integrated land management & planning

Exton Quarry – Increase in capacity Environmental Effects Report

Prepared By: Barry Williams

Date: 16 July 2024

Issue	Date	Recipient	Organisation
Revision 0	14 July 2022	Mr Tony Cresswell	Cresswell's Transport Pty Ltd
Revision 1	15 December 2022	Mr Tony Cresswell	Cresswell's Transport Pty Ltd
Revision 1	17 January 2023		Environment Protection Authority
Revision 2	6 December 2023	Mr Tony Cresswell	Cresswell's Transport Pty Ltd
Revision 2	7 December 2023		Environment Protection Authority
Revision 3	5 June 2024		Environment Protection Authority
Revision 4	8 July 2024		Environment Protection Authority

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PART A – PROPONENT INFORMATION

TABLE 1: PROPONENT DETAILS

Business	Cresswell's Transport Pty Ltd
ACN	009 537 320
Address	PO Box 310 DELORAINE Tasmania 7304
Contact	Mr Tony Cresswell
Email	Tony@cresswellstransport.com.au
Phone	0418 131 342

TABLE 2: CONSULTANT DETAILS

Name	Mr Barry Williams
Business	Integrated Land Management & Planning
ABN	67 057 193 880
Address	331 South Arm Road LAUDERDALE Tasmania 7021
Contact	Barry.williams@ilmp.com.au
Phone	0437 394 492

PART B – PROPOSAL DESCRIPTION

TABLE 3: PROPOSED ACTIVITY

Activity	Exton Quarry is a hard rock quarry which uses drill and blast techniques to extract dolerite rock. The shot rock is processed using mobile crushers and screens to produce aggregates and gravels for sale.

	The activity will be classified under Schedule 2 of EMPC Act 1994 as a materials processing facility by virtue of the use of mechanical crushers.			
New or existing	The Exton Quarry is an existing operational quarry.			
	Mining Lease	1994P/M	Granted	13 Mar 2015
	Council permit	56/95/5	Date issued	8 Aug 1995
	Environment Protection Notice	9502 / 1	Date issued	24 Oct 2016
Product	The site is geologically mapped as Jurassic dolerite, The source rock is reasonably fine-grained dolerite which when crushed produces hard, durable, angular aggregate.			
Current annual extraction capacity	13,235 cubic metres, which on permit 9502/1 is deemed equivalent to 22.500 tonnes.			
Current annual processing capacity	13,235 cubic metres, which on permit 9502/1 is deemed equivalent to 22.500 tonnes.			
Loose bulk density	1.7 tonnes per cubic metre			
Proposed annual extraction capacity	50,000 cubic metres which is deemed equivalent to 80,000 tonnes			
Proposed annual processing capacity	50,000 cubic metres which is deemed equivalent to 80,000 tonnes			
Loose bulk density	1.6 tonnes per cubic metre			
Deemed bulk density	Variations in bulk density occur as different products are derived from the same virgin rock. Rock with the same specific gravity can produce gravels with even particle size distribution or aggregates which are gap graded. An increase in air voids in aggregates results in a lower bulk density.			
Methods	Source rock will be extracted using drill and blast techniques. Shot rock will be processed using mobile crushers and mechanical screens.			
Transport route	Trucks will leave the quarry via the existing access road to the junction with Porters Bridge Road, then travel either north or south depending on the destination for the products.			
Stockpiles	The dolerite is out cropping within the proposed extraction areas. Small quantities of top soil and overburden will be stockpiled adjacent to the footprint of the quarry. Stockpiles of various products will be constructed onsite during an operational campaign and depleted over time.			
Area of disturbance	Current area of disturbance – 2.0 hectares			

	Future area of disturbance – 4.5 hectares				
Major equipment	During an operational campaign the following types of equipment will be utilised:				
	Operation	Equipment	Power (kW)		
	Drilling	Mobile drill rig	120		
	Ripping / excavating	Excavator	120		
	Loading / stockpiling	Wheel loader CAT 950K	157		
	Crushing	Primary crusher: J-1175 Cone crusher: C-1540 VSI: Twister-Trac VS350	257 261 403		
	Screening	Screener: Terex-Finlay 883	72		
	Actual equipment utilised will vary according to what the Operator has available at the time or if contract equipment is hired.				
Infrastructure	Current infrastructure: Relocatable site shed, submersible water pump, portable water pump, access road, top bench access track. New infrastructure: new access road, new top bench access track.				
Proposal timeline	December ‘22	January ‘23	February ‘23	April. ‘23	May ‘22
	Documents	Advertising	EPA assess	MVC assess	Permit
Operating hours	Weekdays	7.00 am to 7.00 pm			
	Saturdays	8.00 am to 4.00 pm			
	Sundays and public holidays	No work.			

TABLE 4: LOCATION AND PLANNING CONTEXT

Location	611 Porters Bridge Road, EXTON, Tas 7303
Property ID	9766314
Certificate of Title	185619/2
Property ID	9766313
Certificate of Title	157328/7
Land tenure	Private freehold
Planning Scheme	Tasmanian Planning Scheme – Meander Valley

Land zoning	Meander Valley Local Provisions Schedule – 20. Rural		
Planning permit	Meander Valley Council advised that a land use planning permit is required, See Appendix 1.		
Use Class	Extractive Industry: use of land for extracting or removing material from the ground, other than Resource Development, and includes the treatment or processing of those materials by crushing, grinding, milling, or screening on, or adjoining the land from which it is extracted. Examples include mining, quarrying, and sand mining.		
Permissibility	Extractive Industry is a 'permitted' use without qualification in the Rural Zone.		
Mining lease	1994P/M	Status	Granted
Mining lease area	22 hectares		

TABLE 5: DESCRIPTION OF SITE AND SURROUNDS

Land use	Exton Quarry is situated in privately owned native forest which has been previously harvested. Further afield land has been cleared for agriculture with occasional residences associated with the agricultural use. Figure 3: General Location Map (Extract from TasMap Topographic) shows the location of Exton Quarry in relation to existing residences.					
Topography	Exton Quarry is situated on the northern face of a sparely forested hillock. This hill is one of a series of low hills rising above mutton plain. The quarry has a northerly aspect and is located on the lower to mid slope hill. The new quarry plan extends the top face to the crest of the hill but not beyond.					
Climate	Deloraine (Athol): 091000 (B.O.M. (a), 2022)					
Mean Maximum Temperature (^{0}C)	February		22.5	July	10.4	
Mean Minimum Temperature (^{0}C)	February		8.7	July	0.9	
Mean monthly rainfall (mm)	Minimum February	45.8	Maximum July	120.2	Annual	945.7
Wind Data	No wind data is available for weather stations within 30 kilometres.					
Geology	Exton Quarry is located within a large area that has been mapped with underlying Jurassic dolerite (Tasmanian dolerite). The site is not close to margins between the intruded dolerite and older sedimentary rock hence the source rock should have consistent properties.					

	It is uncommon for dolerite rock to contain minerals likely to be potentially acid forming.
Soils	Soils in this area are described as 'Kranozems of dolerite'. Slopes are generally moderate to steep and soil is red brown, similar in appearance to kranozems on basalt but are more stony and shallower (Spanswick, 1999). Land capability is classified as 6, Land marginally suited to grazing due to severe limitations (D.N.R.E., 2022).
Hydrology	The closest defined watercourse is off-lease on the eastern side. This watercourse is defined as a minor stream and flows into a series of natural and artificial drains that eventually discharge into the Meander River. The watercourse proximate to the site has an immediate Conservation Management Priority of Moderate and a RS Integrated Conservation Value of High as recorded on the CFEV[1]. Discharge from quarry site enters an ill-defined drainage path with intersects the defined watercourse after travelling through 600 metres of native vegetation.

Natural values

Threatened flora (5000 metres)

	species	Common name	State Listing	National Listing
	Epilobium pallidiflorum	showy willowherb	r-	-
	Glycine microphylla	small-leaf glycine	v	-
	Haloragis heterophylla	variable raspwort	r	-
	Pimelea curviflora	curved riceflower	p	-
	Pimelea curviflora var. gracilis	slender curved riceflower	r	-
	Senecio squarrosus	leafy fireweed	r	

Threatened fauna (5000 metres)

	species	Common name	State Listing	National Listing
	Accipiter novaehollandiae	grey goshawk	e	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	e	E
	Dasyurus maculatus subsp. maculatus	spotted-tail quoll	r	V
	Haliaeetus leucogaster	white-bellied sea-eagle	v	

[1] Conservation of Freshwater Ecosystem Values project is a comprehensive audit of freshwater ecosystems.

