the material is a Virgin Extracted Natural Material (VENM) or equivalent. Where backfill material is reshaped and battered, this will occur in accordance with the NSW Resources Regulator Guideline, *Health and Safety at Quarries*, the RTA *Guide to Slope Risk Analysis* and the Australian Geomechanics Society *Guidelines for Landslide Risk Management*.

Of the total material imported/backfilled on-site, it is important that the finished site achieves an appropriate 'soil profile', which can sustain any proposed future rehabilitation and/or revegetation works.

More specifically, the bottom layer of the soil profile will comprise the lower quality fill materials, including any rock spill. The middle layer will comprise better quality clean virgin fill material mixed with vegetative mulch, whilst the top layer will comprise the majority of the clean virgin fill, overburden and a small component of vegetative mulch mixed throughout, which will help improve the soil profile of the finished surface area and better sustain vegetation.

Notwithstanding the above, it is noted that the majority of the quarry areas currently comprise cleared paddock grasslands with the intention to return these to their current rural condition. Notwithstanding, those rehabilitation areas that adjoin existing environmental areas will be revegetated consistent with the adjoining vegetation type.

It is noted that no excavation and associated backfilling works are proposed in the environmental offset areas currently zoned RU2 Rural Landscape, which will allow for revegetation works to occur in the current soil profile.

4.3.3 Topsoil Management

Topsoil stripping within the disturbed area will be undertaken when the soil is in a slightly moist condition thus reducing damage to soil structure. Stripped material will be placed directly onto the disturbed areas and spread immediately if excavation sequences, equipment scheduling and weather conditions permit.

A maximum stockpile depth of 3 metres will be maintained to preserve viability and reduce soil deterioration.

Stockpiles will be protected with sediment fencing and planted with a sterile cover crop (annual species) to ensure stabilisation. Surface drainage in the vicinity of the stockpiles will be configured so as to direct any runoff around the stockpile.

Where the stockpile is not wholly contained within the "closed loop" water management system, temporary sediment control measures such as sand bags and silt fences will be used to prevent sediment from leaving the disturbed areas. Stockpiles will be placed in areas, so as to avoid impediment of natural localised drainage lines and minimise the likelihood of water ponding against the stockpile.

Topsoil will be re-spread in the reverse sequence to its removal, so that the organic layer, containing any seed or vegetation, is returned to the surface. Topsoil will be spread to a minimum depth of 50 mm on 1:3 or steeper slopes and to a minimum depth of 150 mm on flatter slopes. Re-spreading on the contour will aid runoff control and increase moisture retention for subsequent plant growth. Re-spread topsoil will be levelled to achieve an even surface, avoiding a compacted or an over-smooth finish.

4.3.4 Surface Preparation

The ripping of soil is important in assisting rapid tree growth through deep root growth and enhanced soil water infiltration. The ripping depth must be sufficient to penetrate any near-surface rock or clay. Inadequate site preparation and weed control are often the two biggest single factors responsible for tree revegetation failure. Thorough site preparation will be undertaken to ensure rapid establishment and growth of seedlings. All areas proposed for seeding will be deep ripped to an approximate depth of 400 – 500 mm. Where ripping on slopes is required, the ripping will be undertaken around the contour of the land at right angles to water flow.

4.3.5 Tubestock and Direct Seeding

Revegetation works will occur primarily via tube stock in accordance with the Vegetation Management Plan prepared for the site by Biosis. This is due to the fact that not all native trees and shrubs are suited to direct seeding due to their innate germination requirements, as well as the fact that direct seeding is less predictable in terms of establishment success. Furthermore, the seed availability of preferred species is also sometimes uncertain.

Notwithstanding the above, direct seeding (via broadcasting) will also be utilised to supplement proposed tubestock, which limits the need for ongoing maintenance (e.g. watering).

Native Trees and Shrubs

A mixture of native trees and shrubs endemic to the area will be planted onto the majority of the reshaped pit areas following topdressing and site preparation. These tree and shrub tubestock species will also complement natural regeneration from seed contained within the soil seed bank.

Trees and shrubs endemic to the local area will be chosen consistent with the recommendations of the *South West Slopes Revegetation Guide*. A list of these species that will be used as part of the rehabilitation and revegetation process is provided in **Table 8** below:

Table 8: Recommended Species for Rehabilitation and Revegetation

Species name	Common Name	Growth Form
<i>Acacia dealbata</i>	Silver Wattle	Erect tree or shrub; 0.5 – 5 m
<i>Acacia implexa</i>	Hickory Wattle/Lightwood	Erect tree or shrub; 0.5 – 10
<i>Acacia paradoxa</i>	Hedge Wattle	Spreading shrub; 1 – 4m
<i>Acacia rubida</i>	Red-stemmed Wattle	Erect shrub or small tree; 2 – 10m
<i>Acacia verniciflua</i>	Varnish Wattle	Spreading shrub; 1 – 4m
<i>Bursaria spinosa</i>	Sweet Bursaria	Shrub or small tree; 2 – 10m
<i>Calotis spp.</i>	Burr Daisy	Ground cover; 0.2m
<i>Daviesia latifolia</i>	Hop Bitter-pea	Open Shrub; 1 – 3m
<i>Dianella longifolia</i>	Smooth Flax-lily	Ground cover; 0.5m
<i>Dianella revoluta</i>	Spreading Flax-lily	Ground cover; 0.5m
<i>Eucalyptus albens</i>	White Box	Tree; 25m
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	Tree; 20m
<i>Eucalyptus bridgesiana</i>	Apple Box	Tree; 25m
<i>Eucalyptus melliodora</i>	Yellow Box	Tree; 25m

Source: Vegetation Management Plan, Biosis, 2019

Subject to sufficient follow up rain, high initial tree densities can be expected where appropriate soil biomass has been provided. These high densities will quickly help stabilise and screen the site and will result in healthy mature tree stands over time. It is intended to create, over time, a mosaic of variable native species and plant densities representative of that currently occurring in the area. Growth rates of between 1 and 2 metres per year can be initially expected for many of the more dominant trees and shrubs.

After surface soil amelioration and tillage is completed for any given area, revegetation will commence as soon as practicable. Tubestock will be planted in spring and autumn, however opportunistic revegetation will be undertaken if conditions permit. Where relevant tubestock will be protected and staked to ensure the best opportunity for growth.

Where direct seeding is proposed, this will be undertaken to ensure appropriate ratios are achieved to control emerging weeds (such as phalaris, wild oat, paterson's curse etc) and in allowing the tree stand to develop in a positive direction. Seeds will be broadcast evenly onto top-dressed areas. Care will be taken to ensure it will not be buried. Seeding will be conducted in late spring, summer and early autumn giving superior results due to higher ground temperatures.

The proposed method of sowing will be via conventional spreading using agricultural broadcasting equipment, or by hand if the terrain is difficult and machinery use is not possible. Slope stabilising techniques such as hydro seeding and straw mulching will be undertaken on slopes exceeding 18° for enhancement of pasture germination, being the edge of quarry Pit 3.

4.3.6 Scheduling of Works

Approximately 15 hectares of native and pasture grasses will be disturbed by quarrying in both Pits 1 and 3 over the duration of the project. Rehabilitation work will be undertaken progressively as soon as reshaped, benched and topsoiled areas become available. **Figures 11, 14, 15 and 17** show the proposed final landform following the closure of the quarry.

It is noted that the progressive rehabilitation proposed will also ensure that any visual impacts associated with the top portions of the quarry pit will be mitigated through the early establishment of groundcover, shrubs and trees on the rehabilitated portions of the site as soon as they become available.

4.3.7 Final Land Use

The area currently supports open rural paddocks and grasslands given the sites' proximity to a number of nearby heavy industrial/extractive industries, as well as rural residential development. The broad rehabilitation objective for the post-quarrying landform is to establish a similar land use that will act as an appropriate transition/buffer between proposed large scale heavy industrial developments located to the south and large lot residential properties located to the north.

The topography of the final landform within both Pits 1 and 3 will be reshaped and battered (4:1) consistent with the current topography of the land and revegetated.

Due to the nature and expansion of the excavation works, rehabilitation works will generally be limited until stages 1-3 of the quarry have been completed before rehabilitation works extend in a southerly direction.

Once all operations have been completed, all buildings and infrastructure will be removed from within the activity areas. These areas will be reshaped and ripped where necessary for topsoiling and revegetation.

4.3.8 Fencing and Site Access

Fencing and gates (or a similar barrier) will be erected and maintained to exclude and prohibit the movement of persons, vehicles and stock into areas that have been rehabilitated. The fencing and gates will be routinely checked and repaired where necessary.

Barbed wire fencing will not be utilised for site access given the environmental impacts this has on local fauna species. Plain wire and rural fencing will therefore only be utilised.

Signs will be placed in prominent locations to indicate areas that are undergoing rehabilitation and gates will be locked to prevent unwanted vehicle, person access and disturbance.

4.3.9 Weed Control

Weeds present one of the most significant problems to the creation of forest ecosystems. The minimisation of grass and weed competition over the first six to twelve months after seeding is critical to successful tree establishment. Weed control will be undertaken on an “as required” basis should cyclical weed invasion events occur.

As trees establish and mature they will compete and eventually eliminate most weeds and grass underneath. For this reason, dense direct seeding (as opposed to planting) is an effective long-term weed control mechanism that reduces maintenance significantly, particularly ongoing weed control. Weeds in most tree-seeded stands typically disappear after 18 months to two years.

4.4 Work, Health and Safety

The operation and use of the subject land as an extractive industry and associated works including; the crushing of recycled concrete and disposal of biosolid waste and rehabilitation works has the potential to create a public safety risk for adjoining neighbours, road users and future landowners or users. Therefore, consideration of the public safety risk must be undertaken as part of this rehabilitation plan.

The subject land has operated as a quarry for the last 45 years with little or no incident or complaint. There are a number of factors that have contributed to this level of compliance including;

- the generally isolated location of the proposed works and setbacks from adjoining land uses;
- the relatively small-scale nature and operation of the quarry;
- the fact that the site is secured via fences and gates ensuring that the site is not publicly accessible;
- matters regarding noise and dust generation have been appropriately monitored and mitigated so as to minimise any impacts on public health;
- implementation and maintenance of existing environmental protection measures associated with existing quarrying activities, recycling of concrete and disposal of biosolid waste;
- the development does not store any hazardous chemicals; and
- appropriate site management, work, health and safety practices have been implemented including a requirement for at least 3 staff to be present on-site at all times when undertaking quarrying activities.