	Perameles gunnii	eastern barred bandicoot		V
	Sarcophilus harrisii	tasmanian devil	e	E
	Tyto novaehollandiae subsp. castanops	masked owl (Tasmanian)	e	V
Raptor nests (5000 metres)				
	species	Common name	Nest ID	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	125	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	1515	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	1516	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	193	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	402	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	847	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	960	
	Aquila audax subsp. fleayi	tasmanian wedge-tailed eagle	986	
	Haliaeetus leucogaster	white-bellied sea-eagle	2682	
Declared weeds within 5000 metres				
	species	Common name	WONS	
	Bassia scoparia	copper saltbush		
	Erica lusitanica	spanish heath		
	Ilex aquifolium	holly		
	Onopordum acanthium	scotch thistle		
	Rubus fruticosus	blackberry	yes	
	Senecio jacobaea	ragwort		
	Ulex europaeus	gorse	yes	

1 MAPS AND SITE PLAN

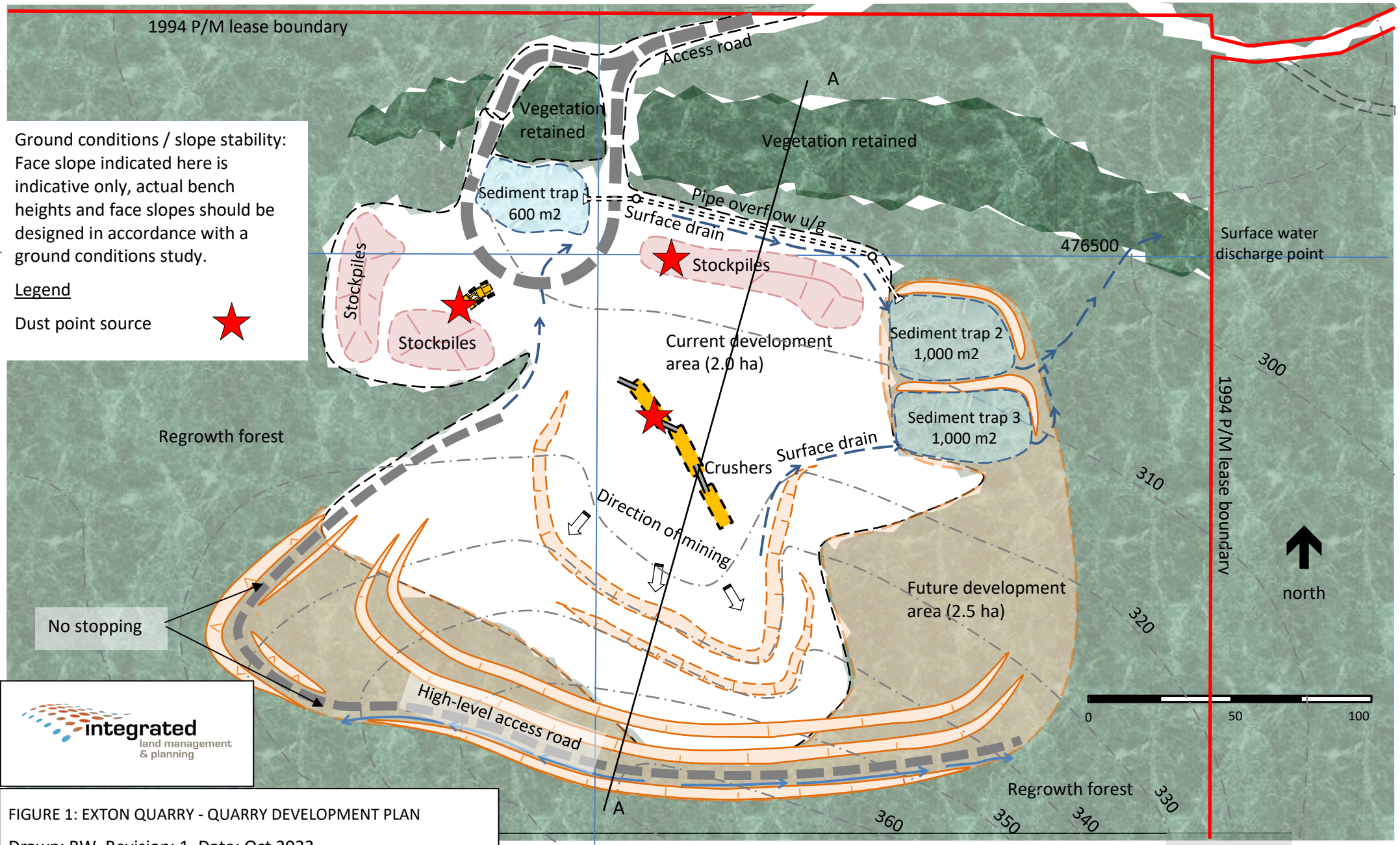

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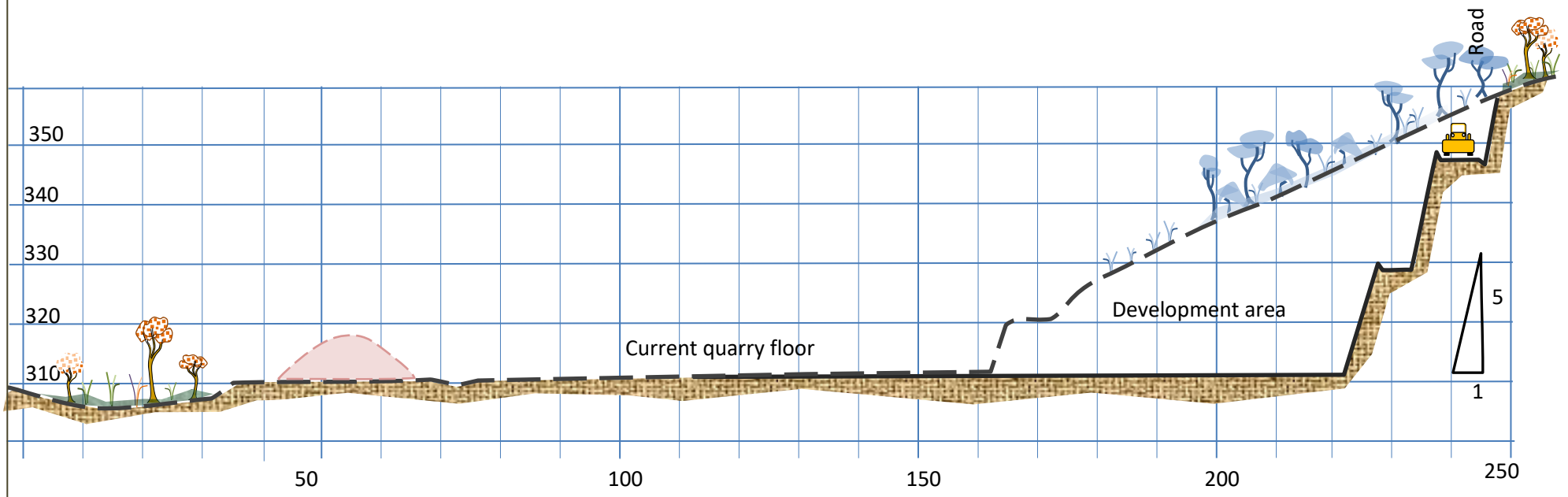
FIGURE 1: EXTON QUARRY - QUARRY DEVELOPMENT PLAN

Drawn: BW, Revision: 1, Date: Oct 2022



Quarry development

- Construct new high-level road to access above top face.
- Cut down road level to provide a 3.0m high face and road side diversion drain.
- Provide berm on outside edge of road to keep vehicles clear of live edge.

FIGURE 2: EXTON QUARRY - SECTION AT A-A

Drawn: BW, Revision: 1, Date: Oct 2022

Ground conditions / slope stability:
Face slope indicated here is indicative only, actual bench heights and face slopes should be designed in accordance with a ground conditions study.