Notwithstanding the above, there is still a need to ensure that the proposed development does not present a risk to public health and safety either during excavation or rehabilitation works. The quarry and associated rehabilitation works will be undertaken in accordance with the NSW Resources

Regulator Guideline, *Health and Safety at Quarries* as well as the *Safety Management Systems in Mines Code of Practice*.

More specifically, the following work, health and safety measures are proposed as part of this rehabilitation plan:

- There shall be a minimum of 3 staff present on-site at all times when undertaking rehabilitation activities;
- Areas shall only be rehabilitated once they have been fully exhausted of extractive materials and shall avoid areas of current extraction;
- Where necessary, rehabilitated areas shall be fenced off or restricted to avoid possible conflicts between rehabilitation and excavation activities;
- No hazardous or potentially hazardous materials shall be utilised as part of rehabilitation works;
- Backfilled areas shall be stabilised and compacted and relevant batters shall be provided (4:1) to avoid potential issues of landslip or instability in accordance with relevant guidelines outlined above.
- The subject land (including exposed and rehabilitated areas) shall be secured to prevent access via the general public in accordance with current site security arrangement (fencing, security gates, infrared security cameras at entrance gates).
- Worker health and safety requirements shall be undertaken in accordance with Section 15 of the NSW Resources Regulator Guideline, *Health and Safety at Quarries* and shall include:
 - o Provision and use of Personal Protective Equipment (PPE)(high visibility clothing, safety footwear, helmets, hearing protection, eye protection, gloves and respiratory protective devices);
 - o Compliance with relevant dust, noise, vibration and chemical handling procedures; and
 - o Hours of work, fatigue and sun protection.

As a condition of the subject land's current mining licence, an annual inspection is conducted with the mine inspection board to ensure that the quarry is operating in accordance with the relevant conditions of the licence and approval. To date, there have been no issues identified as part of these annual inspections.

Further details regarding risk management in relation to work, health and safety requirements are outlined in Section 4.5 below.

4.5 Risk Management

The NSW Resources Regulator Guideline titled: *Health and Safety at Quarries* outlines the following in relation to risk and risk management:

Risk is a measure of the consequence and likelihood of a negative effect on the safety of people, equipment, infrastructure or the environment. A risk assessment can be either qualitative (i.e. rankings or descriptive indicators) or quantitative (i.e. numerical estimates).

A risk assessment involves considering what could happen if someone is exposed to a hazard, assessing the likelihood of it happening, and what would be the consequence if it did happen. By then considering ways to control the hazard, the risk is reduced and you keep adding controls until the risk is acceptable.

Figure 1 of this guidelines provides a diagrammatic representation of relevant hazard controls, which has been reproduced in **Figure 18** below and has been used to inform the preparation of this plan:

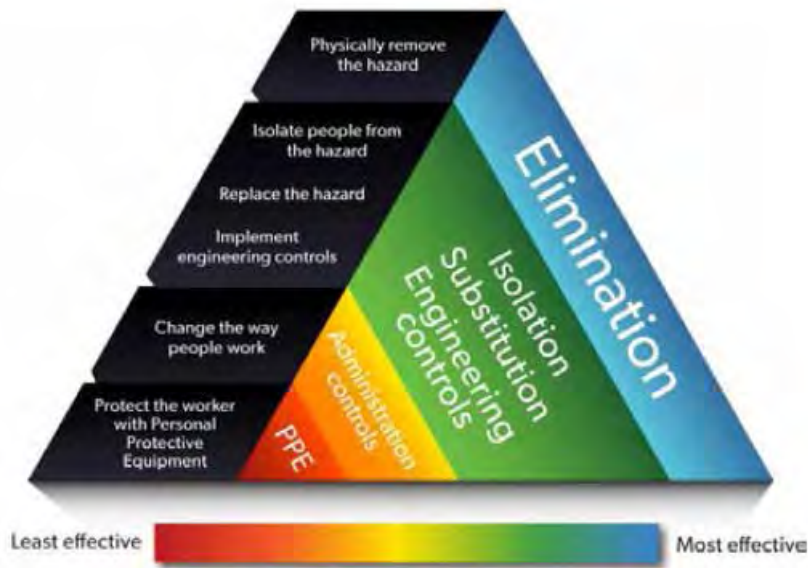


Figure 18: Hierarchy of controls (Source: NSW Resources Regulator Guideline: *Health and Safety at Quarries*, 2018)

In accordance with the requirements of this guideline, it is important that these risk measures are monitored, including reporting any hazards that have occurred.

In response, the business owner has prepared a risk assessment for quarrying and post quarrying operations. In summary, the quarry operator seeks to eliminate where possible the risk or hazard associated with the works. Where this cannot be achieved an engineering solution is proposed (such as a batter of 4:1) or individual worker safety via the use of PPE.

A copy of this risk assessment is included as **Attachment A** to this Plan.

4.6 Rehabilitation Maintenance

Tubestock plantings and direct seedlings will be monitored and watered ongoing to ensure their survival. Some maintenance fertiliser will be required for treed areas on occasion post-closure.

Effective control of weed species within rehabilitated areas will be a critical and an essential component of the proposed revegetation plan. Weed and noxious animal control will be undertaken on all rehabilitation areas according to relevant state and local government legislation and policy.

All erosion and sediment control measures will be maintained in a functioning condition until individual areas have been deemed “successfully” rehabilitated. Structural soil conservation works will be inspected after high intensity rainfall so that de-silting and prompt repairs and/or replacement of damaged works can be initiated as required.

4.7 Rehabilitation Monitoring

Regular monitoring of the revegetated areas will be required during the initial vegetation establishment period and beyond to demonstrate that the objectives of the rehabilitation strategy are being achieved and that a sustainable, stable landform has been provided.

Monitoring will be conducted periodically by independent, suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness.

4.8 Preliminary Rehabilitation Success criteria

Performance indicators will be utilised to demonstrate achievement of rehabilitation objectives. The closure and rehabilitation performance criteria for the Project are outlined in **Table 10**:

The performance indicators will be revised through the Project life and used as the basis for further refinement following the commencement of rehabilitation activities, consideration of the results of the rehabilitation monitoring programs and consideration of any stakeholder feedback.

Table 10: Closure and Rehabilitation Criteria

Performance Indicator	Rehabilitation Performance
Safety	
Access and public safety to be managed during operations and at the closure of the quarry.	Access to the site post closure will be restricted via fencing, access gates and security cameras.
Native Vegetation	
- Rehabilitated quarry areas contain flora species characteristic of the desired native vegetation communities in the landscape; - Monitoring indicates that natural regeneration is occurring. - The majority of trees are healthy and growing in rehabilitated areas. - There is no significant weed infestation.	- More than 75 per cent of trees are healthy and growing. - Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites (i.e. evidence of fruiting of native species observed). - There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum.
Landform	
- No significant erosion or runoff impacts are present. - Rehabilitation activities are undertaken as soon as reasonably possible to minimise unnecessary dust generation from cleared areas. - No significant visual impacts from the quarry.	- Final void areas have been partially backfilled with materials and stabilised to achieve a 4:1 batter. - Rehabilitated slopes on overburden dumps are stabilised. - No significant erosion is present that would constitute a safety hazard or compromise the capability of supporting the end land use. - Contour banks are stable and there is no evidence of overtopping or significant scouring as a result of runoff. - Visually prominent locations are immediately rehabilitated.
Decommissioning	
All surface infrastructure to be decommissioned and removed, including the removal of services (roads, power, water and communications).	- All surface infrastructure which does not have a potential future use associated with the post quarrying land use will be removed, unless such removal has a greater environmental impact than rehabilitating the area with the infrastructure remaining in place. - Removal of all services (power, water, communications) that are not needed as part of the future development of the land. - All infrastructure that is to remain as part of the future land use have been assessed by an appropriately qualified person and determined to be suitable for the intended use and do not pose any hazard to the community.

Performance Indicator	Rehabilitation Performance
Soil	
- Revegetated areas to be top dressed with topsoil. - Soils pH to be within an appropriate pH range. - The land is to be free of land contamination or hazardous materials.	- Topsoil or a suitable alternative has been spread uniformly over the rehabilitation surface. - Soil pH to be within acceptable range of 5-9. - Monitoring demonstrates soil profile development in rehabilitated areas (e.g. development of organic layer, litter layer). - Surface layer is free of any hazardous materials. - Any contamination will be appropriately remediated so that appropriate guidelines for land use are met.
Water	
- Existing dams to be inspected to ensure they are structurally sound following closure of the quarry. - No evidence of excessive run-off or contamination (namely silt) into downstream waterways. - Cut off drains to be removed and/or retained for water quality control.	- Inspection of downstream waterways to ensure that the development site is not causing excessive run-off. - Dams to be retained on-site are structurally sound and show no signs of leaks. - Dams to be de-silted where required to ensure efficiency. - Water control measures (where remaining) are stabilised and working effectively.

5. Final Void Management

5.1 Objectives

The primary objectives of the Final Void Management section of this Quarry Closure and Rehabilitation Plan (as they relate to Pit 1 and Pit 3) include the following:

- Propose mitigation measures to minimise potential off-site impacts associated with the final void; and
- Propose measures to be incorporated in the final landform which aim to minimise potential safety hazards to the general public.

5.2 Justification for the treatment of the final void

The following design and environmental criteria were considered when determining the treatment of the final void. These include:

- Minimising the area of disturbance;
- Diverting clean water around disturbed areas to ensure that water collected within the pit is minimised as much as possible;
- Designing site batters to minimise erosion and enhance rehabilitation opportunities both during operation and post closure;
- Minimising water, noise, and visual impacts generated by the operation;
- Progressively rehabilitating disturbed areas; and
- Rehabilitation of the site in a manner that guarantees the long term environmental, ecological and aesthetic integrity of the area.

5.3 Void Design Criteria and Specifications

Given the size of the final void in Pit 3, this area will not be completely backfilled to current day levels, but rather will be reshaped and stabilised with a 4:1 batter consistent with the topography of the land. This will avoid the creation of a formal 'void', as the land will be reshaped instead.

The area will be backfilled with vegetation (mulch) and clean virgin soil and overburden that has been stockpiled as part of quarrying activities conducted on-site. The area will then be top dressed (seeded), revegetated with local native species and fenced to prevent access by stock.

Due to the size of the proposed expansion area and subsequent void, the works will be undertaken in six (6) stages with initial quarrying activities to occur in a northerly direction prior to moving east and then north-east. Consequently, rehabilitation works are also proposed to occur in a staged manner once portions of the quarry pit become exhausted with rehabilitation works to occur backwards from the pit edges.