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2 PROPERTY DETAILS

FIGURE 3: GENERAL LOCATION MAP (EXTRACT FROM TASMAP TOPOGRAPHIC)

TABLE 6: PROPERTY DETAILS

Address	661 Porters Bridge Road, EXTON
Property Owner	T & C Cresswell Family Trust
Property ID	9766314
Certificate of Title	185619/2

Property ID	9766313	
Certificate of Title	157328 / 7	
Mining Lease	1994 P/M	
'The Land'	For the purposes of regulation mining lease 1994 P/M is The Land.	
Lessee	Cresswell's Transport and Quarrying Pty. Ltd.	
Operator	Cresswell's Transport Pty Ltd	
Tenure	Private Land	
Tasmanian Planning Scheme	20. Rural	
Land Capability	6	Land marginally suited to grazing due to severe limitations
Mining Lease Area	22 hectares	

3 PROJECT RATIONALE AND ALTERNATIVES

3.1 PROJECT RATIONALE

Exton Quarry has operated successfully for 18 years with a modest annual production capacity. In recent years the demand for construction materials has increased. Quarry operators are asked to tender to supply larger quantities in contracts, if the quarry is unable to supply the entirety of the contract the tender is unlikely to be successful.

Exton quarry targets a substantial dolerite resource which is large enough to support a more intensive operation. The campaign style operation can be more efficient when a production run produces greater volumes. Development and establishment costs can be spread over the greater volume of production making overheads comparatively cheaper.

3.2 ALTERNATIVES

Two alternatives to seeking to increase the capacity of Exton Quarry have been considered:

1. Continue to operate with the current restrictive capacity limit. In this scenario the quarry will not benefit from economies of scale and will be unable to confidently tender for available contracts without risking exceeding the capacity limit.
2. Decommission the quarry. The Exton Quarry provides access to a high grade dolerite source rock which is developed in a tight box type high wall quarry footprint providing maximum product for minimum ground disturbance. If the quarry was decommissioned the region would lose access to a sensitively situated, efficient source of quality products.

4 EXISTING ACTIVITY

- The Operator is not required to undertake environmental monitoring; therefore, no environmental monitoring results are available.
- There have been no public complaints of an environmental nature relating to the operation of the Exton Quarry.
- There has been no breach of the conditions imposed through the current regulatory permits.
- There has been no breach of environmental law in relation to the Exton Quarry operation.

PART C – ENVIRONMENTAL IMPACTS AND MANAGEMENT

1 AIR QUALITY

Quarries generate dust through emissions from mechanical crushers and screens, dropping products from buckets into chutes and trays, dropping product from conveyors to chutes and to ground and through vehicle movements over unmade surfaces. The location of these point source emissions is highlighted on Figure 1: Exton Quarry - quarry development plan but will change according to the varying location of key pieces of equipment.

Dust at any quarry is managed to protect the workforce from any discomfort associated with encountering fine particles. In addition to improving the workplace for employees, quarry operators consider any impact of dust on neighbours either directly from the quarry operation or more remotely from vehicular traffic.

1.1 AIR QUALITY STANDARDS

Environment Protection Policy (Air Quality) 2004

Part 3 - ENVIRONMENTAL VALUES AND STANDARDS

Environmental values

6. (1) Environmental values are the values or uses of the environment that are to be protected.

(2) The environmental values to be protected under this Policy are –

(a) the life, health and well-being of humans at present and in the future;

(b) the life, health and well-being of other forms of life, including the present and future health, wellbeing and integrity of ecosystems and ecological processes;

(c) visual amenity; and

(d) the useful life and aesthetic appearance of buildings, structures, property, and materials.

1.2 DUST EMISSION SOURCES

Exton Quarry will generate dust emissions from;

- traffic traversing gravel hard stand and roads surfaces,
- operating the primary and secondary crushers including screens and conveyors,
- drilling and blasting for short periods, and
- gravel surfaces and stockpiles during high wind conditions.

Vehicular traffic generated by the Exton Quarry will travel on the private access road, which has an unsealed gravel surface and in dry conditions is likely to generate dust emissions.

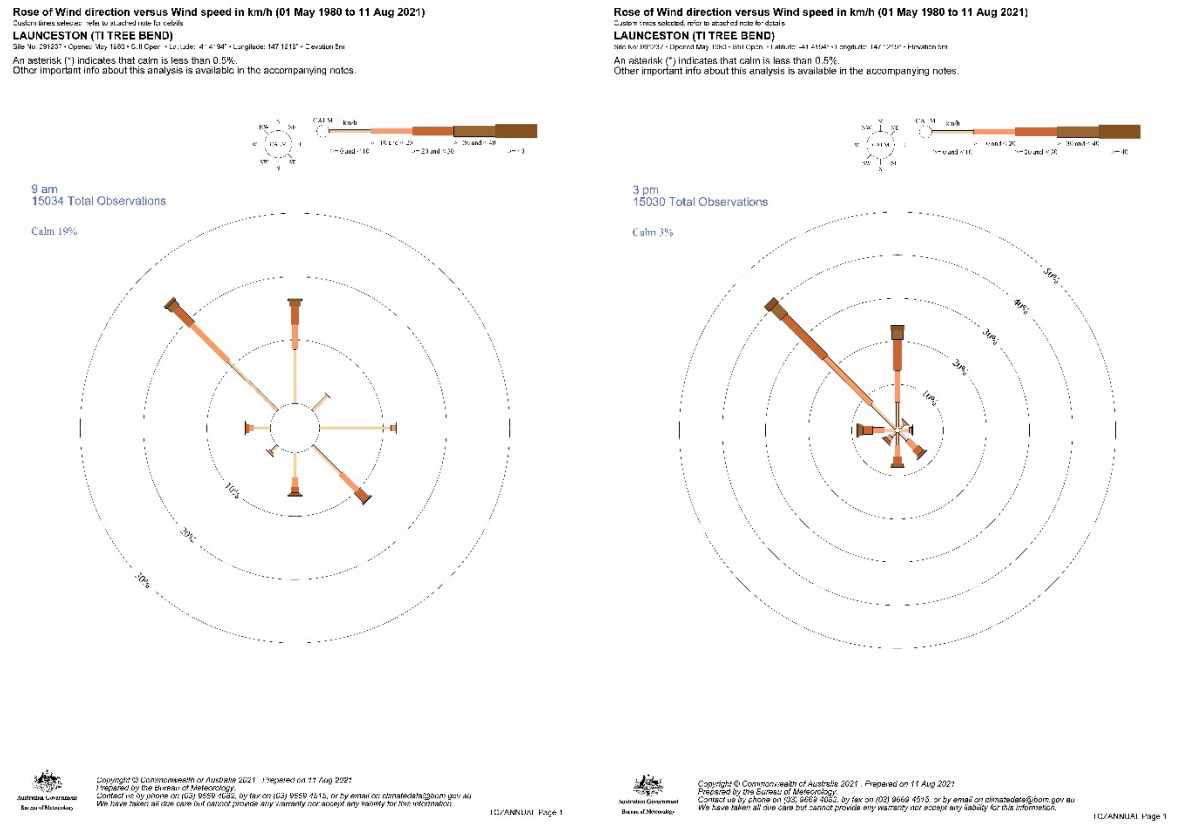
1.3 POTENTIAL FOR ENVIRONMENTAL NUISANCE

The closest residential properties to Exton Quarry are over 1 kilometre distant and the intervening land is forested. The proximity of residences is detailed in Part B, Figure 3: General Location Map (Extract from TasMap Topographic).

1.4 MITIGATING FACTORS

The Bureau of Meteorology data from the closest weather station that gathers wind data (Launceston Ti Tree Bend) shows the predominant wind direction and strongest wind is from the northwest see Table 7: Wind roses (Ti Tree Bend)**.** Dust emissions in these conditions will be carried in a south east direction. Exton Quarry is surrounded by forested land which will reduce wind speed at ground level.

Table 7: Wind roses (Ti Tree Bend)



(B.O.M. (b), 2022)

1.5 MITIGATION MEASURES

The following measures will be employed to help further mitigate the risk of adverse fugitive dust emissions:

- Trafficked surfaces on the quarry floor, benches and haul roads will be maintained in good condition and clean.
- Drop distances between buckets and hoppers and trays and off conveyor chutes will be kept to a minimum.
- Trays carrying product off site will be loaded so the maximum height of the load does not exceed the height of the sides of the tray or alternatively will have covers fitted.

- The operator will deploy a water cart on days where weather conditions are especially dry and windy.

The *Quarry Code of Practice* (EPA Tasmania, May 2017) states that the Operator must take reasonable actions to prevent a visible plume of dust crossing the mining lease boundary.