5.4 Minimisation of Adverse Impacts from the Final Void

5.4.1 Void Slope Stability

To ensure the safety of the final void, the surrounding final slopes should be left in a condition where the risk of slope failure is minimised. This may require the slopes to be battered back from the vertical to enable a stable overall slope angle.

The following will need to be considered when assessing the geotechnical stability of the slope:

- Height and inclination of slope and number and spacing of any intermediate benches;
- Shear strength of the soils and rocks;
- Density and orientation of fractures, faults, bedding planes, and any other discontinuities, and the strength along them; and
- The effects of the external factors, such as surface runoff.

Prior to closure, investigations will be undertaken to confirm the criteria above.

5.4.2 Control of Surface Inflow

The control of surface inflow into the final void is essential for the long-term management of water quality within the void and will also aid in the control of erosion.

Surface water is a possible cause of slope deterioration and ultimate failure. Drainage will be directed away from the pit floors through the construction or maintenance of cut off drains around the voids and spoon drains will be utilised on the upslope side of all batters.

The catchment area of the final void will be minimised by the installation of diversion drains where required. This will reduce the amount of water reporting to the final void.

5.4.3 Monitoring and Management

After decommissioning works have been undertaken, whether progressive or final, a monitoring program will be designed to demonstrate that the completion criteria have been met and that the site is not resulting in any off site effects.

This period should also be used to plan for remedial action where monitoring demonstrates completion criteria are unlikely to be met. If progressive rehabilitation has been successful, with stabilisation and revegetation meeting completion criteria this last phase of closure may be shortened.

The post closure monitoring and measurement program will be similar to that undertaken during operation of the quarry only scaled back to focus on those aspects of the site that have the potential to cause pollution or is being used as an indicator to verify the success or failure of the rehabilitation works (e.g. noise monitoring will not be required once all decommissioning and rehabilitation activities at the quarry have ceased).

5.5 Final Void Rehabilitation

As discussed above in **Section 2.3**, it is proposed to rehabilitate the quarry pits back to rural grasslands and paddocks. Other portions of the site proposed for vegetation offsetting will be revegetated to establish a native open woodland vegetation cover consistent with the environmental zoned portions of the site. Native vegetation will largely be established using tubestock and will be supplemented with direct seeding, where necessary.

Rehabilitation will be undertaken once extraction has been completed. As the surface quarry progresses, the land will be reshaped and battered consistent with the topography of the area.

The revegetation program will progressively re-establish native tree/shrub/ground cover and will stabilise reshaped areas. Battered areas will be deep ripped to actively promote infiltration of water which will enhance soil moisture requirements for direct tree seeding and minimise surface runoff. Revegetation will also visually screen disturbed areas and will re-establish habitat for native fauna.

6. Quarry Closure and Decommissioning

6.1 Quarry Closure Objectives

The objectives of the quarry closure and decommissioning are to:

- Provide a safe and stable landform compatible with the intended final use;
- Comply with relevant regulatory requirements and attain regulatory consensus on the successful closure and rehabilitation of the Project area;
- Complete the closure, decommissioning and rehabilitation works as quickly and cost effectively as possible whilst achieving primary objectives;
- Produce a final “walk away” landform that is geotechnically stable that blends aesthetically into the surrounding landforms, yet as far as possible does not limit possible future land uses; and

6.2 Closure Methodology – Decommissioning of Infrastructure, Plant and Buildings

The following sections summarise the key aspects related to the decommissioning and closure of the site infrastructure, plant and buildings. It assumes that all buildings and other infrastructure are demolished and removed from the site despite the potential for them being used after quarrying (subject to the landholders’ requirements).

6.2.1 Site Services

All services including power and water on the site should be isolated, disconnected and terminated to make them safe. Generally, all underground services should be made safe and left buried in the ground. Overhead power lines (where they are not used by others) should be removed and the materials (i.e. poles and wire) recovered for potential re-sale or recycling as applicable.

6.2.2 Infrastructure and Buildings

All infrastructure, including the site office/workshop, parking areas, crushing plant and product storage areas will be demolished and removed from the site. Where possible, assets will be reused at the site operators’ other quarries or sold to other operators.

The remaining items will be demolished, removed and transported from the site as required. All recoverable scrap steel will be sold and recycled, with the remaining non-recyclable wastes being taken to a licensed landfill. Prior to disposal, all wastes will be assessed and classified in accordance with Waste Classification Guidelines

All concrete footings and pads will be broken up to at least 1.5 m below the surface. The waste concrete will be crushed to produce an aggregate that can either be used on the site or sold for some other beneficial use.

All remaining areas will then be reshaped, deep ripped, topsoiled and seeded in accordance with **Section 2** above.

6.2.3 Roadways, Car Parks and Hardstand

The roadways, car parks and hardstand areas around the processing and office areas will be ripped up as it relates to Pit 3 and the waste disposal area.

Winchester Lane will remain as it will continue to be used by the Clay Target Club and the residential dwelling at 96 Winchester Lane. Similarly, the rural access road within Pit 1 will be retained to provide access to this paddock, whilst the adjoining Crown Travelling Stock Reserve will also remain in its current condition and will be available for use by stock.

Once the areas have been ripped up, they will then be reshaped, deep ripped, topsoiled and seeded in accordance with **Section 2** above.