1.6 Resultant Impacts

Weather and topography reduce the likelihood that dust will cause a nuisance to neighbours and the Exton Quarry operator will actively manage surfaces and operations to minimise the impact of dust. The Operator has access to water from the water storage impoundment, pumps and hoses for use in dust suppression.

A permanent weather station is not appropriate as the site is operated on a campaign style basis, the site therefore is not manned every day.

The *Tasmanian Environment Protection Policy (Air Quality) 2004* (EPP) seeks to further the objectives of the *Environmental Management and Pollution Control Act 1994* set out in Schedule 1 of that Act. In relation to air quality the Act promotes the sustainable development of natural resources in a manner which avoids, remedying or mitigating any adverse effects on the environment.

The Part 5 of the EPP requires the regulatory authority to manage diffuse sources of air pollution that have the potential to cause material or serious environmental harm or an environmental nuisance. To achieve suitable control the EPP states in Part 5;

> *16. (3) Diffuse sources of air pollution should be managed in accordance with any relevant guidelines published, adopted or endorsed by the Board for the purposes of this clause.*

The *Quarry Code of Practice* can be considered a suitable guideline for managing atmospheric dust emissions from a quarry.

MANAGEMENT MEASURE 1: DUST MANAGEMENT

Item	Proposed measure	Timeframe
1.	The quarry operator will introduce active mitigation measures to prevent a visible dust plume crossing the mining lease boundary.	As required

2 Surface water and groundwater quality

2.1 Water quality standards

State Policy on Water Management 1997

> *PART 2 - OBJECTIVES*
>
> *5. Purpose of the Policy*
>
> *5.1 To achieve the sustainable management of Tasmania's surface water and groundwater resources by protecting or enhancing their qualities while allowing for sustainable*

development in accordance with the objectives of Tasmania's Resource Management and Planning System. (Schedule 1 of the State Policies and Projects Act 1993).

2.2 WATER AND OVERLAND FLOW

Exton Quarry is located on the northern face of the foot slopes of a prominent hill. Above the top face the land generally falls either side of the quarry disturbance. The catchment reporting to the quarry disturbance is small (1.7 hectares) and is partly forested but with areas of rock outcropping.

2.2.1 SEDIMENT CONTROL INFRASTRUCTURE

The site currently serviced by a substantial sediment trap / water supply dam (600 square metres in area). The extraction and working areas drain to this impoundment which serves to provide water for dust suppression and mist sprays for crushers, conveyors and hoppers.

A high-level road has been constructed across the top of the face which will intercept and direct overland flow into the surrounding vegetation. The road will be relocated to maintain access to the top of the top face as the benches are advanced.

2.2.2 POTENTIAL FOR ENVIRONMENTAL NUISANCE

An uncontrolled discharge of stormwater runoff from gravel surfaces can cause excess sediment to be deposited onto native vegetation where it can smother native plants, onto agricultural land where pasture and crops can be affected or into a natural watercourse. The excess sediment can smother the bed of the stream killing aquatic flora and fauna and reducing the health of the stream. A substantial 'beach' of sediment can remain in the bed of the stream and be carried downstream with each successive rain event further damaging aquatic habitat.

Exton Quarry targets a fresh dolerite source rock. Weathered dolerite is associated with red / brown clay soil profiles which are not normally dispersive but are prone to water erosion on steep slopes. Fine clay particles liberated from the profile tend to remain in suspension in water bodies for extended periods increasing turbidity.

2.2.3 LIKELIHOOD FOR ENVIRONMENTAL NUISANCE

Best practice sediment control infrastructure has limited effectiveness in preventing pollution of surface water and ground water (NSW Department of Environment and Climate Change, 2008). To minimise the risk of the Exton Quarry operation polluting surface and groundwater, an erosion and sediment control strategy has been applied:

- The initial site planning considered achieving the maximum exposure of source rock with the minimum area of disturbed ground. The site is located on the foot slopes to a steep hill which provides for high wall extraction thereby limiting the plan area of the quarry.
- The flat area in the quarry floor provided for the construction of a substantial sediment retention basin, which in this case doubles as a water supply for processing and dust suppression.
- Topsoil from future land clearing will be stockpiled and stabilised ready to be used in future rehabilitation works.
- A high-level access road intercepts overland flow and diverts it away from the quarry faces and footprint area.
- Future quarry expansion will seek to develop the upper most bench first and work progressively downslope.

2.2.4 MITIGATING FACTORS

The main mitigating factor is the application of the erosion and sediment control strategy and minimising the area of unrehabilitated land. The following sediment control calculations are based on the ultimate footprint of the Exton Quarry.

2.2.5 SEDIMENT CONTROL CALCULATIONS

TABLE 8: TIME OF CONCENTRATION

Formula $Tc = 91L/(A^{0.1} * Se^{0.2})$	**Flow line L (km)**	**Catchment area A (ha)**	**Equal area Slope Se (m/km)**	**Concentration Tc (min)**
Sediment trap 1	0.100	1.65	500	2.5
Sediment trap 2	0.100	0.66	100	3.8
Sediment trap 3	0.100	1.10	500	2.6

TABLE 9: FLOW RATE

Formula $Q = \frac{C \cdot i \cdot A}{360}$	**Coefficient of runoff C (no units)**	**Intensity of rain event i (mm/hr)**	**Catchment area A (ha)**	**Flow rate Q (m^3/s)**
Sediment trap 1	0.35	151	1.65	0.24
Sediment trap 2	0.35	138	0.66	0.09
Sediment trap 3	0.35	151	1.10	0.16

(B.O.M. (c), 2022)

2.2.5.1 Size of sediment traps

The water storage pond / sediment trap is 600 square metres in area. The storage capacity of the impoundment is estimated to be 325 cubic metres.

The impoundment has spilt inlets and an elongated shape enhancing the settling characteristics. Assign ʎ value 0.7 therefore n value 3.3.

TABLE 10: SEDIMENT TRAP CAPACITIES

	Surface area (m^2)	Volume (m^3)	Storage capacity (m^3)	Hydraulic efficiency (n)
Sediment trap 1	600	225	112	3.3
Sediment trap 2	1,000	375	187	1.69

Sediment trap 3	1,000	375	187	1.69

Sediment trap 1:

Depth of pond (d_p) = 1.5 m, extended depth (d_e) = 0.1 m and retention depth (d*) = 1.0 m.

Sediment trap 2:

Depth of pond (d_p) = 1.5 m, extended depth (d_e) = 0.1 m and retention depth (d*) = 1.0 m.

Sediment trap 3:

Depth of pond (d_p) = 1.5 m, extended depth (d_e) = 0.1 m and retention depth (d*) = 1.0 m.

TABLE 11: CAPTURE EFFICIENCY

Formula $R = 1 - (1 + \frac{1}{n} \times \frac{v_s}{Q/a} \times (\frac{d_e + d_p}{d_e + d^*}))^{-n}$	**Settling velocity (fine silt) v_s (m/s)**	**Surface area a (m2)**	**Flow rate Q (m^3/s)**
Sediment trap 1	0.0018	600	0.24
Sediment trap 2	0.0018	1000	0.09
Sediment trap 2	0.0018	1000	0.16

Sediment trap1 capture efficiency $R = 1 - (1.303 \times 4.5 \times 1.454)^{-3.3} = 0.99$

Sediment trap 2 capture efficiency $R = 1 - (1.5917 \times 20 \times 1.454)^{-1.69} = 0.99$

Sediment trap 3 capture efficiency $R = 1 - (1.5917 \times 20 \times 1.454)^{-1.69} = 0.99$

	Flow rate Q (m3/s)	**Retention basin area from WSUD Figure 4.2 for 90% capture (m^2)** (EPA division, 2012)	**Actual basin surface area (m^2)**
Sediment trap 1	0.24	100	600
Sediment trap 2	0.09	40	1,000
Sediment trap 3	0.16	75	1,000

Assume sediment storage of 50% total capacity (m^3) see Table 10: Sediment trap capacities

TABLE 12: CLEAN OUT FREQUENCY

Formula $F_r = S_t / (A \times R \times L_o)$	**Capture efficiency (R)**	**Contributing catchment, A (ha)**	**Storage volume S_t (m^3)**	**Sediment loading rate L_o (m^3/ha/yr)**	**Desired Cleanout frequency F_r (yrs)**
Sediment trap 1	0.99	1.65	112	10	6.8
Sediment trap 2	0.99	0.66	375	10	57
Sediment trap 2	0.99	1.1	375	10	34

The calculated clean out frequency is 6.8 years for the current sediment trap.

2.1 NET ENVIRONMENTAL IMPACT

The above calculations show the existing water impoundment has sufficient capacity to retain the projected sediment derived from the ultimate area of unrehabilitated land.

However, as stated previously weathered dolerite is associated with fine clays, hence runoff from areas of exposed subsoil will be turbid which will increase turbidity in the sediment traps.

The proposed development of Exton Quarry will split the un-vegetated catchment into three and dramatically increase the sediment storage capacity.

2.3 GROUNDWATER

Groundwater levels and flows commonly appear as a subdued representation of the surface topography. No constructed water bores have been installed close to the Exton Quarry site.

The closest is (Feature ID 42092) at a lower elevation (230 metres AHD) and was sunk to depth of 54 metres but in an entirely different geological formation. This bore encountered groundwater at 45 metres depth. Water bore (Feature ID 42344) was sunk in similar geology to the Exton Quarry and is situated at a high elevation (270 metres AHD). The bore encountered groundwater at 32 metres depth.

The Exton Quarry has not encountered groundwater in the excavation to date and by retaining the floor level and advancing the existing faces back it is unlikely that groundwater will be encountered.

3 NOISE EMISSIONS AND BLASTING

3.1 NOISE FROM OPERATIONS

The proponent engaged a noise consultant to investigate noise emissions from Exton Quarry using the equipment currently used on site and including periodic drilling and blasting as an extractive method. The study culminated in a report *Exton Quarry - Noise Assessment* (Pitt & Sherry, Dec 2022). The entire report is included in this document as Appendix 2.

3.1.1 NOISE PRODUCING EQUIPMENT

The investigation included measurements of the noise produced by the existing equipment on site for normal operations.

TABLE 13: MOBILE EQUIPMENT ON SITE

Equipment	Make	Model	Sound Power Level dB(A)
Wheel loader	CAT	950K	106.1
Excavator	CAT	342DL	107.4
Mobile jaw crusher	Terex Finlay	J1175	115.2
Mobile screen	Terex Finlay	883+	118.6
Rock breaker			120.2
Crusher screen & excavator operating			106.1
Road truck	various		104.0

3.1.2 NEAREST SENSITIVE USES

Existing land uses on surrounding land is represented in Figure 3: General Location Map (Extract from TasMap Topographic) The closest sensitive premises to the Exton quarry is identified as 620 Porters Bridge Road.

Different operations and combinations were modelled resulting in a table (Table 2 – SoundPLAN results for existing and expanded operations on page 6 of (Pitt & Sherry, Dec 2022). The worst effects were modelled as occurring at 620 Porters Bridge Road at a sound power level of 38.4 dB(A).

Limits on noise from quarry operations are set in the *Quarry Code of Practice* which states:

- *45 dB(A) from 0700 to 1900 hours (daytime)*
- *40 dB(A) from 1900 to 2200 hours (evening), and*
- *35 dB(A) from 2200 to 0700 hours the following day (night time)*

When measured as a 10 minute L_{eq}

Exton Quarry is restricted to the *Quarry Code of Practice* preferred operating hours which are from 7:00 am to 7:00 pm. Operations will occur fully in the daytime and a limit of 45 dB(A) applies.

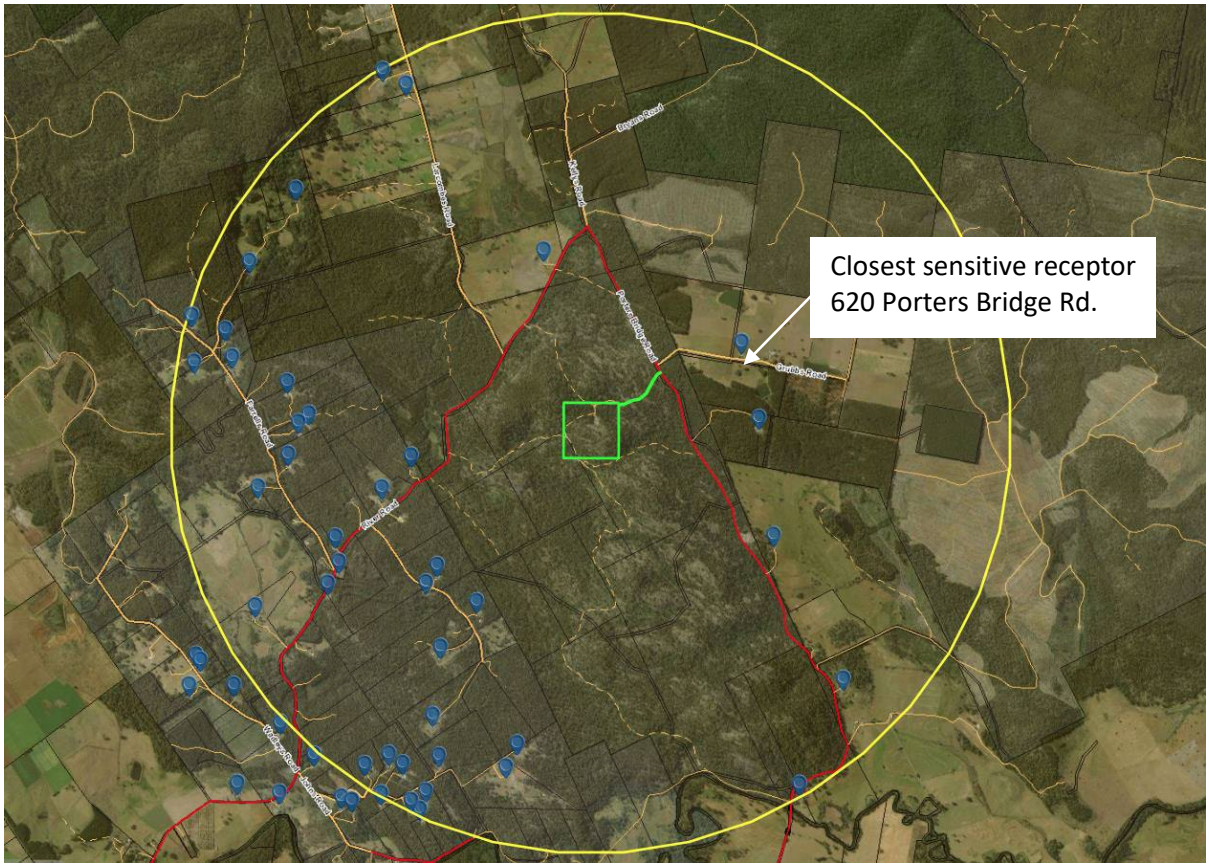


FIGURE 4: SENSITIVE RECEPTORS WITHIN 3 KILOMETRES (EXTRACT FROM P&S REPORT)

3.1.3 Noise mitigation measures

The noise report did not recommend any management measures to mitigate noise emissions:

3.2 Drilling and blasting operations

3.2.1 Blasting emission limits

Limits for blasting on quarry operations are stipulated in the *Quarry Code of Practice:*

Acceptable standard

a) for 95% of blasts, air blast overpressure must not exceed 115 dB (Lin Peak);

b) air blast overpressure must not exceed 120 dB (Lin Peak) at all;

c) for 95% of blasts, ground vibration must not exceed 5 mm/s peak particle velocity; and

d) ground vibration must not exceed 10 mm/s peak particle velocity at all.

Blasting currently occurs at Exton Quarry. Space limitations will restrict the amount of shot rock and processed product that can be stockpiled at any time. The maximum quantity of shot rock that can be accommodated will be around 10,000 cubic metres. The frequency of blasting will increase to between 5 and 10 per year and will be distributed evenly throughout the year. The P&S report uses typical blast plan data to calculate the resultant emissions:

- Ground vibration was modelled at less than 0.1 mm/s and
- Air-blast overpressure was modelled at 106dB

The calculated results show that blasting will result in emissions within the Quarry Code of Practice limits.

MANAGEMENT MEASURE 2: BLAST MANAGEMENT

Item	Proposed measure	Timeframe
2.	A fully certified professional drilling and blasting contractors will be utilised for all blasting. All blasts will be monitored and any exceedance will be reported to the EPA.	During blasting

4 NATURAL VALUES

4.1 NATURAL VALUES ASSESSMENT

The natural values assessment commissioned for this application included a field survey of the mining lease area. The final report, *Natural Values Assessment of Mining Lease 1994P/M, 190 Porters Bridge Road, Exton, Tasmania* (ECOtas, Oct 2022) was finalised on 24 October 2022 and is included in this document as Appendix 3.