6.3 Closure Methodology – Earthworks and Rehabilitation

6.3.1 Dams, Diversions and Surface Water Features

Sedimentation dams which assist in the water flow from the final rehabilitated surface will be retained following quarry closure. All dams will be assessed for structural integrity and upgrade works completed if the dam is to be retained.

6.3.2 Quarry Void

As outlined above, the two voids in Pits 1 and 3 will be backfilled and re-shaped with a 4:1 batter. The main aim will be to ensure that the pit is left geo-technically stable.

The rehabilitation will involve the following:

- Surface preparation of the area by ripping;
- Placement of at least 100 mm of top dressing on the battered areas; and
- Planting of native shrubs on the topsoiled batter. It is proposed to undertake some revegetation planting in the early stages of the project. These rehabilitated areas will assist in minimising the visual impacts of the quarrying activities from the adjacent landowners. By the time open pit operations have reached an advanced stage, these rehabilitated areas will be well established and will form part of the final landform.

The areas to be rehabilitated can be prepared, topsoiled and revegetated. The site topography will allow for continued access to all rehabilitated areas.

6.4 Post Mine Land Use

6.4.1 Land Capability

The proposed quarry activities will not have a significant impact on land capability in the area. No impacts will occur on adjacent lands and the only impacts will be associated with the area immediately impacted by the quarry operation.

The area contains a valuable local construction material resource and the proposed development will involve extracting this resource prior to returning the area to rural paddocks and grasslands consistent with a number of adjoining lands.

Following completion of extraction, the area surrounding the open cut void will be rehabilitated and returned to rural paddocks and grasslands. The land capability of this area will not alter from current land capability although the area of the voids in Pit 1 and Pit 3 will be altered in terms of topography. The land is currently located in close proximity to another adjoining quarry and a proposed heavy industrial estate and is not suitable for rural residential purposes. Similarly, the land is also not suitable for industrial purposes due to its proximity to rural residential dwellings.

6.5 Rehabilitation and Closure Liability

The closure liability has been estimated generally in accordance with the Department of Trade and Investment, Regional Infrastructure and Services (formerly Industry and Investment NSW) *ESG1 – Rehabilitation Cost Estimate Guidelines (I&I NSW 2010)*, with the following key assumptions:

- That rehabilitation works will be staged and ongoing by AP Delaney staff as part of their day to day operations;
- That all infrastructure can be demounted and either used at the site operators' other quarries or sold at a neutral cost to the site; and
- That all plant is removable from the site, therefore limited costs associated with the removal of concrete pads and footings.

The closure liability for Rockwood Quarry has been estimated as follows:

- Dismantling/decommissioning of equipment = \$30,000;
- Revegetation works, weeding, fencing = \$20,000;
- Quarry rehabilitation work (including sourcing fill, backfilling works and staff time) = \$15,000 p.a. x 15 years (once stage 3 excavation has concluded) = \$225,000.
- Total = **\$275,000.**

6.6 Sudden or Unplanned Closure

Sudden or unplanned closure occurs when mining and/or processing suddenly cease due to a variety of reasons including: financial constraints (or similar economic imperatives) or if the operation is instructed to close due to non-conformance/s with regulatory requirements.

In the event of unplanned closure some of the objectives, processes and implementation timeframes may vary. However, the practice of progressive rehabilitation and quarry closure planning including adequate financial provisioning will be in place. This forms a strong foundation in the event of unplanned closure, to provide the highest chance of a successful closure to the satisfaction of the relevant agencies and stakeholders.

The following general site requirements will be completed under a sudden unplanned closure:

- Notify workers and contractors, as well as council and other government authorities;
- Review and update the Rehabilitation and Closure Plan;
- Designate a contact person(s) for authorised access to the site and project management of rehabilitation and closure;
- Where required, demolish buildings/infrastructure, if buildings were to remain then seal, secure and/or lock buildings;
- Remove all mobile equipment from the site, salvage and sell machinery/infrastructure to assist with closure costs;
- Construct fences/barriers to restrict access to the site of specific areas within the site;
- Establish a program for roadway maintenance to ensure access to the site is maintained;
- Continue regular inspections; and
- Establish a schedule for environmental and rehabilitation monitoring.

7. Roles, Responsibilities & Project Reporting

The quarry manager (or their nominated representative) is responsible for overseeing the implementation of this Quarry Closure and Rehabilitation Plan, including:

- Delegating tasks associated with this Quarry Closure and Rehabilitation Plan where necessary;
- Providing adequate resources to implement this Quarry Closure and Rehabilitation Plan; and
- Providing adequate training to employees and contractors regarding their requirements under this Quarry Closure and Rehabilitation Plan.

7.1 Review

The quarry operation is proposed to have an additional life of 30 years, during which time the quarry plan may be changed or altered depending on operational circumstances. Therefore, this Quarry Closure and Rehabilitation Plan will be regularly updated, where needed, to capture these quarry plan changes.

One year prior to extraction ceasing, the Quarry Closure and Rehabilitation Plan will be reviewed addressing the final quarry plan and any changes that may have occurred since the previous Plan.

7.2 Quarry Records

Throughout the life of the Project, active records will be maintained in relation to processes that may impact upon rehabilitation of the Project area. This will provide the basis for interpretation of subsequent rehabilitation monitoring outcomes. Amongst these records to be maintained include:

- detailed rehabilitation procedures;
- identification of any potentially contaminated sites (e.g. fuel/oil facilities);
- environmental monitoring records;
- records of topsoil stockpiles, including information such as the date in which they were formed and maintenance works undertaken (e.g. weed control, planting with native legumes to maintain microbes etc.); and
- environmental incident records.