4.2 FIELD ASSESSMENT

The field assessment was conducted on 12 October 2022, and covered the entire mining lease area.

4.3 KEY FINDINGS

A summary of the key findings is as follows:

4.3.1 THREATENED FLORA

No individuals or populations of species or communities listed under state or federal legislation were detected.

4.3.2 THREATENED FAUNA

No fauna species listed as threatened under state or federal legislation were detected.

Potential habitat for some listed species was observed, as follows;

- marsupial carnivores (Tasmanian devil, spotted tailed quoll eastern quoll)
- eastern-barred bandicoot
- swift parrot
- grey goshawk
- masked owl
- white-bellied sea-eagle
- wedge-tailed eagle.

4.3.3 VEGETATION TYPES

The site area supports the following vegetation types;

- *Eucalyptus amygdalina* forest and woodland on dolerite (DAD)
- *Eucalyptus obliqua* forest and woodland (DOB)
- *Eucalyptus ovata* forest and woodland (DOV)
- *Eucalyptus amygdalina - Eucalyptus obliqua* forest damp sclerophyll forest (DSC)
- *Eucalyptus obliqua* dry forest with broad-leafed shrubs (WOB)
- rockplate grassland (GRP)
- extra-urban miscellaneous (FUM)
- water, sea (OAQ).

Eucalyptus ovata forest and woodland equates to a native vegetation community listed on Schedule 3A of the Tasmanian *Nature Conservation Act 2002.*

Occurrences of *Eucalyptus ovata* forest and woodland can equate to Tasmanian Forests and Woodlands dominated by Black Gum or Brookers Gum which is identified as a threatened ecological community listed on schedules of the E*nvironment Protection and Biodiversity Conservation Act 1999* (Com).

4.4 PROPOSED CLEARING

Over the life of Exton Quarry, it is proposed that an additional area of 2.52 hectares will be cleared to facilitate development of top benches and intercept drains and two large sediment traps that will double as water storages. The locations of these areas are detailed on Figure 1: Exton Quarry - quarry development plan.

The areas of disturbance have been altered from that originally proposed because of the findings of the Ecological Study. The proposal to develop a large hardstand area between the existing quarry floor and the access road has been abandoned. Instead, the quarry benches and footprint extend further east.

The areas of proposed clearing in different vegetation types (taken from the ecological study) are detailed below:

TABLE 14: AREAS OF CLEARING BY VEG TYPE

Vegetation community	Area cleared for ultimate development
DAD *Eucalyptus amygdalina* forest and woodland on dolerite	1.45 hectares
DOB *Eucalyptus obliqua* forest and woodland	0.11 hectares
DSC *Eucalyptus amygdalina - Eucalyptus obliqua* forest damp sclerophyll forest	0.04 hectares
FUM extra-urban miscellaneous	0.89 hectares

4.5 RECOMMENDATIONS

Below is a summary of the report recommendations:

- Vegetation types – Areas mapped as Eucalyptus ovata forest and woodland must be excluded from future expansion and managed to minimise the risk of degradation.
- Threatened flora – no special management recommended.
- Threatened fauna – refer to management of areas mapped as DOV as also preserving habitat for swift parrot.
- Weed and disease management – The site is largely weed free; it is recommended that the few plants of gorse be appropriately managed with application of herbicide. Any disturbance to the areas where gorse is currently present shall be avoided to prevent spreading the weed seed present under these plants further.
- Protocols to manage hygiene on vehicles and machinery shall be employed to minimise the risk of importing weeds and disease to the site.
- Specific weed management actions should be incorporated into future management of the mining lease area.

4.6 POTENTIAL IMPACTS

4.6.1 FLORA AND FAUNA

The ecological report suggests that impacts on threatened flora and fauna is unlikely.

4.6.2 VEGETATION COMMUNITIES

The ecological report suggests that the only potential impact of the proposal came because of the development of the hard stand area which would have caused loss of an important vegetation community. The alternative proposal restricts loss of this community to an absolute minimum, see Table 14: areas of clearing by Veg type.

4.6.3 ROADKILL (MARSUPIAL CARNIVORES)

The ecological study found that an increase in road kill because of this proposal is unlikely. The Operator will apply a maximum speed limit of 40 km/hr on the access road from the quarry to Porters Bridge Road.

MANAGEMENT MEASURE 3: ROAD KILL MANAGEMENT

Item	Proposed measure	Timeframe
3.	A 40 km/hr speed limit will be imposed on the quarry access road to mitigate the risk of increased road kill on this road.	On issue of a permit
4.	The high-level access road will be constructed outside the wedge-tailed eagle breeding season (July to February).	On issue of a permit
5.	Vehicles, equipment and pedestrians will not stop on the section of high-level access road near to the tight bend at any time.	On issue of a permit

4.6.4 RAPTORS

The ecological study found that nest 125 has the highest potential for disturbance because of expanded quarrying activities. This nest site is located 450 metres away from the quarry. Figure 1: Exton Quarry - quarry development plan shows the quarry development will stop at a point below the crest of an existing ridgeline on the southwestern side. This is the alignment of the high-level access road. By maintaining the ridgeline quarry operations will remain screened by topography as well as vegetation from all vantage point south west of the site. The high-level access road will be constructed to allow access for equipment for drilling and to load holes with explosives. The construction of this road will occur outside the normal wedge-tailed eagle breeding season (July to February). The exposed portion of the access road is proximate to the tight bend and no vehicles, equipment or pedestrians will stop on this section of road.

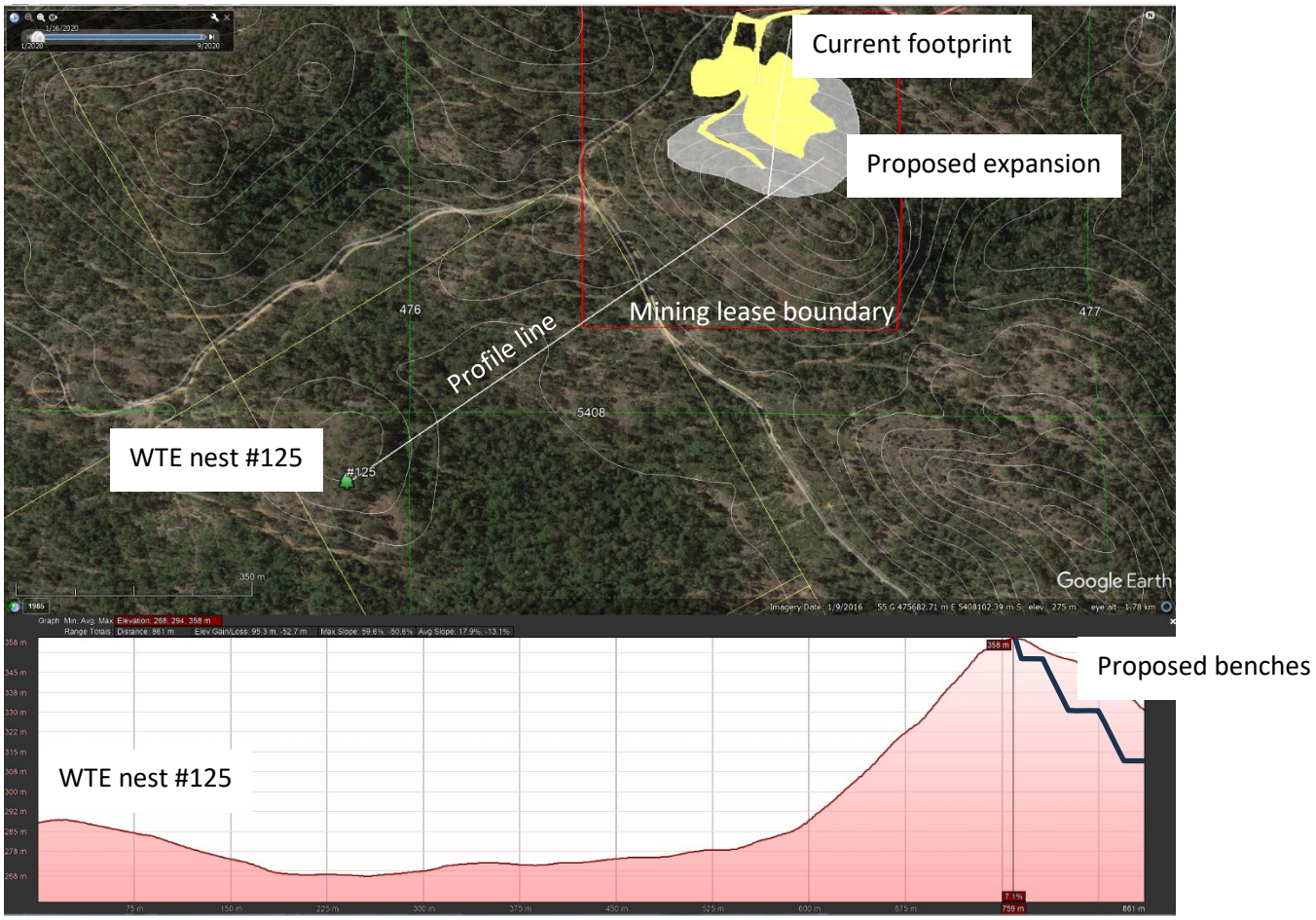


FIGURE 5: ELEVATION PROFILE #125 TO QUARRY (EXTRACT - GOOGLE EARTH)

The elevation profile Figure 5 shows the terrain surface profile on a direct line between the quarry and the site of wedge-tailed eagle nest #125. Superimposed on the profile is the planned extent of the extraction under this proposed expansion. As stated above the design retains the crest of the ridge providing a 'topographic' screen between the quarry and the nest without relying on vegetation.

Figure 6 shows the view for a point 18 metres above the location point recorded for wedge-tailed eagle nest #125 looking towards Exton Quarry. The topographic information is derived from Google

Earth (terrain), the nest location is derived from the latest observation dated 23 November 2023 which is still recorded as having a horizontal accuracy of 1,000 metres.

Using this information the limit of the extent of clearing for the proposed expansion is just visible (yellow) on the ridgeline but this analysis does not include any vegetation whereas it is known that undisturbed side of the ridge has tall forest ground cover, as can be seen in the photograph on the front page of this document.

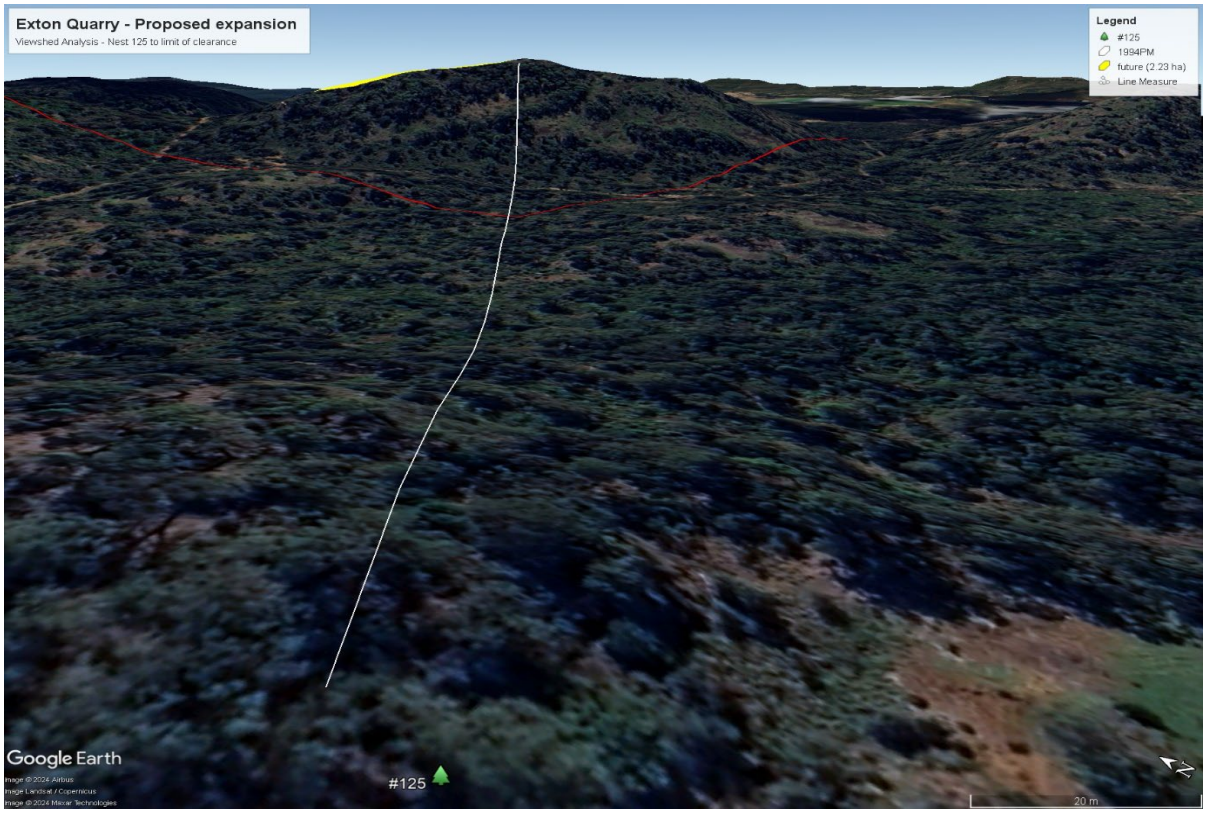


FIGURE 6: NEST 125 TO EXTON QUARRY (GOOGLE EARTH)

Observations during the ground survey for threatened species and vegetation mapping indicates that the nest is not active. The report suggests that if the proposed development does not occur within 2 years of the current study a new search will be required.

The ecological report stated that there is potential habitat for masked owl within *Eucalyptus obliqua* forest near the quarry. The Operator engaged a zoological consultant to conduct a passive observation survey around the perimeter of the quarry to identify any actual evidence of masked owl activity. The findings and conclusions of the report of the masked owl survey are summarised below, the report is included as Appendix 4.

- The survey was conducted on a night when conditions for observation of masked owl were ideal.
- The area of observation was small in a much larger area which is superficially suitable for masked owl breeding.
- Based on the results of the survey it is unlikely that masked owls are breeding in the area surveyed.

(Mooney, Nov 2023)

4.6.5 OTHER VALUES

There are no geo-conservation sites listed in proximity to the Exton Quarry. Mapping indicates the substrata is generally Jurassic dolerite and hence is unlikely to contain karst. The closest listed watercourse is off site and a considerable distance (over 600 metres through dense vegetation) from the discharge point of the quarry's proposed surface water management system.

2.2 LEGISLATIVE AND POLICY

A referral to the commonwealth government in relation to the *Environment Protection and Biodiversity Conservation Act 1999* is not required if the DOV community can be excluded from disturbance and appropriately managed.

No permit is required under the *Threatened Species Protection Act 1995*.

5 WEEDS, PESTS AND PATHOGENS

The following weeds have been observed within 5 kilometres of the site:

TABLE 15: WEED SPECIES WITHIN 5 KILOMETRES (NVA)

Species	Common name	WMA 1999	WONS
Bassia scoparia	copper saltbush	Yes (zone A)	no
Erica lusitanica	spanish heath	yes	no
Ilex aquifolium	holly	yes	no
Onopordum acanthium	scotch thistle	Yes (zone A)	no
Prunus laurocerasus	cherry laurel	no	no
Rubus echinatus	blackberry	Yes (zone B)	yes
Rubus fruticosus	blackberry	yes (zone B)	yes
Senecio jacobaea	ragwort	Yes (zone B)	no
Ulex europaeus	gorse	Yes (zone B)	yes

The Ecologist incorporated observations for weed species on the site as part of the ecological study. The results of that investigation follow:

5.1.1 WEEDS

One weed species classified as declared weeds under the Weed Management Act 1999 was detected within the study area;

- *Ulex europaeus* (gorse)

The few gorse plants detected in the survey have been removed. Any further germination of gorse plants particularly in the location they were detected but more generally around the site will be treated by either foliar spray or cut and paint methods as appropriate.

5.1.2 Plant disease

The site presented no evidence of the following plant diseases;

- *Phytophthora cinnamomi* (root rot),
- myrtle wilt, or
- myrtle rust.

5.1.3 Animal disease

The study area is not known to support frog chytrid disease but does contain localised habitat suitable for amphibian species.