7.3 Rehabilitation Reporting

Given the nature of the proposed works, being an extractive industry and the need to undertake ongoing rehabilitation works (where necessary/able), it is expected that a condition will be included as part of any issued development consent requiring periodic project reporting consistent with condition 20 on the existing development consent. The periods for this project reporting will be determined by council in association with the current quarry operator.

Such details may include:

- Compliance report, which reviews the overall performance of the development in terms of the conditions of consent;

- Details of compliance with relevant statutory authority requirements;
- A certified assessment of the amount of material extracted from the site; and
- Details regarding waste material, recycled concrete and clean fill material deposited on site for disposal, recycling or as part of rehabilitation works.

8. References

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Attachment A

Risk Assessment – Rockwood Quarry

RISK ASSESSMENT - ROCKWOOD QUARRY

HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
SURFACE MINE						
1. High Wall / Pit Wall	*	1.1 collapse or slump of wall	L4	Has happened but to date no	1	MEDIUM
	*	1.2 materials falling off	L4	Injuries	1	MEDIUM
	*	1.3 equipment or persons going over	L5		1	MEDIUM
		1.4 other -				
2. Dusts that can effect health such as silica,		2.1 creation and/or accumulation of amounts sufficient to effect health 2.2 confined space exposures 2.3 other -				
3. Other dusts that can effect operations	*	3.1 dust levels that effect operations visibility	L3	Visability	2	MEDIUM
	*	3.2 dust levels that effect equipment	L3	Dusty windscreen effecting vision	2	MEDIUM
		3.3 other -				
4. Water		4.1 dam, diversion or storage facility collapse	-	Not an issue - dam below quarry.		
		4.2 inrush into/flood of surface mine	-			
		4.3 inability to manage	-			
		4.4 flow failure of pumping system eg outlet blockage	-			
		4.5 other -				

SURFACE MINE (continued)						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
5. Mobile mechanical equipment such as trucks, loaders, dozers, utes, rail, winders,	*	5.1 inappropriate exposure to moving machinery	L2	People do walk around on site.	1	HIGH
	*	5.2 park brake / isolation error	L3	Human Error Signage may not be followed correctly.	1	HIGH
		5.3 mechanical failure	L3		1	HIGH
	*	5.4 road traffic in and out issues	L3		1	HIGH
		5.5 other -				
6. Mining equipment such as drills, loaders, excavator,	*	6.1 inappropriate exposure to energised/moving mining machinery (eg too close to face)	L4	Has happened but to date no injuries.	1	MEDIUM
	*	6.2 isolation error	L5	Isolation procedure in place but could possibly happen.	1	MEDIUM
	*	6.3 mechanical failure	L4		1	MEDIUM
		6.4 other -				
7. Thermal heat sources such as electrical apparatus, engines, pumps, friction points such as bearings, idlers,	*	7.1 thermal sources > 150 o C possible close to flammable substances	L5	No stored fuel on site	1	MEDIUM
	*	7.2 possible overheating near fuel sources	L5	Fuel is isolated.		MEDIUM
		7.3 other -				

SURFACE MINE (continued)						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
8. Electrical energy from apparatus such as cables, transformers, switch gear, connections,	*	8.1 inappropriate exposure to energised electrical equipment (eg cable fault/ contacts, cabinet open)	L5	Possibility of it happening.	1	MEDIUM
	*	8.2 isolation error (tagging system)	L4	Human Error	1	MEDIUM
	*	8.3 electrical equipment failure	L5	Possibility of it happening.	1	MEDIUM
		8.4 other -				
9. Hydraulic pressure from pump stations and reticulation or equipment	*	9.1 unwanted pressure (eg hoses detaching, equipment failure)	L4	Possibility of it happening.	3	MEDIUM
	*	9.2 high pressure leaks	L4	Possibility of it happening.	3	MEDIUM
		9.3 other -				
10. Pneumatic pressure from compressor and reticulation or equipment	*	10.1 unwanted pressure releases such as hoses detaching, equipment failure	L4	Possibility of it happening.	4	LOW
	*	10.2 high pressure leaks	L4	Possibility of it happening.	4	LOW
		10.3 other -				
11. Water pressure from pump stations and reticulation or equipment	*	11.1 unwanted pressure releases such as hoses detaching, equipment failure	L4	Possibility of it happening.	5	LOW
	*	11.2 high pressure leaks	-	No high water pressure.		
		11.3 other -				

SURFACE MINE (continued)						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
12. Stored pressure/energy such as accumulators, spring/tension devices,	*	12.1 unwanted pressure releases such as hoses detaching, equipment	L4	(Crusher)	1	MEDIUM
	*	12.2 high pressure leaks	L4	Possibility of it happening.	1	MEDIUM
		12.3 other -				
13. Radiation such as sunshine	*	13.1 exposure of skin (sunburns) that could lead to cancers	L4	Protective equipment etc supplied	2	MEDIUM
	*	13.2 reflected ultraviolet light to exposed eyes (eg limestone)	L4		3	MEDIUM
		13.3 other -				
14. Slopes/grades/ramps where equipment can move in an uncontrolled manner	*	14.1 vehicle runaways	L4	Possibility of it happening.	1	MEDIUM
	*	14.2 toppling/rolling over (berms not in place etc)	L4	Berms in place	1	MEDIUM
		14.3 other -				
15. Post rehabilitation safety		15.1 land stabilisation/batter failure	L4	Possibility of occurrence if batters are not appropriately stabilised and compacted	1	MEDIUM
		15.2 Environmental contamination/harm	L4	Possibility of occurrence should no environmental protection measures be implemented or they fail	2	MEDIUM
		15.3 Unauthorised site access	L2	Possibility of occurrence given no-one will be present on-site	3	LOW

SURFACE FACILITIES eg Workshop						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
17. Flammable gases such as Acetylene, LPG	*	17.1 escape and/or accumulation of flammable levels	L4	Possibility of it happening.	1	MEDIUM
	*	17.2 exposure to heat sources	L4	Possibility of it happening. Not stored on site	3	LOW
		17.3 cylinders stored and used to standard				
		17.4 other -				
18. Chemical fumes such as from welding/cutting, grinding, glues/grouts, diesels,	*	18.1 escape and/or accumulation of amounts sufficient to effect health	L4	Possibility of it happening. None stored on site	1	MEDIUM
	*	18.2 confined space exposures				
		18.3 other -				
19. Chemicals such as petrol, diesel, oils, degreasers, solvents,	*	19.1 exposure of chemical to heat source	L4	Possibility of it happening.	1	MEDIUM
	*	19.2 leaks/spills (no bunding)	L4	Bunding in place	5	LOW
		19.3 storage to standard (MSDS)				
		19.4 other -				
20. Chemicals that may effect health such as cleaners, oils/lubes, solvents,degreasers,	*	20.1 exposure of chemical to contact, ingestion or inhalation situations (MSDS available)	L4	Possibility of it happening.	3	LOW
	*	20.2 leaks/spills	L4	Possibility of it happening.	3	LOW
		20.3 other -				

PLANT / TREATMENT FACILITY						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
22. Fixed mechanical equipment such as conveyor, crusher, screens,	*	22.1 inappropriate access to operating machinery (eg guards missing)	L4	Possibility of it happening.	1	MEDIUM
	*	22.2 isolation error	L4	Possibility of it happening.	1	MEDIUM
	*	22.3 mechanical failure	L3	Possibility of it happening.	1	HIGH
	*	22.4 safe access/procedures for blocked crusher	L3	Possibility of it happening.	1	HIGH
		22.5 other -				
23. Fall of things such as components, tools, structures,	*	23.1 frail structures or unstable structure locations	L4	Possibility of it happening.	1	MEDIUM
	*	23.2 components/tools used in an unprotected manner at height	L4	Possibility of it happening.	1	MEDIUM
	*	23.3 materials falling from elevated process, such as conveyors	L4	Possibility of it happening.	1	MEDIUM
		23.4 other -				
24. Fall of persons from height greater than 2 metres	*	24.1 work locations at 2 metres or more with poor/no fall protection	L4	Possibility of it happening.	1	MEDIUM
	*	24.2 elevated work access or passages with poor/no fall protection	L4	Possibility of it happening.	1	MEDIUM
		24.3 other -				

EXPLOSIVES						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
26. Explosives storage - including detonators		26.1 storage /magazine problems (not to standard) 26.2 transportation ignition of dets and/or explosives 26.3 lightning strike on explosives storage 26.4 other -				
27. Explosives - general		27.1 unauthorised person entering shot 27.2 inappropriate firing 27.3 misfire 27.4 flyrock occurrences 27.5 other -				

GENERAL						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
53. Noise hazards	*	53.1 loud equipment	L1	Machinery Loud	5	MEDIUM
	*	53.2 poor use of hearing equipment	L2	Protection supplied	5	LOW
		53.3 other -				
54. Slip/trip hazards	*	54.1 poor housekeeping	L3	Housekeeping	2	MEDIUM
	*	54.2 poorly placed cables/hoses	L3	Maintenance	2	MEDIUM
	*	54.3 rough terrain	L2	Housekeeping	2	MEDIUM
		54.4 other -				
55. Manual handling hazards	*	55.1 heavy, awkward, cumbersome	L2	Procedures in place	3	MEDIUM
	*	55.2 difficult access/posture problem	L4	Procedures in place	4	LOW
	*	55.3 high repetition	L1	Jobs are repetitive	4	MEDIUM
		55.4 other -				
56. Wildlife such as kangaroos, snakes, spiders,	*	56.1 vehicle collisions	L5	Fencing	1	MEDIUM
	*	56.2 bites	L5	Possibility	4	LOW
		56.3 other -				
57. Biological such as exposure to work related bacteria	*	57.1 health problems due to bacteria in water systems, including drinking, cooling etc.	E	Possibility	4	LOW
		57.2 other -				

GENERAL						
HAZARD TYPE	* IF APPLIES	ARE ANY OF THESE PRESENT OR POSSIBLE IN THE MINE?	LIKELIHOOD LEVEL	REASON FOR SELECTING THE LIKELIHOOD	MAXIMUM CONSEQUENCE	RISK RATING
58. External threats	*	58.1 bushfire effect on surface facilities	L4	Possibility	5	LOW
		58.2 bushfire effect underground	N/A			
	*	58.3 security threat to operations	L4	Vandals (after hours)	5	LOW
		58.4 other activities in close proximity effect operations	N/A			
		58.5 other -				