6 Waste

6.1 Waste from extraction

The new area for development for the Exton Quarry has a sparce vegetation with large areas of exposed rock outcrops. Extractive operations will generate a small amount of stripping, topsoil and overburden which will be used to provide an even gradient on the top bench access track.

The source rock is igneous and unlikely to contain pyrite or any other potentially acid forming mineral.

6.2 Spares and litter

Machinery will be taken off site to the Operator's workshops for servicing and maintenance. Spares or waste generated through breakdowns or routine lubrication will be retained in workers utilities and taken off-site at the end of each working day.

Litter emanating from lunches and other amenities will be retained in enclosed containers and periodically disposed of to an approved disposal site.

7 Environmentally hazardous substances

7.1 Hydrocarbons

Mobile equipment will be refuelled using a utility mounted refuelling facility. Lubricants, engine oil and hydraulic fluid for daily maintenance will be stored on a bunded pallet within a storage shed

7.2 Leak and spills

The Operator will retain a hydrocarbon spill kit onsite ready for immediate deployment if a hydrocarbon leak or spill occurs. A hydrocarbon boom will be retained onsite for deployment across the surface of the sediment trap should a hydrocarbon spill or leak enter the sediment control infrastructure.

7.3 OTHER HAZARDOUS SUBSTANCES

Explosives will not be stored onsite. The Blasting Contractor will retain responsibility for explosives and will bring to site only those required for the planned shot. The Blasting Contractor will be fully accredited and insured for the transport and handling of explosives.

MANAGEMENT MEASURE 4: HYDROCARBON MANAGEMENT

Item	Proposed measure	Timeframe
6.	A hydrocarbon spill kit and a hydrocarbon boom will be retained on-site ready for immediate deployment in the event of a leak or spill.	At all times

8 SITE CONTAMINATION

Exton Quarry has been operated by the current operator continuously on this site for 18 years. Prior to development as a quarry the site was native forest which was subjected to periodic selective logging. The Operator is not aware of any event that may have led to site contamination.

9 OTHER OFF-SITE IMPACTS

The increase in annual capacity of the Exton Quarry will increase the volume of traffic including heavy vehicle traffic on Porters Bridge Road. The impact of the additional traffic on Porters Bridge Road will be considered as part of a Development Application which will be lodged during this approval process.

10 MONITORING

No routine monitoring will be undertaken during operations. Extraordinary monitoring will be undertaken to observe the condition of stormwater runoff control infrastructure, prevailing air quality conditions and the presence of weeds.

10.1 SEDIMENT TRAP / WATER STORAGE IMPOUNDMENT

The Operator will observe the level of accumulated sediment in the water impoundment ponds and drainage channels. Once the level of accumulated sediment in the traps or drains has risen to half the full water level, the sediment trap or drain will be cleaned out.

10.2 DUST IMPACTS

The quarry operator will observe dust conditions in dry and windy conditions. If dust is observed within the quarry operations area, a series of dust suppression activities will be implemented including:

- Sprinklers on the product stockpiles will be deployed.

10.1 WEEDS

During normal operations the operator, employees and contractors will observe the quarry stockpiles and surrounding areas for emergent weeds and if present initiate controls as required.

11 DECOMMISSIONING AND REHABILITATION

11.1 PROGRESSIVE REHABILITATION

Exton Quarry will continue to be developed as an intermittent operation. The increased production will be realised by more intensive and longer duration productive campaigns. The product produced in these campaigns will be stored on-site in stockpiles. The need for hard stand areas for stockpiles will constrain the area available for progressive rehabilitation.

The base area of a 1,000 cubic metres of product in stockpile is approximately 625 square metres. A substantial hard stand area is required to stockpile aggregates with traffic manoeuvring areas from a single production campaign.

11.2 DECOMMISSIONING

When quarry closure is pending the Operator will introduce an intermediate bench into any operating quarry face higher than 5 metres or overburden will be placed against the toe of the face to reduce the height to 5 metres and provide a growing medium.

Once all remaining marketable materials have been recovered;

- all machinery, sheds and equipment will be removed from the site.
- remaining overburden and topsoil stockpiles will be spread across the floor of the quarry,
- the impoundment pond will be cleaned out and the spoil used in rehabilitation works,
- quarry access road and any side tracks and hard stands will be ripped to facilitate infiltration,
- any seed slash resulting from clearing for the final shot will be spread over the floor surface, and
- the access will be secured against unauthorised entry.

12 MONITORING

Inspection	Action
Emerging weeds	Weed control using herbicide spray or cut and paint
Water impoundment will be inspected for capacity	Clean out if accumulated sediment has reduced trap effectiveness.
Planting and natural recruitment revegetation	Broadcast native seed mix if revegetation is not successful. In fill planting if losses exceed 50 %.

13 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

Greenhouse gas emissions associated with the quarrying are attributable to diesel fuel used to energise mobile equipment and machinery and transport of materials to project sites. Normally transport emissions are registered against the construction project rather than the quarry.

Fixed plant crusher / screener plants are commonly energised with electrical power, which in Tasmania is predominantly generated using renewable energy. The fixed plant quarries have an advantage in terms of greenhouse gas emissions over mobile crushers and screens.

The greenhouse gas deficit as a result of using fossil fuel to energise the plant is offset by overall efficiency of supplying regional project locally significantly reducing greenhouse gas emissions associated with transport.

PART D SUMMARY OF PROPOSED MANAGEMENT MEASURES

Item	Proposed measure	Timeframe
1.	The quarry operator will introduce active mitigation measures to prevent a visible dust plume crossing the mining lease boundary.	
2.	A fully certified professional drilling and blasting contractors will be utilised for all blasting. All blasts will be monitored and any exceedance will be reported to the EPA.	
3.	A 40 km/hr speed limit will be imposed on the quarry access road to mitigate the risk of increased road kill on this road.	During blasting
4.	The high-level access road will be constructed outside the wedge-tailed eagle breeding season (July to February).	On issue of a permit
5.	Vehicles, equipment and pedestrians will not stop on the section of high-level access road near to the tight bend at any time.	On issue of a permit
6.	A hydrocarbon spill kit and a hydrocarbon boom will be retained on-site ready for immediate deployment in the event of a leak or spill.	At all times

PART E PUBLIC AND STAKEHOLDER CONSULTATION

The Meander Valley local government area uses the Tasmanian Planning Scheme (TPS) with the Meander Valley Local Provisions. In Table 6.2 Use Classes of the TPS, quarries are included in the Extractive Industries category. The land on which the proposal is based is mapped as being within the 20. Rural Zone by the TPS. Use Table 20.2 includes Extractive Industry in the Permitted class, therefore a permit from the Meander Valley Council is required.

The Exton Quarry has a permit issued by the Meander Valley Council, Planning Application number 56/95/5. Condition 2. of that permit states that the "*development shall be in accordance with the application and generally consistent with the conditions imposed by the Department of Environment and Land Management, Division of Environmental Management."*

The conditions referred to above were varied by the Environment Protection Notice No. 9502/1. Condition Q1 Regulatory Limits requires that an annual limit on processing rocks and minerals is restricted to 13,235 cubic metres. This application seeks to vary that limit to 50,000 cubic metres of rock processed per year. A quarry processing rock at a rate greater than 1,000 cubic metres per year is classified under Schedule 2 of the *Environmental Management and Pollution Control Act 1995* (EMPC Act) as Level 2. Under EMPC Act Section 25. an application for a permissible Level 2 Activity must be delt with under Section 57 of the *Land Use Planning and Approvals Act 1993* (LUPA Act).

This section requires that the application is treated as discretionary and hence the planning authority must advertise the application and call for representations. The application is also directed to the Board of the Environment Protection Authority for consideration.

Stakeholders that have been consulted through this process include the following:

- Meander Valley Council has been consulted regarding the status of the existing quarry permit and consideration of the Development Application.
- The Board of the Environment Protection Authority (EPA) through this Environment Effects Report.
- Mineral Resources Tasmania has been consulted through the assigned Leasing Officer.
- Aboriginal Heritage Tasmania was asked to consider the heritage significance of the site, and replied with advice that disturbance was unlikely see Appendix 5.

During the subsequent application assessment process these additional stakeholders will be consulted:

- Meander Valley Council regarding traffic implications on Porters Bridge Road.
- Policy and Conservation Advice Branch of DPIPWE about potential impacts on native vegetation.
- Any property owners that share a boundary with the development site through a direct notice from the Planning Authority.

14 REFERENCES

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